Chapter 1

Assessing Capabilities, Staff Competency, and User Satisfaction

WORK PAPER 1-1   Self-Assessment on Software Testing Environment

ITEMS TO ADDRESS ON TEST ENVIRONMENT PLANNING	YES	NO	COMMENTS
1. Does your IT organization have a policy on software testing?			
2. Does your software testing organization have a test strategy?			
3. Does your software testing organization have software processes and tools to support that testing strategy?			
4. Does your software testing approach include both verification and validation testing (i.e., testing the software in both a static and executable mode)?			
5. Does your testing strategy address the various roles that testing can assume, and determine which of those roles will be incorporated into your organization's testing strategy (e.g., testing user needs in addition to software specifications)?			
ITEMS TO ADDRESS ON MANAGEMENT SUPPORT	YES	NO	COMMENTS
1. Does management provide the resources necessary (including calendar time) to adequately train, plan, conduct, and evaluate results for software testing assignments?			
2. Are testers involved from the inception through termination of software projects to ensure that testing concerns are continuously addressed?			
3. Does management allocate as many resources to the test processes and tools as it does to the development process and tools?			
4. Does management spend as much time on test planning and test execution as it does on development planning and development execution?			
5. Is management knowledgeable and sufficiently trained in test theory, processes, and tools to effectively manage test planning and execution, and understand and effectively act on test results?			

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1

	ITEMS TO ADDRESS ON THE USE OF TEST PROCESSES	YES	NO	COMMENTS
1.	Do testers follow processes to plan tests, prepare test data, execute tests, and develop and report test results?			
2.	Can testers correctly interpret documented test processes so that the test procedures can be followed as intended?			
3.	Do the processes provided for testing cover all the activities that are needed to perform effective testing?			
4.	Has a plan been developed and put in place to mature the test processes so that they become more effective and efficient and are performed on time?			
5.	Do the owners/users of the test processes (the testers) build the processes used for testing?			
	ITEMS TO ADDRESS ON TEST TOOLS	YES	NO	COMMENTS
1.	Do testers use an automated tool to generate and reuse test data?			
2.	Are test tools selected in a logical manner?			
3.	Can testers use test tools only after they have received adequate training in how to use them?			
4.	Is test tool usage specified in the test plan?			
5.	Has a process for obtaining assistance in using test tools been established, and does it provide testers with the needed instructional information?			

	ITEMS TO ADDRESS ON TEST TRAINING	YES	NO	COMMENTS
1.	Does a career training plan for testers exist, and is it in use to develop a tester from an unskilled state to a master tester state?			
2.	Are testers adequately trained in test processes before using those processes for testing?			
3.	Are testers trained in the theory of testing, risk analysis, the various approaches to testing, and so forth so that they understand "why" they perform certain test tasks?			
4.	Are testers trained in statistics so that they understand the level of confidence they can provide a user by different test approaches and how to interpret test results?			
5.	Are testers trained in how to measure process performance, and do they use the results of that measurement to improve the test processes?			
	ITEMS TO ADDRESS ON USER SATISFACTION	YES	NO	COMMENTS
1.	Do users get the information they need to track test progress and assess results prior to placing software into production?			
2.	Are surveys conducted to determine user satisfaction with test planning, test execution, test results, communications, and so forth?			
3.	Do users participate in tests that determine whether the software is acceptable for use?			
4.	Are users presented with a plan for testing, and do they "approve" (i.e., agree) that if that plan is followed, they will consider testing to be satisfactory?			
5.	Are the user support activities (such as data entry, output usage, terminal usage, manual usage, and so forth) validated as part of testing?			

(continues)

WORK PAPER 1-1 *(continued)*

	ITEMS TO ADDRESS TO TEST MEASUREMENT	YES	NO	COMMENTS
1.	Does a set of test measures and metrics exist, and are they used to measure the efficiency and effectiveness of software testing?			
2.	Has a measurement process been installed to measure the efficiency of the test processes?			
3.	Is compliance to the budget and schedule measured and variances addressed effectively?			
4.	Is tool usage measured to assess the contribution received from automated testing?			
5.	Is the percentage of defects removed versus the total defects eventually attributable to a development phase measured?			
	ITEMS TO ADDRESS TO TEST QUALITY CONTROL	YES	NO	COMMENTS
1.	Are defects made by testers during testing recorded and effectively addressed?			
2.	Is the test plan reviewed/inspected during/after completion by peers for adequacy and compliance to test standards?			
3.	Does the test plan include the procedures that will be used to verify that the plan is executed in accordance with the plan?			
4.	Are regular reports prepared that show the full status of testing individual software systems?			
5.	Are the individual quality control reports periodically summarized to show the efficiency and effectiveness of testing in the entire information services organization?			

WORK PAPER 1-2   Test Environment Assessment Footprint Chart

Management Support for Test

Test Environment Planning

Use of Test Processes

Test Quality Control

Test Tools

User Satisfaction with Test

Test Training

Test Measurement
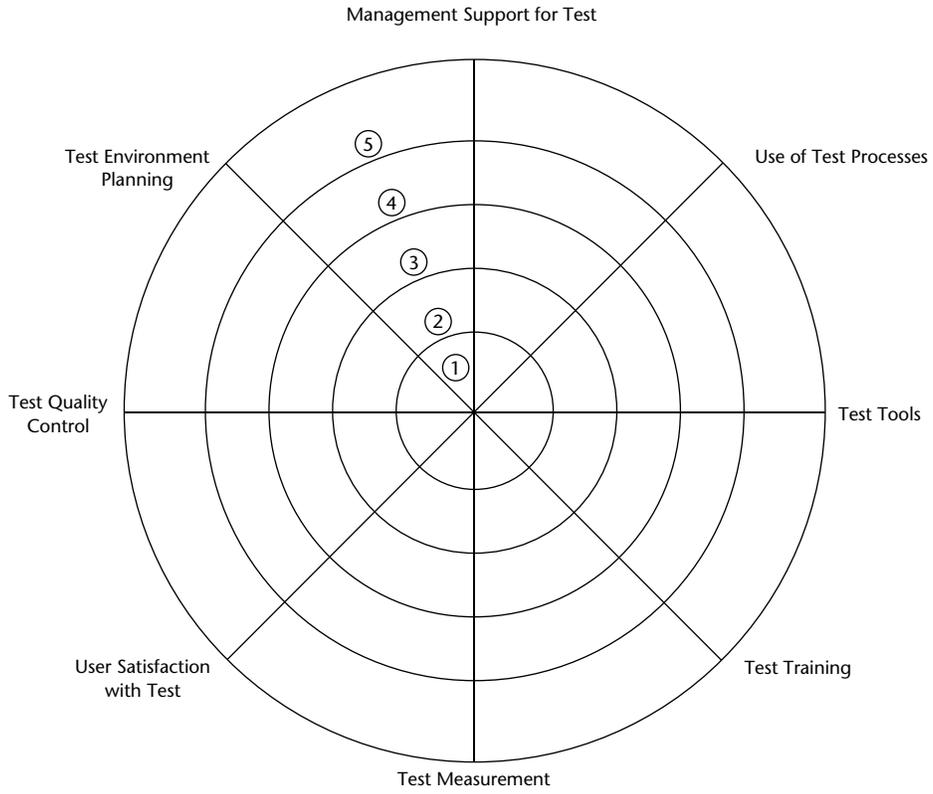
WORK PAPER 1-3   Self-Assessment on Test Processes

| ITEMS TO ADDRESS ON PREPARING FOR A SOFTWARE TESTING PROJECT	YES	NO	COMMENTS
1. Have the objectives and requirements for this software system being developed been defined?			
2. Are the requirements testable?			
3. Have adequate time and resources been allotted for both development and testing?			
4. Has the process to be used for testing software been defined?			
5. Are the testers familiar with the methodology that will be used to develop the software?			
ITEMS TO ADDRESS ON TEST PLANNING	YES	NO	COMMENTS
1. Have the risks associated with the software been defined?			
2. Have the test objectives been defined?			
3. Do the testers have a well-structured process to follow to develop the test plan?			
4. Have the constraints that will be imposed on testing been defined?			
5. Does the test plan include a matrix that relates the test objectives to the tests that will be conducted?			
ITEMS TO ADDRESS ON TEST EXECUTION	YES	NO	COMMENTS
1. Is there a process to follow to design test data?			
2. Will verification testing be performed during the requirements phase of development?			
3. Will verification testing be performed during the design and build phases of development?			
4. Is a process in place to record and track defects?			
5. Will test execution be performed in accordance with a plan included in the test plan?			

(continues)

ITEMS TO ADDRESS ON ACCEPTANCE TESTING	YES	NO	COMMENTS
1. Have the users defined acceptance criteria?			
2. Do the users have a planning process to follow in developing an acceptance test plan?			
3. Do the users have the competencies needed to conduct acceptance testing? (Note that the competencies may include professional software testers involved in acceptance testing)			
4. Will acceptance testing simulate real-world processing conditions?			
5. Prior to acceptance testing, has the user determined the actions that will be taken based on the software meeting or not meeting the acceptance test criteria?			

ITEMS TO ADDRESS ON TEST ANALYSIS AND REPORTING	YES	NO	COMMENTS
1. Will test reporting be tied to the testing plan as defined in the test plan?			
2. Will test reporting follow the test plan's reporting standards?			
3. Will both interim and final test reports be issued?			
4. Will reporting report back on status of the function/test matrix included in the test plan?			
5. Will the test report include an analysis and recommendation by the software test team?			

(continues)

WORK PAPER 1-3 *(continued)*

ITEMS TO ADDRESS ON TESTING SOFTWARE INSTALLATION	YES	NO	COMMENTS
1. Does a software configuration plan exist and is that plan effective and operational?			
2. Does version control exist as part of the software configuration management plan?			
3. Does the installation plan include the appropriate training and use of personnel?			
4. Have all the interfaces to other software systems been identified and addressed in the installation process?			
5. Will the installed software be tested to ensure its correct prior to moving to an operational status?			
ITEMS TO ADDRESS ON POST-TEST ANALYSIS	YES	NO	COMMENTS
1. Will an analysis of the testing process be conducted after the software is placed into an operational status?			
2. Will that analysis include the operational results of the software?			
3. Will that analysis identify good and bad testing practices?			
4. Does that analysis include a set-up matrix that will be used to quantitatively assess the effectiveness of testing?			
5. Is there a process to incorporate the results of a post-test analysis into a process to improve the software testing process?			

WORK PAPER 1-4 Test Process Assessment Footprint Chart

Prepare for a software
testing project

Conducting test
planning

Test environment
planning

Executing the
test plan

Post-test
analysis

Conducting
acceptance testing

Testing
software
installation

Analyzing test results
and preparing reports

1

2

3

4

5
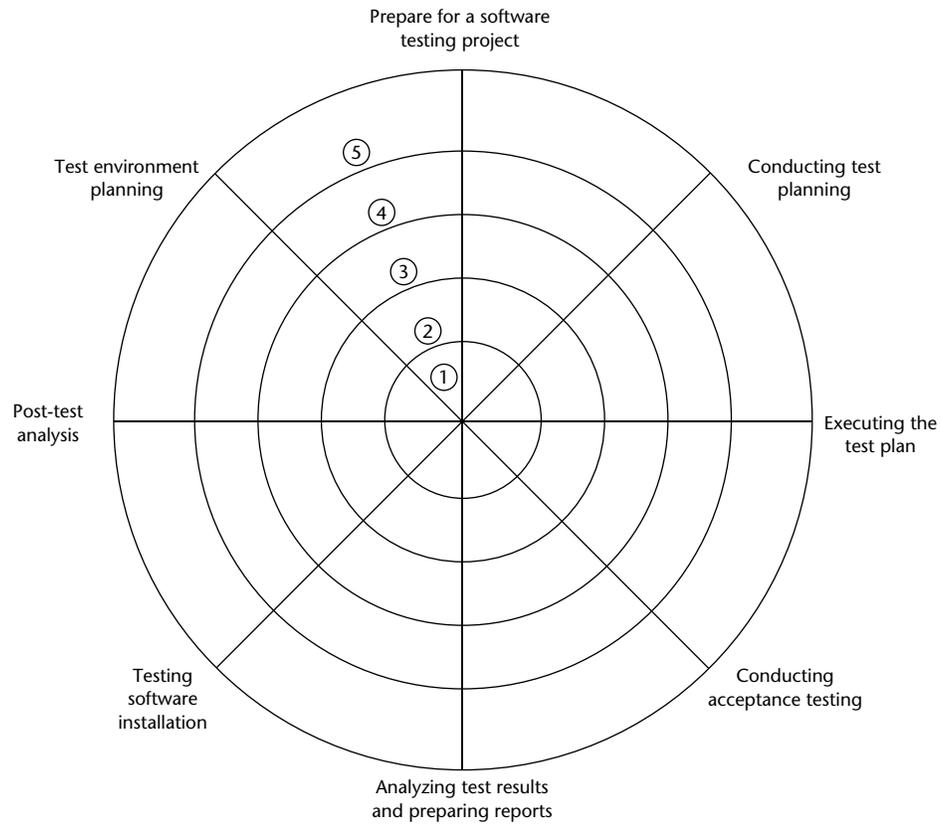
WORK PAPER 1-5 Self-Assessment on Tester Competency

ITEMS TO ADDRESS FOR SOFTWARE TESTING PRINCIPLES AND CONCEPTS	YES	NO	COMMENTS
1. Are you familiar with the technical terms used to describe various testing techniques, tools, principles, concepts and activities?			
2. Do you have knowledge of the different levels of testing, such as unit testing?			
3. Do you have an understanding of the multiple roles of software testers, including testing against specifications and testing to meet users' needs?			
4. Do you understand the "V" concept of testing?			
5. Do you understand the tester's workbench, meaning that you understand the process by which the testing task is performed?			
ITEMS TO ADDRESS FOR BUILDING THE TEST ENVIRONMENT	YES	NO	COMMENTS
1. Do you understand the concepts of policies, standards and procedures and their integration into test processes?			
2. Do you understand how to select processes for performing the test activities?			
3. Do you understand how to adapt a test environment to different software development methodologies?			
4. Do you understand a process for acquiring and deploying test tools?			
5. Do you understand what management must do in order to create a work environment in which testers are motivated to do the right thing in an efficient and effective manner?			

(continues)

WORK PAPER 1-5   *(continued)*

ITEMS TO ADDRESS FOR MANAGING THE TEST PROJECT	YES	NO	COMMENTS
1. Do you possess the necessary communication skills to effectively manage a test project?			
2. Do you possess the personal effectiveness skills, such as negotiation, to effectively manage the test project?			
3. Do you have the test administration skills, such as budgeting and scheduling, to effectively administer the test project?			
4. Do you have the skills to ensure that the test plan and processes used in the project will be in line with the organizational goals, user business objectives, release cycles, and different development for methodologies?			
5. Do you have the skills needed to develop working relationships with users and other stakeholders in the testing process?			
ITEMS TO ADDRESS FOR TEST PLANNING	YES	NO	COMMENTS
1. Do you understand the methods for performing risk analysis?			
2. Do you know how to estimate the magnitude of risks?			
3. Do you know how to develop a test plan that meets industry test plan standards?			
4. Are you competent in software configuration management, change management, and version control?			
5. Can you develop test objectives and acceptance criteria for a project being tested?			

(continues)

WORK PAPER 1-5 *(continued)*

	ITEMS TO ADDRESS FOR EXECUTING THE TEST PLAN	YES	NO	COMMENTS
1.	Do you have the skills necessary to design test data and test scripts?			
2.	Can you develop a test cycle strategy that will determine the number of test cycles to be conducted and what type of testing will occur during these cycles?			
3.	Do you know the type of information that must be recorded to effectively document test results?			
4.	Do you understand the process that testers should follow in recording and monitoring the resolution of defects?			
5.	Do you understand what is necessary to test changes introduced to software testing after you have started testing?			
	ITEMS TO ADDRESS FOR TEST ANALYSIS AND REPORTING	YES	NO	COMMENTS
1.	Do you understand the difference between a measure and a metric?			
2.	Do you know how to report results of testing that is consistent with the IT industry test reporting standards?			
3.	Are you familiar with, and can you calculate the more common metrics used in testing, such as defect removal efficiency?			
4.	Do you know the type of information that must be gathered during testing to enable test reports to provide the information projects need to assess their readiness to be placed into operation, such as code coverage and requirements coverage?			
5.	Do you have a knowledge of the tools needed to develop effective test reports, such as statistical analytical tools?			

(continues)

|	ITEMS TO ADDRESS FOR USER ACCEPTANCE TESTING	YES	NO	COMMENTS
1.	Do you understand the differences between the system test and acceptance test?			
2.	Can you create "use case" test conditions?			
3.	Do you understand the user's role and the software tester's role in acceptance testing?			
4.	Can you develop, in conjunction with users, an acceptance test plan that is consistent with the industry standards for acceptance test plan?			
5.	Do you know how to develop user acceptance criteria that are verifiable?			
	ITEMS TO ADDRESS FOR TESTING SOFTWARE DEVELOPED BY OUTSIDE ORGANIZATIONS	YES	NO	COMMENTS
1.	Do you know the difference between software developed in-house and software developed by outside organizations?			
2.	Are you familiar with the process that would enable you to effectively test commercial off-the-shelf (COTS) software?			
3.	Are you knowledgeable in a process that would enable you to assess the software testing capabilities of an outside organization being considered for outsourcing?			
4.	Are you knowledgeable in the process that would enable you to test new versions of software acquired from outside organizations?			
5.	Do you know the risks/concerns associated with acquiring COTS software?			

WORK PAPER 1-5   *(continued)*

ITEMS TO ADDRESS FOR TESTING SOFTWARE CONTROLS AND THE ADEQUACY OF SECURITY PROCEDURES	YES	NO	COMMENTS
1. Are you knowledgeable in the vocabulary of internal control and security?			
2. Are you knowledgeable in the industry-accepted model for internal control?			
3. Are you knowledgeable in how to test systems of internal control in software business applications?			
4. Do you understand the relationship between risk and control?			
5. Are you knowledgeable in how to test the adequacy of security in a business application software system?			
ITEMS TO ADDRESS FOR TESTING NEW TECHNOLOGIES	YES	NO	COMMENTS
1. Do you understand how to test new application architecture?			
2. Do you know how to test new application business models?			
3. Do you know how to test new communication methods?			
4. Do you know how to test new hardware technologies?			
5. Do you know how to evaluate the effective integration of new technologies into an organization's IT policies and procedures?			

Test new technologies — Test principles — Build test environment — Manage test project — Plan test — Execute test — Analyze and report test — Accept test — Test software developed outside organization — Test controls and security
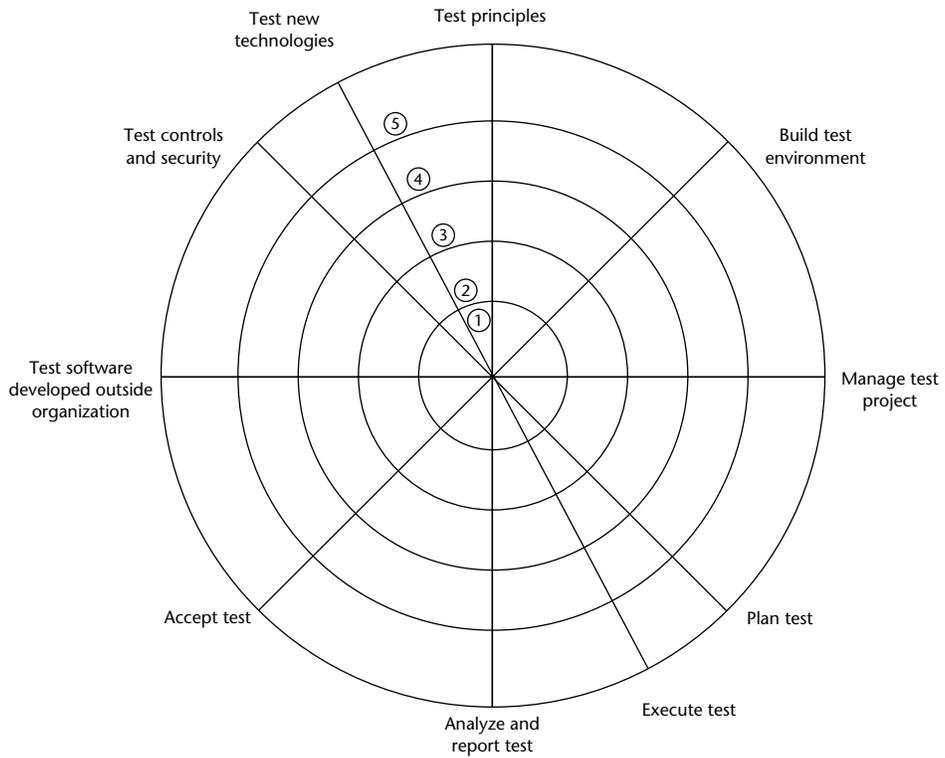
Chapter 2

Creating an Environment
Supportive of Software Testing

WORK PAPER 2-1 Test Factor/Risk Ranking

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Number	A sequential number identifying the 15 test factors described in this chapter.
Test Factor	The 15 test factors described in this chapter.
Factor Rank	Rank the most important test factors, ideally 1 through 15; but in practice, this has proven difficult. As an alternative, pick the top five without ranking them; for example, just indicate a check in the Factor Rank column. Or rank five of them high, five medium, and five low.
Ranking Rationale	Explain why a particular test factor was ranked as indicated. For example, if accuracy was ranked as the number 1 factor, the ranking rationale might explain that outputs would be sent to governmental agencies that have viewed incorrect reports negatively.

NUMBER	TEST FACTOR	FACTOR RANK	RANKING RATIONALE
1	Accuracy		
2	File Integrity		
3	Authorization		
4	Audit Trail		
5	Processing Continuity		
6	Service Levels		
7	Access Control		
8	Compliance		
9	Reliability		
10	Ease of Use		
11	Ease of Maintenance		
12	Portability		
13	Coupling		
14	Performance		
15	Ease of Operation		

WORK PAPER 2-2   Test Factors/Test Phase/Test Concerns

TEST PHASE TEST FACTORS (RANKED HIGH TO LOW)	REQUIREMENTS	DESIGN	PROGRAM	TEST	INSTALLATION	MAINTAINENANCE
Factors or Risks				*Test Concerns*		

Chapter 3

Building the Software Testing Process

WORK PAPER 3-1   Structural Risk Assessment

TEST DOCUMENT
Structural Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
1. Amount of time since last major change to existing area of business		3
• More than 2 years	L=1	
• 1 to 2 years; unknown	M=2	
• Less than 1 year	H=3	
• No automated system	H=3	
2. Estimated frequency of change to proposed/existing systems		3
• No existing automated system; or development effort insufficient for estimate	NA=0	
• Fewer than 2 per year	L=1	
• 2 to 10 per year	M=2	
• More than 20 per year	H=3	
3. Estimated extent of total changes in business area methods in last year in percentage of methods affected		3
• No changes NA=0		
• Less than 10%	L=1	
• 10 to 25% M=2		
• More than 25%	H=3	
4. Magnitude of changes in business area associated with this project		3
• Minor change(s)	L=1	
• Significant but manageable change	M=2	
• Major changes to system functionality and/or resource needs	H=4	
5. Project performance site		2
• Company facility	L=1	
• Local noncompany facility	M=2	
• Not in local area	H=5	
6. Critical staffing of project		2
• In-house	L=1	
• Contractor, sole-source	M=2	
• Contractor, competitive-bid	H=6	
7. Type of project organization		2
• Line and staff: project has total management control of personnel	L=1	
• Mixture of line and staff with matrix-managed elements	M=2	
• Matrix: no management control transferred to project	H=3	

TEST DOCUMENT
Structural Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
8. Potential problems with subcontractor relationship		5
• Not applicable to this project	NA=0	
• Subcontractor not assigned to isolated or critical task: prime contractor has previously managed subcontractor successfully	L=1	
• Subcontractor assigned to all development tasks in subordinate role to prime contractor: company has favorable experience with subcontractor on other effort(s)	M=2	
• Subcontractor has sole responsibility for critical task; subcontractor new to company	H=3	
9. Status of the ongoing project training		2
• No training plan required	NA=0	
• Complete training plan in place	L=1	
• Some training in place	M=2	
• No training available	H=3	
10. Level of skilled personnel available to train project team		3
• No training required	NA=0	
• Knowledgeable on all systems	L=1	
• Knowledgeable on major components	M=2	
• Few components understood	H=3	
11. Accessibility of supporting reference and or compliance documents and other information on proposed/existing system		3
• Readily available	L=1	
• Details available with some difficulty and delay	M=2	
• Great difficulty in obtaining details, much delay	H=3	
12. Status of documentation in the user areas		3
• Complete and current	L=1	
• More than 75% complete and current	M=2	
• Nonexistent or outdated	H=6	
13. Nature of relationship with users in respect to updating project documentation to reflect changes that may occur during project development		3
• Close coordination	L=1	
• Manageable coordination	M=2	
• Poor coordination	H=5	
14. Estimated degree to which project documentation reflects actual business need		3
• Excellent documentation	L=1	
• Good documentation but some problems with reliability	M=2	
• Poor or inadequate documentation	H=3	

(continues)

TEST DOCUMENT
Structural Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
15. Quality of documentation for the proposed system		3
• Excellent standards: adherence and execution are integral part of system and program development	L=1	
• Adequate standards: adherence is not consistent	M=2	
• Poor or no standards: adherence is minimal	H=3	
16. Quality of development and production library control		3
• Excellent standards: superior adherence and execution	L=1	
• Adequate standards: adherence is not consistent	M=2	
• Poor or no standards: adherence is minimal	H=3	
17. Availability of special test facilities for subsystem testing		2
• Complete or not required	L=1	
• Limited	M=2	
• None available	H=3	
18. Status of project maintenance planning		2
• Current and complete	L=1	
• Under development	M=2	
• Nonexistent	H=3	
19. Contingency plans in place to support operational mission should application fail		2
• None required	NA=0	
• Complete plan	L=1	
• Major subsystems addressed	M=2	
• Nonexistent	H=3	
20. User approval of project specifications		4
• Formal, written approval based on structured, detailed review processes	L=1	
• Formal, written approval based on informal unstructured, detailed review processes	M=2	
• No formal approval; cursory review	H=3	
21. Effect of external systems on the system		5
• No external systems involved	NA=0	
• Critical intersystem communications controlled through interface control documents; standard protocols utilized: stable interfaces	L=1	
• Critical intersystem communications controlled through interface control documents: some nonstandard protocols: interfaces change infrequently	M=2	
• Not all critical intersystem communications controlled through interface control documents: some nonstandard protocols: some interfaces change frequently	H=3	

(continues)

3

TEST DOCUMENT
Structural Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable	RATING × WEIGHT=	
RISK	RATINGS	SCORE
22. Type and adequacy of configuration management planning		2
• Complete and functioning	L=1	
• Undergoing revisions for inadequacies	M=2	
• None available	H=3	
23. Type of standards and guidelines to be followed by project		4
• Standards use structured programming concepts, reflect current methodology, and permit tailoring to nature and scope of development project	L=1	
• Standards require a top-down approach and offer some flexibility in application	M=2	
• Standards are out of date and inflexible	H=3	
24. Degree to which system is based on well-specified requirements		5
• Detailed transaction and parametric data in requirements documentation	L=1	
• Detailed transaction data in requirements documentation	M=2	
• Vague requirements documentation	H=5	
25. Relationships with those who are involved with system (e.g., users, customers, sponsors, interfaces) or who must be dealt with during project effort		3
• No significant conflicting needs: system primarily serves one organizational unit	L=1	
• System meets limited conflicting needs of cooperative organization units	M=2	
• System must meet important conflicting needs of several cooperative organization units	H=3	
• System must meet important conflicting needs of several uncooperative organizational units	H=4	
26. Changes in user area necessary to meet system operating requirements		3
• Not applicable	NA=0	
• Minimal	L=1	
• Somewhat	M=2	
• Major	H=3	
27. General user attitude		5
• Good: values data processing solution	L=1	
• Fair: some reluctance	M=2	
• Poor: does not appreciate data processing solution	H=3	

(continues)

TEST DOCUMENT
Structural Risk Assessment

	RATINGS	RATING × WEIGHT= SCORE
Ratings: L - Low M - Medium H - High NA - Not Applicable		
RISK		
28. Status of people, procedures, knowledge, discipline, and division of details of offices that will be using system		4
• Situation good to excellent	L=1	
• Situation satisfactory but could be improved	M=2	
• Situation less than satisfactory	H=3	
29. Commitment of senior user management to system		3
• Extremely enthusiastic	L=1	
• Adequate	M=3	
• Some reluctance or level of commitment unknown	H=3	
30. Dependence of project on contributions of technical effort from other areas (e.g., database administration)		2
• None	L=1	
• From within IT	M=2	
• From outside IT	H=3	
31. User's IT knowledge and experience		2
• Highly capable	L=1	
• Previous exposure but limited knowledge	M=2	
• First exposure	H=3	
32. Knowledge and experience of user in application area		2
• Previous experience	L=1	
• Conceptual understanding	M=2	
• Limited knowledge	H=4	
33. Knowledge and experience of project team in application area		3
• Previous experience	L=1	
• Conceptual understanding	M=2	
• Limited knowledge	H=4	
34. Degree of control by project management		2
• Formal authority commensurate with assigned responsibility	L=1	
• Informal authority commensurate with assigned responsibility	M=2	
• Responsibility but no authority	H=3	
35. Effectiveness of project communications		2
• Easy access to project manager(s); change information promptly transmitted upward and downward	L=1	
• Limited access to project manager(s); downward communication limited	M=2	
• Aloof project management; planning information closely held	H=3	

(continues)

5

TEST DOCUMENT
Structural Risk Assessment

		RATING × WEIGHT=
Ratings: L - Low M - Medium H - High NA - Not Applicable		
RISK	RATINGS	SCORE
36. Test team's opinion about conformance of system specifications to business needs based on early tests and/or reviews		3
• Operational tests indicate that procedures and operations produce desired results	L=1	
• Limited tests indicate that procedures and operations differ from specifications in minor aspects only	M=2	
• Procedures and operations differ from specifications in important aspects: specifications insufficient to use for testing	H=3	
37. Sensitivity of information		1
• None L=0		
• High H=3		

		Total	107.00
PREPARED BY:	DATE:	Total Score / Total Weight = Risk Average	

TEST DOCUMENT
Technical Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
1. Ability to fulfill mission during hardware or software failure		2
• Can be accomplished without system	L=1	
• Can be accomplished without fully operational system, but some minimum capability required	M=2	
• Cannot be accomplished without fully automated system	H=6	
2. Required system availability		2
• Periodic use (weekly or less frequently)	L=1	
• Daily use (but not 24 hours per day)	M=2	
• Constant use (24 hours per day)	H=5	
3. Degree to which system's ability to function relies on exchange of data with external systems		2
• Functions independently: sends no data required for the operation of other systems	L=0	
• Must send and/or receive data to or from another system	M=2	
• Must send and/or receive data to or from multiple systems	H=3	
4. Nature of system-to-system communications		1
• System has no external interfaces	L=0	
• Automated communications link using standard protocols	M=2	
• Automated communications link using nonstandard protocals	H=3	
5. Estimated system's program size limitations		2
• Substantial unused capacity	L=1	
• Within capacity	M=2	
• Near limits of capacity	H=3	
6. Degree of specified input data control procedures		3
• Detailed error checking	L=1	
• General error checking	M=2	
• No error checking	H=3	
7. Type of system hardware to be installed		3
• No hardware needed	NA=0	
• Standard batch or on-line systems	L=1	
• Nonstandard peripherals	M=2	
• Nonstandard peripherals and mainframes	H=3	
8. Basis for selection of programming and system software		3
• Architectural analysis of functional and performance requirements	L=1	
• Similar system development experience	M=2	
• Current inventory of system software and existing programming language skills	H=3	

(continues)

TEST DOCUMENT
Technical Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
9. Complexity of projected system		2
• Single function (e.g., word processing only)	L=1	
• Multiple but related function (e.g., message generation, editing, and dissemination)	M=2	
• Multiple but not closely related functions (e.g., database query, statistical manipulation, graphics plotting, text editing)	H=3	
10. Projected level of programming language		2
• High level, widely used	L=1	
• Low-level or machine language, widely used	M=2	
• Special-purpose language, extremely limited use	H=3	
11. Suitability of programming language to application(s)		2
• All modules can be coded in straightforward manner in chosen language	L=1	
• All modules can be coded in a straightforward manner with few exit routines, sophisticated techniques, and so forth	H=3	
• Significant number of exit routines, sophisticated techniques, and so forth are required to compensate for deficiencies in language selected	H=3	
12. Familiarity of hardware architecture		2
• Mainframe and peripherals widely used	L=1	
• Peripherals unfamiliar	M=2	
• Mainframe unfamiliar	H=4	
13. Degree of pioneering (extent to which new, difficult, and unproven techniques are applied)		5
• Conservative: no untried system components; no pioneering system objectives or techniques	L=1	
• Moderate: few important system components and functions are untried; few pioneering system objectives and techniques	H=3	
• Aggressively pioneering: more than a few unproven hardware or software components or system objectives	H=3	
14. Suitability of hardware to application environment		2
• Standard hardware	NA=0	
• Architecture highly comparable with required functions	L=1	
• Architecture sufficiently powerful but not particularly efficient	M=2	
• Architecture dictates complex software routines	H=3	

(continues)

TEST DOCUMENT
Technical Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
15. Margin of error (need for perfect functioning, split-second timing, and significant cooperation and coordination)		5
• Comfortable margin	L=1	
• Realistically demanding	M=2	
• Very demanding; unrealistic	H=3	
16. Familiarity of project team with operating software		2
• Considerable experience	L=1	
• Some experience or experience unknown	M=2	
• Little or no experience	H=3	
17. Familiarity of project team with system environment supporting the application		2
• Considerable experience	L=1	
• Some experience or experience unknown	M=2	
• Little or no experience with:		
Operating System	H=3	
DBMS	H=3	
Data Communications	H=3	
18. Knowledgeability of project team in the application area		2
• Previous experience	L=1	
• Conceptual understanding	M=2	
• Limited knowledge	H=3	
19. Type of test tools used		5
• Comprehensive test/debut software, including path analyzers	L=1	
• Formal, documented procedural tools only	M=2	
• None	H=3	
20. Realism of test environment		4
• Tests performed on operational system: total database and communications environment	L=1	
• Tests performed on separate development system: total database, limited communications	M=2	
• Tests performed on dissimilar development system: limited database and limited communications	H=3	
21. Communications interface change testing		4
• No interfaces required	NA=0	
• Live testing on actual line at operational transaction rates	L=1	
• Loop testing on actual line, simulated transactions	M=2	
• Line simulations within development system	H=3	

TEST DOCUMENT
Technical Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
22. Importance of user training to the success of the system		1
• Little training needed to use or operate system: documentation is sufficient for training	L=1	
• Users and or operators need no formal training, but experience is required in addition to documentation	M=2	
• Users essentially unable to operate system without formal, hands-on training in addition to documentation	H=3	
23. Estimated degree of system adaptability to change		3
• High: structured programming techniques used: relatively unpatched, well documented	L=1	
• Moderate	M=2	
• Low: monolithic program design, high degree of inner/ intrasystem dependency, unstructured development, minimal documentation	H=4	

		Total	61.00
PREPARED BY:	DATE:	Total Score / Total Weight = Risk Average	

4

TEST DOCUMENT
Size Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=
RISK	RATINGS	SCORE
1. Ranking of this project's total worker-hours within the limits established by the organization's smallest and largest system development projects (in number of worker-hours)		3
• Lower third of systems development projects	L=1	
• Middle third of systems development projects	M=2	
• Upper third of systems development projects	H=3	
2. Project implementation time		3
• 12 months or less	L=1	
• 13 months to 24 months	M=2	
• More than 24 months, with phased implementation	H=3	
• More than 24 months; no phasing	H=4	
3. Estimated project adherence to schedule		1
• Ahead of schedule	L=1	
• On schedule	M=2	
• Behind schedule (by three months or less)	H=3	
• Behind schedule (by more than three months)	H=4	
4. Number of systems interconnecting with the application		3
• 1 to 2	L=1	
• 3 to 5	M=2	
• More than 5	H=3	
5. Percentage of project resources allocated to system testing		2
• More than 40%	L=1	
• 20 to 40%	M=2	
• Less than 20%	H=3	
6. Number of interrelated logical data groupings (estimate if unknown)		1
• Fewer than 4	L=1	
• 4 to 6	M=2	
• More than 6	H=3	
7. Number of transaction types		1
• Fewer than 6	L=1	
• 6 to 25	M=2	
• More than 25	H=3	
8. Number of output reports		1
• Fewer than 10	L=1	
• 10 to 20	M=2	
• More than 20	H=3	

(continues)

TEST DOCUMENT
Size Risk Assessment

Ratings: L - Low M - Medium H - High NA - Not Applicable		RATING × WEIGHT=	
RISK		RATINGS	SCORE
9. Ranking of this project's number of lines of program code to be maintained within the limits established by the organization's smallest and largest systems development projects (in number of lines of code)			3
• Lower third of systems development projects		L=1	
• Middle third of systems development projects		M=2	
• Upper third of systems development projects		H=3	
		Total	18.00
PREPARED BY:	DATE:	Total Score / Total Weight = Risk Average	

WORK PAPER 3-4　Risk Score Analysis

TEST DOCUMENT
Risk Score Analysis

APPLICATION SYSTEM　_____

RISK AREA	SCORE		COMPARATIVE RATING WITH COMPANY APPLICATIONS			COMMENTS
	TOTAL	AVERAGE	HIGH	MEDIUM	LOW	
STRUCTURE						
TECHNOLOGY						
SIZE						
TOTAL RISK SCORE						

HIGH RISK ATTRIBUTES		
RISK AREA	RISK ATTRIBUTES	TEST CONCERN

PREPARED BY:　　　　　　　　　　　　　　　　DATE:

WORK PAPER 3-5 Testing Tactics Checklist

	YES	NO	COMMENTS
1. Did you use your test strategy as a guide for developing the test tactics?			
2. Did you decompose your strategy into test tactics? (May not fully occur until the test planning step.)			
3. Did you consider trade-offs between test factors when developing test tactics (e.g., choosing between continuity of processing and accuracy)?			
4. Did you compare your test tactics to the test strategy to ensure they support the strategy?			
5. Have you identified the individuals who can perform the tests?			
6. Did you compose a strategy for recruiting those individuals?			
7. Did management agree to let the team members accept the proposed responsibilities on your project team?			
8. Has a test plan for testing been established? If so does the test team have the following responsibilities:			
Set test objectives.			
Develop a test strategy.			
Develop the test tactics.			
Define the test resources.			
Execute tests needed to achieve the test plan.			
9. Modify the test plan and test execution as changes occur.			
Manage use of test resources.			
Issue test reports.			
Ensure the quality of the test process.			
Maintain test statistics.			
10. Does the test team adequately represent the following:			
User personnel			
Operation's staff			
Data administration			
Internal auditors			
Quality assurance staff			
Information technology			
Management			
Security administrator			
Professional testers			

(continues)

1

WORK PAPER 3-5 *(continued)*

	YES	NO	COMMENTS
11. Did you develop test team assignments for each test member?			
Does the test team accept responsibility for finding users/customer type defects?			
12. Does the test team accept responsibility for finding defects?			
13. Does the team recognize the benefit of removing defects earlier in the correction life cycle process?			
14. Will testing begin when the development process begins?			
15. Does one person have primary responsibility for testing?			
16. Will the test team perform validation tests?			
17. Will the test team perform verification tests?			
18. Will verification tests include requirement reviews?			
19. Will verification tests include design reviews?			
20. Will verification tests include code walkthroughs?			
21. Will verification tests include code inspections?			
22. Will validation tests include unit testing?			
23. Will validation tests include integration testing?			
24. Will validation tests include system testing?			
25. Will validation tests include user acceptance testing?			
26. Will testers develop a testers' workbench?			
27. Will the workbench identify the deliverables/products to be tested?			
28. Will the workbench include test procedures?			
29. Will the workbench check accuracy of test implementation?			
30. Will you identify test deliverables?			
31. Does your workbench identify the tools you'll use?			
32. Have the testers identified a source of these generic test tools?			

1

Chapter 4

Selecting and Installing Software Testing Tools

WORK PAPER 4-1   Selecting Tools

Tool	Use	Include in Tester's Toolbox?	
		Yes	No
Boundary value analysis	Divides system top down into logical segments and then limits testing within the boundaries of each segment.		
Capture/ playback	Testing used to capture transactions from the testing process for re-use in future tests.		
Cause-effect graphing	Limits the number of test transactions by determining which of the number of variable conditions pose minimal risk based on system actions.		
Checklist	Provides a series of questions designed to probe potential system problem areas.		
Code comparison	Compares two versions of the same program in order to identify differences between the two versions.		
Compiler-based analysis	Detects errors during the program-compilation process.		
Confirmation/ examination	Verifies that a condition has or has not occurred.		
Control flow analysis	Identifies processing inconsistencies, such as routines with no entry point, potentially unending loops, branches into the middle of a routine, and so on.		
Correctness proof	Requires a proof hypothesis to be defined and then used to evaluate the correctness of the system.		
Data dictionary	Generates test data to verify data validation programs based on the data contained in the dictionary.		
Data flow analysis	Identifies defined data not used and used data that is not defined.		
Database	Repository for collecting information for or about testing for later use analysis		
Design-based functional testing	Evaluates functions attributable to the design process as opposed to design requirements; for example, capability may be a design process.		
Design reviews	Requires reviews at predetermined points throughout systems development in order to examine progress and ensure the development process is followed.		

(continues)

1

Tool	Use	Include in Tester's Toolbox?	
		Yes	**No**
Desk checking	Provides an evaluation by programmer or analyst of the propriety of program logic after the program is coded or the system is designed.		
Disaster test	Simulates an operational or systems failure to determine if the system can be correctly recovered after the failure.		
Error guessing	Relies on the experience of testers and the organization's history of problems to create test transactions that have a high probability of detecting an error.		
Executable specs	Provides a high-level interpretation of the system specs in order to create the response to test data. Interpretation of expected software packages requires system specs to be written in a high-level language.		
Fact finding	Performs those steps necessary to obtain facts to support the test process.		
Flowchart	Pictorially represents computer systems logic and data flow.		
Inspections	Requires a step-by-step explanation of the product with each step checked against a predetermined list of criteria.		
Instrumentation	Measures the functioning of a system structure by using counters and other monitoring instruments.		
Integrated test facility	Permits the integration of test data in a production environment to enable testing to run during production processing.		
Mapping	Identifies which part of a program is exercised during a test and at what frequency.		
Modeling	Simulates the functioning of the environment or system structure in order to determine how efficiently the proposed system solution will function.		
Parallel operation	Verifies that the old and new version of the application system produce equal or reconcilable results.		
Parallel simulation	Approximates the expected results of processing by simulating the process to determine if test results are reasonable.		

(continues)

2

Tool	Use	Include in Tester's Toolbox?	
		Yes	**No**
Peer review	Provides an assessment by peers of the efficiency, style, adherence to standards, and so on of the product that is designed to improve the quality of the product.		
Ratio/ Relationships	To provide a high-level proof quantitatively that some aspect of the software or testing is reasonable.		
Risk matrix	Produces a matrix showing the relationship between system risk, the segment of the system where the risk occurs, and the presence or absence of controls to reduce that risk.		
Scoring	Identifies areas in the application that require testing, through the rating of criteria that have been shown to correlate to problems.		
Snapshot	Shows the content of computer storage at predetermined points during processing.		
Symbolic execution	Identifies processing paths by testing the programs with symbolic rather than actual test data.		
System logs	Provides an audit trail of monitored events occurring in the environment area controlled by system software.		
Test data	Creates transactions for use in determining the functioning of a computer system.		
Test data generator	Provides test transactions based on the parameters that need to be tested.		
Test scripts	Creating test transactions in the sequence in which those transactions will be processed for an online software system.		
Tracing	Follows and lists the flow of processing and database searches.		
Use case	Preparing test conditions that represent real world uses of the software.		
Volume testing	Identifies system restriction (e.g., internal table size) and then creates a large volume of transactions that exceed those limits.		
Walkthroughs	Leads a test team through a manual simulation of the product using test transactions.		

WORK PAPER 4-2   Documenting Tools

Tool Name: _____

Tool Vendor: _____

Tool Capabilities: _____

_____

_____

Tool Purpose: _____

_____

_____

Process That Will Use Tool: _____

_____

_____

Tool Training Availability: _____

_____

_____

Tool Limitations: _____

_____

_____

Chapter 5

Building Software Tester Competency

WORK PAPER 5-1   2006 Common Body of Knowledge

Knowledge Category 1: Software Testing Principles and Concepts   The "basics" of software testing are represented by the vocabulary of testing, testing approaches, methods, and techniques, as well as the materials used by testers in performing their test activities.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Testing Techniques** Understanding the various approaches used in testing, including static (e.g., desk checking), white-box (logic-driven), black-box (requirements-driven), load testing, coverage testing, and regression testing. Also included are the methods for designing and conducting tests.			
2	**Levels of Testing** Identifying testing levels such as unit, performance, string, integration, systems recovery, acceptance, parallel, performance, and interface testing.			
3	**Testing Different Types of Software** The changes in the approach to testing when testing different development approaches such as batch processing, client/server, Web-based, object-oriented, and wireless systems.			
4	**Independent Testing** Testing by individuals other than those involved in product/system development.			
5	**Vocabulary** The technical terms used to describe various testing techniques, tools, principles, concepts, and activities.			
6	**The Multiple Roles of Software Testers** The objectives that can be incorporated into the mission of software testers. This would include the testing to determine whether requirements are met, testing effectiveness and efficiency, testing user needs versus software specifications, and testing software attributes such as maintainability, ease of use, and reliability.			

(continues)

1

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
7	**Testers Workbench** An overview of the process that testers use to perform a specific test activity, such as developing a test plan or preparing test data.			
8	**The V Concept of Testing** The V concept relates the build components of the development phases to the test components that occur during the test phases.			

Knowledge Category 2: Building the Test Environment   The test environment comprises all the conditions, circumstances, and influences surrounding and affecting software testing. The environment includes the organization's policies, procedures, culture, attitudes, rewards, test processes, test tools, methods for developing and improving test processes, management's support of software testing, as well as any test labs developed for the purpose of testing software and multiple operating environments. This category also includes ensuring the test environment fairly represents the production environment.

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
1	**Knowledge of Test Process Selection and Analysis**			
	Concepts of Test Processes—The concepts of policies, standards, and procedures, and their integration into the test process.			
	Test Process Selection—Selecting processes that lead to efficient and effective testing activities and products.			
	Acquisition or Development of a Test Bed/ Test Lab/Test Processes—Designing, developing, and acquiring a test environment that simulates the "real" world, including the capability to create and maintain test data.			
	Quality Control—Testing quality control to ensure that the test process has been performed correctly.			

(continues)

WORK PAPER 5-1 *(continued)*

	FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
Test Process Analysis—Analyzing the test process to ensure			
a. Its effectiveness and efficiency			
b. Test objectives are applicable, reasonable, adequate, feasible, and affordable			
c. The test program meets the test objectives			
d. The correct test program is being applied to the project			
e. The test methodology, including the processes, infrastructure, tools, methods, and planned work products and reviews, is adequate to ensure that the test program is conducted correctly			
f. Test progress, performance, and process adherence are assessed to determine the adequacy of the test program			
g. Adequate, not excessive, testing is performed			
Continuous Improvement—Identifying and making improvements to the test process using formal process improvement processes.			
Adapting the Test Environment to Different Software Development Methodologies—Establishing the environment to properly test the methodologies used to build software systems, such as waterfall, Web-based, object-oriented, agile, and so forth.			
Competency of the Software Testers—Providing the training necessary to ensure that software testers are competent in the processes and tools included in the test environment.			

(continues)

3

WORK PAPER 5-1 *(continued)*

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
2	**Test Tools**			
	Tool Development and/or Acquisition— Understanding the processes for developing and acquiring test tools.			
	Tool Usage— Understanding how tools are used for automated regression testing, defect management, performance/load testing; understanding manual tools such as checklists, test scripts, and decision tables; using traceability tools, code coverage, and test case management.			
3	**Management Support for Effective Software Testing**			
	Creating a tone that encourages testers to work in an efficient and effective manner.			
	Aligning test processes with organizational goals, business objectives, release cycles, and different developmental methodologies.			

Knowledge Category 3: Managing the Test Project   Software testing is a project with almost all the same attributes as a software development project. Software testing involves project planning, project staffing, scheduling and budgeting, communicating, assigning and monitoring work, and ensuring that changes to the project plan are incorporated into the test plan.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Test Planning, Scheduling, and Budgeting**			
	Alignment— Ensuring the test processes are aligned with organizational goals, user business objectives, release cycles, and different development methodologies.			
	Test Performance— Monitoring test performance for adherence to the plan, schedule and budget, reallocating resources as required, and averting undesirable trends.			

(continues)

4

	FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
Staffing—Acquiring, training, and retaining a competent test staff.			
Management of Staff—Keeping staff appropriately informed, and effectively utilizing the test staff.			
Differences Between Traditional Management—Using a hierarchical structure versus quality management using a flattened organization structure.			
2 **Personal and Organizational Effectiveness**			
Communication Skills a. *Written Communication*—Providing written confirmation and explanation of a variance from expectations. Being able to describe on paper a sequence of events to reproduce the defect. b. *Oral Communication*—Demonstrating the ability to articulate a sequence of events in an organized and understandable manner. c. *Listening Skills*—Actively listening to what is said, asking for clarification when needed, and providing feedback. d. *Interviewing Skills*—Developing and asking questions for the purpose of collecting data for analysis or evaluation. e. *Analyzing Skills*—Determining how to use the information received.			

	FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
Personal Effectiveness Skills a. *Negotiation*—Working effectively with one or more parties to develop options that will satisfy all parties. b. *Conflict Resolution*—Bringing a situation into focus and satisfactorily concluding a disagreement or difference of opinion between parties. c. *Influence and Motivation*—Influencing others to participate in a goal-oriented activity. d. *Judgment*—Applying beliefs, standards, guidelines, policies, procedures, and values to a decision. e. *Facilitation*—Helping a group to achieve its goals by providing objective guidance.			
Project Relationships—Developing an effective working relationship with project management, software customers, and users.			
Recognition—Showing appreciation to individuals and teams for work accomplished.			
Motivation—Encouraging individuals to do the right thing and do it effectively and efficiently.			
Mentoring—Working with testers to ensure they master the needed skills.			
Management and Quality Principles—Understanding the principles needed to build a world-class testing organization.			

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
3	**Leadership**			
	Meeting Chairing—Organizing and conducting meetings to provide maximum productivity over the shortest time period.			
	Facilitation—Helping the progress of an event or activity. Formal facilitation includes well-defined roles, an objective facilitator, a structured meeting, decision-making by consensus, and defined goals to be achieved.			
	Team Building—Aiding a group in defining a common goal and working together to improve team effectiveness.			

Knowledge Category 4: Test Planning   Testers need the skills to plan tests. Test planning assesses the business and technical risks of the software application and then develops a plan to determine if the software minimizing those risks. Test planners must understand the development methods and environment to effectively plan for testing.

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
1	**Prerequisites to Test Planning**			
	Identifying Software Risks—Demonstrating knowledge of the most common risks associated with software development.			
	Identifying Testing Risks—Demonstrating knowledge of the most common risks associated with software testing.			
	Identifying Premature Release Risk—Understanding how to determine the risk associated with releasing unsatisfactory, untested software products.			
	Risk Contributors—Identifying the contributors to risk.			
	Identifying Business Risks—Demonstrating knowledge of the most common risks associated with the business using the software.			

(continues)

WORK PAPER 5-1 *(continued)*

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
	Risk Methods—Understanding of the strategies and approaches for identifying risks or problems associated with implementing and operating information technology, products, and processes; assessing their likelihood, and initiating strategies to test for those risks.			
	Risk Magnitude—Demonstrating the ability to calculate and rank the severity of a risk quantitatively.			
	Risk Reduction Methods—Understanding the strategies and approaches that can be used to minimize the magnitude of a risk.			
	Contingency Planning—Planning to reduce the magnitude of a known risk.			
2	**Test Planning Entrance Criteria**			
	Success Criteria/Acceptance Criteria—Understanding the criteria that must be validated to provide user management with the information needed to make an acceptance decision.			
	Test Objectives—Understanding the objectives to be accomplished through testing.			
	Assumptions—Establishing the conditions that must exist for testing to be comprehensive and on schedule.			
	Issues—Identifying specific situations/ products/processes that, unless mitigated, will impact forward progress.			
	Constraints—Limiting factors to success.			
	Entrance Criteria/Exit Criteria—Understanding the criteria that must be met prior to moving software to the next level of testing or into production.			

(continues)

WORK PAPER 5-1   *(continued)*

	FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
Test Scope—Understanding what is to be tested.			
Test Plan—Understanding the activities and deliverables to meet a test's objectives.			
Requirements/Traceability—Defining the tests needed and relating them to the requirements to be validated.			
Estimating—Determining the resources and timeframes required to accomplish the planned activities.			
Scheduling—Establishing milestones for completing the testing effort and their dependencies on meeting the rest of the schedule.			
Staffing—Selecting the size and competency of the staff needed to achieve the test plan objectives.			
Test Check Procedures—Incorporating test cases to ensure that tests are performed correctly.			
Software Configuration Management—Organizing the components of a software system, including documentation, so that they fit together in working order.			
Change Management—Modifying and controlling the test plan in relationship to actual progress and scope of system development.			
Version Control—Understanding the methods to control, monitor, and achieve change.			

(continues)

Knowledge Category 5: Executing the Test Plan   This category addresses the skills required to execute tests, design test cases, use test tools, and monitor testing.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Test Design and Test Data/Scripts Preparation**			
	Specifications—Ensuring test data scripts meet the objectives included in the test plan.			
	Cases—Developing test cases, including techniques and approaches for validation of the product. Determination of the expected result for each test case.			
	Test Design—Understanding test design strategies and attributes.			
	Scripts—Developing the online steps to be performed in testing; focusing on the purpose and preparation of procedures; emphasizing entrance and exit criteria.			
	Data—Developing test inputs; using data generation tools; determining the data set or sub-sets to ensure a comprehensive test of the system; determining data that suits boundary value analysis and stress testing requirements.			
	Test Coverage—Achieving the coverage objectives in the test plan to specific system components.			
	Platforms—Identifying the minimum configuration and platforms on which the test must function.			
	Test Cycle Strategy—Determining the number of test cycles to be conducted during the test execution phase of testing; determining what type of testing will occur during each test cycle.			

(continues)

WORK PAPER 5-1 *(continued)*

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
2	**Performing Tests**			
	Execute Tests—Performing the activities necessary to execute tests in accordance with the test plan and test design—including setting up tests, preparing test database(s), obtaining technical support, and scheduling resources.			
	Compare Actual Versus Expected Results—Determining whether the actual results meet expectations.			
	Documenting Test Results—Recording test results in the appropriate format.			
	Use of Test Results—Understanding how test results should be used and who has access to them.			
3	**Defect Tracking**			
	Defect Recording—Recording defects to describe and quantify deviations from requirements/expectations.			
	Defect Reporting—Reporting the status of defects, including severity and location.			
	Defect Tracking—Monitoring defects from the time of recording until satisfactory resolution has been determined and implemented.			
4	**Testing Software Changes**			
	Static Testing—Evaluating changed code and associated documentation at the end of the change process to ensure correct implementation.			
	Regression Testing—Testing the whole product to ensure that unchanged functionality performs as it did prior to implementing a change.			

(continues)

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
	Verification—Reviewing requirements, design, and associated documentation to ensure they are updated correctly as a result of the change.			

Knowledge Category 6: Test Status, Analysis, and Reporting   Testers need to demonstrate the ability to develop status reports. These reports should show the status of the testing based on the test plan. Reporting should document what tests have been performed and the status of those tests. To properly report status, testers should review and conduct statistical analysis on the test results and discovered defects. The lessons learned from the test effort should be used to improve the next iteration of the test process.

		FULLY COMPETENT	**PARTIALLY COMPETENT**	**NOT COMPETENT**
1	**Metrics of Testing**			
	Using quantitative measures and metrics to manage the planning, execution, and reporting of software testing.			
2	**Test Status Reports**			
	Code Coverage—Monitoring the execution of software and reporting on the degree of coverage at the statement, branch, or path level.			
	Requirement Coverage—Monitoring and reporting the number of requirements tested, and whether they are correctly implemented.			
	Test Status Metrics—Understanding the following metrics: a. *Metrics Used to Test*—Includes metrics such as defect removal efficiency, defect density, and mean time to last failure. b. *Complexity Measurements*— Quantitative values, accumulated by a predetermined method, that measure the complexity of a software product.			

(continues)

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
	c. *Project Metrics*—The status of a project, including milestones, budget and schedule variance, and scope changes.			
	d. *Size Measurements*—Methods primarily developed for measuring the software size of information systems, such as lines of code and function points.			
	e. *Defect Metrics*—Values associated with the number or types of defects, usually related to system size, such as "defects/1000 lines of code" or "defects/100 function points."			
	f. *Product Measures*—Measures of a product's attributes, such as performance, reliability, and usability.			
3	**Final Test Reports**			
	Reporting Tools—Using word processing, database, defect tracking, and graphic tools to prepare test reports.			
	Test Report Standards—Defining the components that should be included in a test report.			
	Statistical Analysis—Demonstrating the ability to draw statistically valid conclusions from quantitative test results.			

Knowledge Category 7: User Acceptance Testing   The objective of software development is to meet the true needs of the user, not just the system specifications. Testers should work with the users early in a project to clearly define the criteria that would make the software acceptable in meeting the user needs. As much as possible, once the acceptance criteria have been established, they should integrate it into all aspects of development.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Concepts of Acceptance Testing**			
	Understanding the difference between system test and acceptance test.			

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
2	**Acceptance Test Planning Process**			
	Defining the acceptance criteria.			
	Developing an acceptance test plan for execution by user personnel.			
	Testing data using use cases.			
3	**Acceptance Test Execution**			
	Executing the acceptance test plan.			
	Developing an acceptance decision based on the results of acceptance testing.			
	Signing off on successful completion of the acceptance test plan.			

Knowledge Category 8: Testing Software Developed by Outside Organizations   Many organizations do not have the resources to develop the type and/or volume of software needed to effectively manage their business. The solution is to obtain or contract for software developed by another organization. Software can be acquired by purchasing commerical off-the-shelf software (COTS) or contracting for all or parts of the software development to be done by outside organizations.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	Understanding the difference between testing software developed in-house and software developed by outside organizations.			
2	Understanding the election process for selecting COTS software.			
3	Verifying that testers are able to a. Ensure that requirements are testable. b. Review the adequacy of the test plan to be performed by the outsourcing organization. c. Oversee acceptance testing.			

(continues)

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
	d. Issue a report on the adequacy of the software to meet the contractual specifications.			
	e. Ensure compatibility of software standards, communications, change control, and so on between the two organizations.			
4	Using the same approach as used for in-house software, but may need to be modified based on documentation available from the developer.			
5	Understanding the following objectives:			
	a. Testing the changed portion of the software			
	b. Performing regression testing			
	c. Comparing the documentation to the actual execution of the software			
	d. Issuing a report regarding the status of the new version of the software			

Knowledge Category 9: Testing Software Controls and the Adequacy of Security Procedures   The software system of internal control includes the totality of the means developed to ensure the integrity of the software system and the products created by the software. Controls are employed to control the processing components of software, ensure that software processing is in accordance with the organization's policies and procedures, and according to applicable laws and regulations.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Principles and Concepts of a Software System of Internal Control and Security**			
	Vocabulary of Internal Control and Security—Understanding the vocabulary of internal control and security, including terms such as risk, threat, control, exposure, vulnerability, and penetration.			

WORK PAPER 5-1 *(continued)*

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
	Internal Control and Security Models— Understanding internal control and security models (specifically, the COSO [Committee of Sponsoring Organizations] model).			
2	**Testing the System of Internal Controls**			
	Perform Risk Analysis—Determining the risk faced by the transactions/events processed by the software.			
	Determining the controls for each of the processing segments for transactions processing, including a. Transaction origination b. Transaction entry c. Transaction processing d. Database control e. Transaction results			
	Determining whether the identified controls are adequate to reduce the risks to an acceptable level.			
3	**Testing the Adequacy of Security for a Software System**			
	Evaluating the adequacy of management's security environment.			
	Determining the types of risks that require security controls.			
	Identifing the most probable points where the software could be penetrated.			
	Determining the controls at those points of penetration.			
	Assessing whether those controls are adequate to reduce the security risks to an acceptable level.			

(continues)

Knowledge Category 10: Testing New Techniques   Testers require skills in their organization's current technology, as well as a general understanding of the new information technology that might be acquired by their organization.

		FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1	**Understanding the Challenges of New Technologies**			
	New application architecture			
	New application business models			
	New communication methods			
	New testing tools			
2	**Evaluating New Technologies to Fit into the Organization's Policies and Procedures**			
	Assessing the adequacy of the controls within the technology and the changes to existing policies and procedures that will be needed before the new technology can be implemented effectively. This would include:			
	Testing new technology to evaluate actual performance versus supplier's stated performance.			
	Determining whether current policies and procedures are adequate to control the operation of the new technology and modify to bring in currency.			
	Assessing the need to acquire new staff skills to effectively implement the new technology			

WORK PAPER 5-2   Evaluating Individual Competency

	KNOWLEDGE CATEGORY	NUMBER OF SKILLS	FULLY COMPETENT	PARTIALLY COMPETENT	NOT COMPETENT
1.	Software Testing Principles and Concepts	8			
2.	Building the Test Environment	12			
3.	Managing the Test Project	16			
4.	Test Planning	27			
5.	Executing the Test Plan	19			
6.	Test Status, Analysis and Reporting	8			
7.	User Acceptance Testing	5.			
8.	Testing Software Developed by Outside Organizations	6			
9.	Testing Software Controls and the Adequacy of Security Procedures	11			
10.	Testing New Technologies	8			
	Total	**120**			
	Multiply Total By		3	2	1
	Multiplied Total				
	Total the Sum in Each of the Three Columns				
	Divide by 120				
	Software Testing Competency Score				

WORK PAPER 5-3 Building Test Team Competency

| | SOFTWARE TEST TEAM MEMBER | | | | |
CATEGORY	A	B	C	D	E
1. Software Testing Principles and Concepts					
2. Building the Test Environment					
3. Managing the Test Project					
4. Test Planning					
5. Executing the Test Plan					
6. Test Status, Analysis and Reporting					
7. User Acceptance Testing					
8. Testing Software Developed by Outside Organizations					
9. Testing Software Controls and the Adequacy of Security Procedures					
10. Testing New Technologies					

Chapter 7

Step 1: Organizing for Testing

WORK PAPER 7-1   Calculation of Total Weighted Documentation Criteria Score

CRITERION	WEIGHT	EXPLANATION
1. Originality required		
2. Degree of generality		
3. Span of operation		
4. Change in scope and objective		
5. Equipment complexity		
6. Personnel assigned		
7. Developmental cost		
8. Criticality		
9. Average response time to program change		
10. Average response time to data input		
11. Programming languages		
12. Concurrent software development		

Total Weighted Criteria Score:

WORK PAPER 7-2   Testing Documentation Completeness

	COMPLETENESS CRITERION	ADEQUATE	INADEQUATE	COMMENTS
1.	Content			
2.	Audience			
3.	Redundancy			
4.	Flexibility			
5.	Size			
6.	Combining and expanding of document types			
7.	Format			
8.	Content sequence			
9.	Documenting of multiple programs or multiple files			
10.	Section titles			
11.	Flowcharts and decision tables			
12.	Forms			

WORK PAPER 7-3   Characteristics Included/Excluded from Your Organization's Software Estimating Model

Name of Model: _____

CHARACTERISTIC	INCLUDED	EXCLUDED	COMMENTS
1. The model should have well-defined scope.			
(It should be clear which activities associated with the software life cycle are taken into account in the model and which are excluded. It should also be clear which resources—manpower, computer time, and elapsed time—are being estimated, and whether costs of support software are included.)			
2. The model should be widely applicable.			
(It should be possible to tailor a model to fit individual organizations, and types of software development.)			
3. The model should be easy to use.			
(Input requirements should be kept to a minimum, and output should be provided in an immediately useful format.)			
4. The model should be able to use actual project data as it becomes available.			
(Initial project cost estimates are likely to be based on inadequate information. As a project proceeds, more accurate data becomes available for cost estimating. It is essential that any estimating model be capable of using actual data gathered at any stage in the project life to update the model and provide refined estimates, probably with a lower likely range of values than achieved initially.			
Estimating is based on a probabilistic model. This means that an estimate is a number in the likely range of the quantity being estimated, and confidence in the estimate depends on the likely range of the quantity being estimated. The better the information we have on which to base an estimate, the smaller the likely range and the greater the confidence.)			
5. The model should allow for the use of historic data in the calibration for a particular organization and type of software.			
6. The model should have been checked against a reasonable number of historic projects.			

(continues)

WORK PAPER 7-3 *(continued)*

Name of Model: _____

CHARACTERISTIC	INCLUDED	EXCLUDED	COMMENTS
7. The model should only require inputs based on properties of the project which are well defined and can be established with a reasonable degree of certainty at the time the estimate is required.			
8. The model should favor inputs based on objective rather than subjective criteria.			
9. The model should not be oversensitive to subjective input criteria.			
10. The model should be sensitive to all the parameters of a project which have been established as having a market effect on the cost, and should not require input of parameters which do not have a marked effect on cost.			
11. The model should include estimates of how and when the resource will be needed. (This is particularly important if the estimates are to be used for resource allocation, but also important if the results are given in financial terms since inflation needs to be taken into account.)			
12. The model should produce a range of likely values for the quantity being estimated. (It is important to realize that an estimate cannot provide a precise prediction of the future. It must, of course, predict sufficiently closely to be useful, and to do this it should ideally be able to place bounds on either side of the estimate within a stated probability that the actual figures will lie within the stated bounds.)			
13. The model should include possibilities for sensitivity analysis, so that the response of the estimates to variation of selected input parameters can be seen.			
14. The model should include some estimate of the risk of failure to complete within the estimated time or cost.			
TOTAL CHARACTERISTICS INCLUDED			

WORK PAPER 7-4   Factors that Influence Software Cost Estimate

FACTOR	INCLUDED	EXCLUDED	COMMENTS
Project-Specific Factors			
1. Size of the software			
2. Percentage of the design and/or code that is new			
3. Complexity of the software system			
4. Difficulty of design and coding			
5. Quality			
6. Programming language			
7. Security classification			
8. Target machine			
9. Utilization of the target hardware			
10. Requirement volatility			
Organization-Dependent Factors			
1. Project schedule			
2. Personnel			
• Technical competence			
• Nontechnical manpower			
3. Development environment			
• Development machine			
• Availability of associated software and hardware			
• Software tools and techniques to be used during design and development			
4. Resources not directly attributable to technical aspects of the project			
5. Computing resources			
6. Labor rates			
7. Inflation			

WORK PAPER 7-5   Organizing for Testing Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Has the test team manager been appointed?				
2. Has the test team manager's role been defined?				
3. Is the scope of testing consistent with the competency of hte test manager?				
4. Is the test team competent?				
5. Are there standards for system documentation?				
6. Are the members of the test team in total knowledgeable of the intent and content of those standards?				
7. Are the standards customizable for systems of various sizes, so that small projects may not need as extensive documentation as large projects?				
8. Are the testers provided a complete copy of system documentation current to the point where the tests occur?				
9. Have the testers measured the documentation needs for the project based on the twelve criteria included in this chapter?				
10. Have the testers determined what documents must be produced?				
11. Do the project personnel agree with the testers' assessment as to what documents are needed?				
12. Have the testers determined the completeness of individual documents using the 13 criteria outlined in Task 3?				
13. Have the testers used the inspection process to determine the completeness of system documentation?				
14. Have the testers determined the currentness of the project documentation at the point of test?				
15. Have the testers prepared a report that outlines documentation deficiency?				
16. Do the testers ensure that the documentations deficiency outlined in their report is acted upon?				
17. Does project management support the concept of having the test team assess the development estimate and status?				

(continues)

1

	YES	NO	N/A	COMMENTS
18. If so, is the test team knowledgeable in the estimation process?				
19. If so, is the test team knowledgeable in the method that will be used to report project status?				
20. Does the test team understand how the software estimate was calculated?				
21. Has the test team performed a reasonable test to determine the validity of the estimate?				
22. If the test team disagrees with the validity of the estimate, will a reasonable process be followed to resolve that difference?				
23. Does the project team have a reasonable status reporting system?				
24. Have the testers determined that the project status system will be utilized on a regular basis?				
25. Is there a process to follow if the status reporting system indicates that the project is ahead or behind estimates?				
26. Have the test team taken into account the influencing factors in evaluating the estimate (e.g., size of the software and so forth)?				
27. Will the team receive copies of the status reports?				
28. Is there a process in the test plan to act upon the status reports when received?				
29. Does the test team have a knowledge of how projects are planned and how the content of a project is planned?				
30. Does the test team have an understanding of the project estimating process used to estimate this project?				
31. Does the project team have an understanding of the developmental process that will be used to build the software specified in this project?				
32. Is the project plan complete?				
33. Is the project estimate fully documented?				
34. Is the developmental process documented?				

(continues)

2

	YES	NO	N/A	COMMENTS
35. Is the estimating method used for this project reasonable for the project characteristics?				
36. Is the estimate reasonable to complete the project as specified in the plan?				
37. Has the project been completed using the development process?				
38. Does the project team have a method for determining and reporting project status?				
39. Is that project status method used?				
40. Do the testers agree that the project status as reported is representative of the actual status?				

Chapter 8

Step 2: Developing
the Test Plan

WORK PAPER 8-1   Test Objective

Number	Objective	Priority	Completion Criteria

WORK PAPER 8-2   Software Module

Software Project: _____

Number	Software Module Name	Description	Evaluation Criteria

Software Project: _____

Software Model Number	Structural Attribute	Description	Evaluation Criteria

WORK PAPER 8-4   Batch Tests

Software Project: _____

Name of Test: **Test No.** _____

Test Objective _____

Test Input _____

Test Procedures _____

Test Output _____

Test Controls _____

Software or Structure Attribute Tested _____

1

WORK PAPER 8-5   Conceptual Test Script for Online System Test

Software Project: _____

Software Module: _____ **Test No.** _____

Sequence	Source	Script Event	Evaluation Criteria	Comments

WORK PAPER 8-6   Verification Tests

Software Project: _____

Number	Verification Test	System Product	Purpose	Responsibility	Test Point/ Schedule

1

WORK PAPER 8-7   Software/Test Matrix

Software Project: _____

<div align="center">Tests</div>

Software Module	1	2	3	4	5	6	7	8	9	10

WORK PAPER 8-8   Test Plan General Information

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Software Project	The name or number that uniquely identifies the project or system that will be tested for compliance.
Summary	A one- or two-paragraph overview of what is to be tested and how the testing will be performed.
Pretest Background	Summary of any previous test experiences that might prove helpful with testing.The assumption is, if there were problems in the past, they will probably continue; however, if there were few problems with test tools, the test team can expect to use those tools effectively.
Test Environment	The computer center or facilities used to test the application. In a single computer center installation, this subsection is minimal. If the software is used in multiple installations, the test environments may need to be described extensively.
Test Constraints	Certain types of testing may not be practical or possible during testing. For example, in banking systems in which the software ties into the Fed Wire system, it is not possible to test software with that facility. In other cases, the software cannot yet interface directly with production databases, and therefore the test cannot provide assurance that some of those interfaces work. List all known constraints.
References	Any documents, policies, procedures, or regulations applicable to the software being tested or the test procedures. It is also advisable to provide a brief description of why the reference is being given and how it might be used during the testing process.
When to stop testing	What type of test results or events should cause testing to be stopped and the software returned to the implementation team for more work.

Software Project: _____

Summary

Pretest Background

Test Environment

Test Constraints

References

When to Stop Testing

1

WORK PAPER 8-9   Test Milestones

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Tests	Tests to be conducted during execution (the tests described on Work Papers 8.4, 8.5, and 8.6 and shown in matrix format in Work Paper 8.7). The vertical column can contain either or both the test number and/or name.
Start/Completion Milestone	The names to identify when tests start and stop. The milestones shown in Work Paper 8.9 are numbers 1–30, but these could be week numbers, day numbers, or specific dates such as November 18, 1999, included in the heading of the vertical columns.
Intersection between Tests and Start/ Completion Milestones	Insert a check mark in the milestone where the test starts, and a check mark in the column where the tests are to be completed.

Tests   **Start/Completion Milestones**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

WORK PAPER 8-10   Administrative Checkpoint

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Software Project	The name or number that uniquely identifies the project or system that will be tested for compliance.
Project	The name of the project being tested.
Checkpoint for Test	The name of the systems development checkpoint at which testing occurs. Unless the test team knows which development documents have been completed, testing is extremely difficult to perform.
Schedule	The dates on which the following items need to be started and completed: • plan • train test group • obtain data • test execution • test report(s)
Budget	The test resources allocated at this milestone, including both test execution and test analysis and reporting.
Resources	The resources needed for this checkpoint, including: • equipment (computers and other hardware needed for testing) • software and test personnel (staff to be involved in this milestone test, designated by name or job function)
Testing Materials	Materials needed by the test team to perform the test at this checkpoint, including: • system documentation (specific products and documents needed to perform the test at this point) • software to be tested (names of the programs and subsystems to be tested at this point) • test input (files or data used for test purposes) • test documentation (any test documents needed to conduct a test at this point) • test tools (software or other test tools needed to conduct the test at this point) *Note:* Not all these materials are needed for every test.
Test Training	It is essential that the test team be taught how to perform testing. They may need specific training in the use of test tools and test materials, the performance of specific tests, and the analysis of test results.

(continues)

WORK PAPER 8-10 *(continued)*

Software Project: _____

Test Milestone Number: _____

	Start	Finish
Schedule: Test Plan: _____		
Tester Training: _____		
Obtaining Data: _____		
Execution: _____		
Report: _____		

Budget:

_____

Resources

Equipment:

Support Personnel:

Test Personnel:

_____

Testing Materials

Project Documentation:

Software to Be Tested:

Test Input:

Test Documentation:

Test Tools:

_____

Test Training

_____

WORK PAPER 8-11   Moderator Checklist

      _____   Check that entry criteria (inspection package cover sheet) have been met.

      _____   Meet with author and team leader to select qualified inspection participants and assign roles.

      _____   Determine need for an overview session.

      _____   Schedule inspection meeting; complete inspection meeting notice.

      _____   Gather materials from author, and distribute to inspection participants.

      _____   Talk with inspectors to ensure preparation time.

      _____   Complete self-preparation of material for inspection.

      _____   Conduct inspection meeting.

      _____   Ensure completion and distribution of inspection defect list and inspection summary.

      _____   Verify conditional completion (moderator review or reinspection).

      _____   Complete inspector certification report.

WORK PAPER 8-12   Inspection Preparation Report

Project Software: _____   Date: _____

Name of Item Being Inspected: _____

Item Version Identification: _____

Material Size (lines/pages): _____   Expected Preparation Time: _____

Preparation Log:

Date   Time Spent

_____   _____

_____   _____

Total Preparation Time: _____

Defect List:

Location	Defect Description	Exit Criteria Violated
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WORK PAPER 8-13   Inspection Defect List

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Project Name	The name of the project in which an interim deliverable is being inspected.
Date	The date on which this workpaper is completed.
Name of Item Being Inspected	The number or name by which the item being Inspected is known.
Item Version Identification	The version number if more than one version of the item is being inspected.
Material Size	The size of the item being inspected. Code is frequently described as number of lines of executable code. Written documentation is frequently described as number of pages.
Expected Preparation Time	Total expected preparation time of all the inspectors.
Moderator	The name of the person leading the inspection.
Phone	The phone number of the moderator.
Inspection Type	Indicates whether an initial inspection or a reinspection of the item to verify defect correction.
Release #	A further division of version number indicating the sequence in which variations of a version are released into test.
Product Type	The type of product being inspected, such as source code.
Location	The location of a defect determined to be a defect by the formal inspection meeting.
Origin/Defect Description	The name by which the defect is known in the organization; inspectors' opinion as to where that defect originated.
Defect Phase	The phase in the development process at which the defects were uncovered.
Defect Type	A formal name assigned to the defect. This Work Paper suggests 17 different defect types. Your organization may wish to modify or expand this list.
Severity Class	Indicate whether the defect is an extra, missing, or wrong class. (See Chapter 8 for explanation of defect class.)
Severity MAJ/MIN	Indicate whether the defect is of major or minor severity. (See Chapter 8 for a discussion of the meaning of major and minor.
	Note: This form is completed by the inspector filling the reporter role during the formal inspection process.

(continues)

1

Project Name: _____ Date: _____

Name of Item Being Inspected: _____

Item Version Identification: _____

Material Size (lines/pages): _____ Expected Preparation Time: _____

Moderator: _____ Phone: _____

Inspection Type: _____ Inspection   Release #: _____

_____ Reinspection   Product Type: _____

Location	Origin Defect Description	Defect Phase	Defect Type	Severity	
				Class	**Maj/Min**
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Defect Types:

CM	Comments	LO	Logic	PF	Performance
DA	Data	LR	Linkage Requirements	RQ	Requirements
DC	Documentation	MN	Maintainability	SC	Spec Clarification
EN	English Readability	MS	Messages/Return Codes	ST	Standards
IF	Interface	OT	Other	TP	Test Plan
LD	Logical Design	PD	Physical Design		

Defect Class: E   Extra   M   Missing   W   Wrong

WORK PAPER 8-14   Inspection Meeting Notice

Project Name: _____ Date: _____

Name of Item Being Inspected: _____

Item Version Identification: _____

Material Size (lines/pages): _____

Expected Preparation Time: _____

Moderator: _____

Phone: _____

Inspection Type: _____ Inspection

                   _____ Reinspection

Schedule: _____

Date: _____

Time: _____

Location: _____

Duration: _____

(continues)

1

Participants:

Name	Phone	Role
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

WORK PAPER 8-15 Inspection Defect Summary

Project Name: _____ Date: _____

Name of Item Being Inspected: _____

Item Version Identification: _____

Material Size (lines/pages): _____

Moderator: _____ Phone: _____

Inspection Type: _____ Inspection

_____ Reinspection

Defect Types	Minor Defect Class				Major Defect Class			
	E	M	W	Total	E	M	W	Total
CM (Comments)								
DA (Data)								
DC (Documentation)								
EN (English Readability)								
IF (Interfaces)								
LD (Logical Design)								
LO (Logic)								
LR (Linkage Requirements)								
MN (Maintainability)								
MS (Messages/Return Codes)								
OT (Other)								
PD (Physical Design)								
PF (Performance)								
RQ (Requirements)								
SC (Spec Clarification)								
ST (Standards)								
TP (Test Plan)								
Totals:								

WORK PAPER 8-16   Inspection Certification Report

Project Name: _____   Date: _____

Name of Item Being Inspected: _____

Item Version Identification: _____

The following people have inspected the named item and have agreed that all technical, contractual, quality, and other requirements and inspection criteria have been satisfied:

Moderator: _____

Recorder: _____

Reader: _____

Author: _____

Software Quality Representative: _____

Inspectors: _____

_____

_____

_____

_____

_____

_____

_____
Moderator Signature/Date

1

WORK PAPER 8-17 Quality Control Checklist

	YES	NO	NA	COMMENTS
Software Function/Software Attribute Work Papers				
1. Have all the business software functions been identified?				
2. Does the sponsor/user agree that these are the appropriate software functions?				
3. Is the software function identified by a commonly used name?				
4. Are all the software functions described?				
5. Have the criteria for evaluating the software functions been identified?				
6. Are the evaluation criteria measurable?				
7. Has the structure addressed: Reliability? Efficiency? Integrity? Usability? Maintainability? Testability? Flexibility? Portability? Reusability? Interoperability?				

(continues)

1

		YES	NO	NA	COMMENTS
8.	Have the criteria for each structural attribute been stated?				
9.	Are the evaluation criteria measurable?				
10.	Has the description for each structural attribute been given?				
Work Papers on Tests to Be Conducted					
1.	Has the test been named?				
2.	Has the test been given a unique identifying number?				
3.	Has the test objective been stated clearly and distinctly?				
4.	Are the tests appropriate to evaluate the functions defined?				
5.	Is the level of detail on the document adequate for creating actual test conditions once the system is implemented?				
6.	Are the verification tests directed at project products?				
7.	Is the verification test named?				

		YES	NO	NA	COMMENTS
8.	Is the name of the verification test adequate for test personnel to understand the intent of the test?				
9.	Have the products to be tested been identified?				
10.	Has the purpose of the verification test been stated?				
11.	Has the sequence in which each online test will be performed been identified?				
12.	Has the name for each test been included (optional)?				
13.	Have the criteria that would cause testing to be stopped been indicated?				
14.	Are the stop criteria measurable (i.e., there is no question that the criteria have been met)?				
15.	Are the stop criteria reasonable?				
Software Function/Test Matrix					
1.	Does the matrix contain all the software functions defined on Work Paper 8-2?				
2.	Does the matrix contain all the structural attributes defined on Work Paper 8-3?				
3.	Does the matrix contain all the tests described in test Work Papers 8-4, 8-5, and 8-6?				

	YES	NO	NA	COMMENTS
4. Are the tests related to the functions?				
5. Are there tests for evaluating each software function?				
6. Are there tests for evaluating each structural attribute?				
Administrative Work Papers				
1. Has a work paper been prepared for each test milestone?				
2. Has the date for starting the testing been identified?				
3. Has the date for starting test team training been identified?				
4. Has the date for collecting the testing material been identified?				
5. Has the concluding date of the test been identified?				
6. Has the test budget been calculated?				
7. Is the budget consistent with the test workload?				
8. Is the schedule reasonably based on the test workload?				
9. Have the equipment requirements for the test been identified?				

4

	YES	NO	NA	COMMENTS
10. Have the software and documents needed for conducting the test been identified?				
11. Have the personnel for the test been identified?				
12. Have the system documentation materials for testing been identified?				
13. Has the software to be tested been identified?				
14. Has the test input been defined?				
15. Have the needed test tools been identified?				
16. Has the type of training that needs to be conducted been defined?				
17. Have the personnel who require training been identified?				
18. Will the test team be notified of the expected defect rate at each checkpoint?				
19. Has a test summary been described?				
20. Does this summary indicate which software is to be included in the test?				
21. Does the summary indicate the general approach to testing?				

(continues)

WORK PAPER 8-17 *(continued)*

		YES	NO	NA	COMMENTS
22.	Has the pretest background been defined?				
23.	Does the pretest background describe previous experience in testing?				
24.	Does the pretest background describe the sponsor's/user's attitude to testing?				
25.	Has the test environment been defined?				
26.	Does the test environment indicate which computer center will be used for testing?				
27.	Does the test environment indicate permissions needed before beginning testing (if appropriate)?				
28.	Does the test environment state all the operational requirements that will be placed on testing?				
29.	Have all appropriate references been stated?				
30.	Has the purpose for listing references been stated?				
31.	Are the number of references complete?				
32.	Are the test tools consistent with the departmental standards?				
33.	Are the test tools complete?				

(continues)

		YES	NO	NA	COMMENTS
34.	Has the extent of testing been defined?				
35.	Have the constraints of testing been defined?				
36.	Are the constraints consistent with the resources available for testing?				
37.	Are the constraints reasonable based on the test objectives?				
38.	Has the general method for recording test results been defined?				
39.	Is the data reduction method consistent with the test plan?				
40.	Is the information needed for data reduction easily identifiable in the test documentation?				
Test Milestones Work Paper					
1.	Has the start date of testing been defined?				
2.	Are all the test tasks defined?				
3.	Are the start and stop dates for each test indicated?				
4.	Is the amount of time allotted for each task sufficient to perform the task?				
5.	Will all prerequisite tasks be completed before the task depending on them is started?				

Chapter 9

Step 3: Verification Testing

WORK PAPER 9-1   Requirements Test Phase Process

TEST FACTOR: Requirements Comply with Methodology

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the applicable organization's policies and procedures been identified?					Confirm with those individuals responsible for developing the policies and procedures that all the applicable policies have been identified.	Compliance	Confirmation/ examination
2. Do the requirements comply with these policies and procedures?					Review requirement to ensure compliance.	Compliance	Fact finding
3. Have the requirements been documented in accordance with the requirements methodology?					Examine requirements to ensure all needed documentation is complete.	Compliance	Checklist
4. Is the cost/benefit analysis prepared in accordance with the appropriate procedures?					Examine cost/benefit analysis to ensure it was prepared in accordance with procedures.	Compliance	Checklist
5. Has the requirements phase met the intent of the requirements methodology?					Review the deliverables from requirements and assess if they meet the intent of the methodology.	Compliance	Checklist
6. Is the requirements phase staffed according to procedures?					Verify that the project is appropriately staffed.	Compliance	Peer review
7. Will all of the applicable policies, procedures, and requirements be in effect at the time the system goes in operation?					Confirm with the appropriate parties the effective dates of existing policies, procedures, and regulations.	Compliance	Fact finding
8. Will there be new standards, policies, and procedures in effect at the time the system goes operational?					Confirm with the appropriate parties the effective dates of new standards, policies, and procedures.	Compliance	Fact finding

(continues)

TEST FACTOR: Functional Specifications Defined

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Can the data required by the application be collected with the desired degree of reliability?					Confirm with the people who would generate the data that it can be generated with the desired degree of reliability.	Requirements	Fact finding
2. Can the data be collected within the time period specified?					Confirm with the people generating the data that it can be collected within the required time frame.	Requirements	Fact finding
3. Have the user requirements been defined in writing?					Confirm with the user that the requirements in writing are complete.	Requirements	Checklist
4. Are the requirements stated in measurable terms?					Examine the reasonableness of the criteria for measuring successful completion of the requirements.	Requirements	Walkthroughs
5. Has the project solution addressed the user requirements?					Examine the system specifications to confirm they satisfy the user's stated objectives.	Requirements	Walkthroughs
6. Could test data be developed to test the achievement of the objectives?					Verify that the requirements are stated in enough detail that they could generate test data to verify compliance.	Requirements	Test data
7. Have procedures been specified to evaluate the implemented system to ensure the requirements are achieved?					Examine the specifications that indicate a post-installation review will occur.	Requirements	Confirmation/ examination
8. Do the measurable objectives apply to both the manual and automated segments of the application system?					Examine to verify that the system objectives cover both the manual and automated segments of the application.	Requirements	Confirmation/ examination

(continues)

WORK PAPER 9-1 *(continued)*

TEST FACTOR: Usability Specifications Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the user functions been identified?					Confirm with the user that all user functions are defined in requirements.	Manual support	Confirmation/ examination
2. Have the skill levels of the users been identified?					Examine requirements documentation describing user skill level.	Manual support	Confirmation/ examination
3. Have the expected levels of supervision been identified?					Examine requirements documentation describing expected level of supervision.	Manual support	Confirmation/ examination
4. Has the time span for user functions been defined?					Confirm with the user that the stated time span for processing is reasonable.	Manual support	Confirmation/ examination
5. Will the counsel of an industrial psychologist be used in designing user functions?					Confirm that the industrial psychologist's services will be used.	Manual support	Confirmation/ examination
6. Have clerical personnel been interviewed during the requirements phase to identify their concerns?					Confirm with clerical personnel that their input has been obtained.	Manual support	Confirmation/ examination
7. Have tradeoffs between computer and people processing been identified?					Examine reasonableness of identified tradeoffs.	Manual support	Design reviews
8. Have the defined user responsibilities been presented to the user personnel for comment?					Confirm that users have examined their responsibilities.	Manual support	Confirmation/ examination

TEST FACTOR: Maintenance Specifications Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Has the expected life of the project been defined?					Confirm with the user that the stated project life is reasonable.	Compliance	Confirmation/ examination
2. Has the expected frequency of change been defined?					Confirm with the user that the expected frequency of change is reasonable.	Compliance	Confirmation/ examination
3. Has the importance of keeping the system up to date functionally been defined?					Confirm with the user that the stated importance of functional updates is correct.	Compliance	Confirmation/ examination
4. Has the importance of keeping the system up to date technologically been defined?					Confirm with IT management that the importance of technological update is correct.	Compliance	Confirmation/ examination
5. Has it been decided who will perform maintenance on the project?					Confirm with IT management who will perform maintenance.	Compliance	Confirmation/ examination
6. Are the areas of greatest expected change identified?					Examine documentation for areas of expected change.	Compliance	Peer review
7. Has the method of introducing change during development been identified?					Examine project change procedures.	Compliance	Checklist
8. Have provisions been included to properly document the application for maintenance purposes?					Examine the completeness of project maintenance documentation.	Compliance	Peer review

(continues)

4

WORK PAPER 9-1 *(continued)*

TEST FACTOR: Portability Needs Determined

		ASSESSMENT					
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Are significant hardware changes expected during the life of the project?					Confirm with computer operations expected hardware changes.	Operations	Confirmation/ examination
2. Are significant software changes expected during the life of the project?					Confirm with computer operations expected software changes.	Operations	Confirmation/ examination
3. Will the application system be run in multiple locations?					Confirm with the user the locations where the application will be operated.	Compliance	Confirmation/ examination
4. If an online application, will different types of terminals be used?					Examine terminal hardware requirements.	Compliance	Confirmation/ examination
5. Is the proposed solution dependent on specific hardware?					Review requirements to identify hardware restrictions.	Compliance	Inspections
6. Is the proposed solution dependent on specific software?					Review requirements to identify software restrictions.	Compliance	Inspections
7. Will the application be run in other countries?					Confirm with the user the countries in which the application will be run.	Compliance	Confirmation/ examination
8. Have the portability requirements been documented?					Examine the requirements documentation for portability requirements.	Compliance	Inspections

(continues)

TEST FACTOR: Systems Interface Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have data to be received from other applications been identified?					Confirm with the project team that interfaced applications have been identified.	Intersystems	Confirmation/examination
2. Have data going to other applications been identified?					Confirm with the project team that interfaced applications have been identified.	Intersystems	Confirmation/examination
3. Has the reliability of interfaced data been defined?					Confirm with other applications the reasonableness of reliability requirements.	Control	Fact finding
4. Has the timing of transmitting data been defined?					Confirm with other applications the reasonableness of timing requirements.	Control	Fact finding
5. Has the timing of data being received been defined?					Confirm with other applications the reasonableness oftiming requirements.	Control	Fact finding
6. Has the method of interfacing been defined?					Examine documentation to ensure the completeness of interface methods.	Intersystems	Walkthroughs
7. Have the interface requirements been documented?					Verify completeness of the interface requirements documentation.	Intersystems	Walkthroughs
8. Have future needs of interfaced systems been taken into consideration?					Confirm with interfaced projects the need to consider future requirements.	Intersystems	Fact finding

(continues)

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WORK PAPER 9-1 *(continued)*

TEST FACTOR: Performance Criteria Established

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Will hardware and software be obtained through competitive bidding?					Examine the reasonableness of the competitive bidding procedures.	Compliance	Acceptance test criteria
2. Have cost-effectiveness criteria been defined?					Examine the cost-effectiveness criteria.	Compliance	Confirmation/examination
3. Has the cost-effectiveness for this application system been calculated in accordance with the procedures?					Examine the calculation and confirm that it has been prepared in accordance with the procedures.	Compliance	Checklist
4. Are the cost-effectiveness procedures applicable to this application?					Confirm with the user that the procedures are applicable to this application.	Compliance	Confirmation/examination
5. Could application characteristics cause the actual cost to vary significantly from the projections?					Confirm with the user that there are no unusual characteristics that could cause the cost to vary significantly.	Compliance	Confirmation/examination
6. Are there application characteristics that could cause the benefits to vary significantly from the projected benefits?					Confirm with the user that there are no characteristics that would cause the actual benefits to vary significantly from the projected benefits.	Compliance	Confirmation/examination
7. Is the expected life of the project reasonable?					Confirm with the user the reasonable life for the project.	Compliance	Confirmation/examination
8. Does a design phase schedule exist that identifies tasks, people, budgets, and costs?					Examine the completeness of the design phase work program.	Compliance	Design review

(continues)

TEST FACTOR: Operational Needs Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the volume of transactions been identified?					Confirm with user that the volume of transactions is correct.	Compliance	Confirmation/ examination
2. Has the timing of processing been determined?					Confirm with user that the timing is reasonable.	Compliance examination	Confirmation/
3. Has the frequency of processing been determined?					Confirm with user that the frequency is reasonable.	Compliance	Confirmation/ examination
4. Has the number of documents that need to be stored online been determined?					Confirm with user that the storage requirements are correct.	Compliance	Confirmation/ examination
5. Will communication capabilities be required for processing?					Confirm with user that the communication needs are correct.	Compliance	Confirmation/ examination
6. Will special processing capabilities such as optical scanners be required?					Review documentation to identify special processing needs.	Operations	Peer review
7. Will computer operations be expected to perform special tasks, such as data entry?					Review documentation to identify special operating requirements.	Operations	Peer review
8. Has it been confirmed with computer operations that they havebeen advised of project requirements?					Confirm with computer operations that they have been advised of project requirements.	Operations	Confirmation/ examination

(continues)

WORK PAPER 9-1 *(continued)*

TEST FACTOR: Tolerances Established

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the significant financial fields been identified?					Confirm with the accounting department that the indicated financial fields are the key financial fields for the application system.	Control	Confirmation/examination
2. Has responsibility for the accuracy and completeness of each financial field been assigned?					Examine system documentation indicating individual responsible for each key financial field.	Control	Inspections
3. Have the accuracy and completeness risks been identified?					Assess the completeness of the identified risks.	Requirements	Walkthroughs
4. Has the individual responsible for each field stated the required precision for financial accuracy?					Review the system documentation to determine that the stated accuracy precision is recorded.	Control	Confirmation/examination
5. Has the accounting cutoff method been determined?					Confirm with the user that the projected cutoff procedure is realistic.	Control	Confirmation/examination
6. Have procedures been established to ensure that all of the transactions will be entered on a timely basis?					Examine the reasonableness of the procedures to ensure the timely recording of transactions.	Control	Walkthroughs
7. Has a procedure been specified to monitor the accuracy of financial information?					Review the reasonableness of the procedures to monitor financial accuracy.	Control	Walkthroughs
8. Are rules established on handling inaccurate and incomplete data?					Review the reasonableness of the procedures to handle inaccurate and incomplete data.	Error handling	Inspections

(continues)

WORK PAPER 9-1 *(continued)*

TEST FACTOR: Authorization Rules Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have all of the key transactions been identified?					Confirm with the user that all of the key transactions are identified.	Security	Confirmation/ examination
2. Have the rules for authorizing each of the key transactions been determined?					Verify that the authorization rules comply with organizational policies and procedures.	Control	Confirmation/ examination & Peer review
3. Are the authorization rules consistent with the value of the resources controlled by the transaction?					Review the reasonableness of the authorization rules in relationship to the resources controlled.	Requirements	Walkthroughs and Peer review
4. Have the individuals who can authorize each transaction been identified?					Verify that the individuals have been granted that specific authorization by management.	Control	Confirmation/ examination & Peer review
5. Have specifications been determined requiring the name of the individual authorizing the transaction to be carried with the transaction?					Review the documentation to verify the specifications require the system to maintain records on who authorized each transaction.	Requirements	Inspection
6. Have the transactions that will be automatically generated by the system been identified?					Confirm with the user that all of the transactions that will be computer generated have been identified.	Security	Confirmation/ examination
7. Have the rules for authorizing computer-generated transactions been identified?					Verify that these authorization rules are consistent with the organization's policies and procedures.	Control	Confirmation/ examination
8. Have procedures to monitor the reasonableness of computer-generated transactions been specified?					Review the reasonableness of the procedures that will monitor computer-generated transactions.	Requirements	Walkthroughs

(continues)

WORK PAPER 9-1   *(continued)*

TEST FACTOR: File Integrity Requirements

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Have key computer files been identified?					Confirm with the user that the identified files are the key files.	Requirements	Confirmation/examination
2. Has the composition of the data on each of the key files been identified?					Confirm with the user that the major data fields have been identified.	Requirements	Confirmation/examination
3. Have the key control fields been identified?					Confirm with the user that the identified key fields are the key control fields.	Requirements	Confirmation/examination
4. Has the method of internal file integrity for each of the key fields been determined?					Verify the reasonableness of the method to ensure the integrity of the key fields within the automated system.	Control	Walkthroughs
5. In a multiuser system, has one user been assigned data integrity responsibility?					Determine the reasonableness of assigning responsibility to the named individual.	Control	Fact finding
6. Has a decision been made as to whether the integrity of the field warrants an external, independently maintained control total?					Confirm with the organization's comptroller the importance of the key fields with which independent external control totals are not maintained.	Control	Confirmation/examination
7. Has the method of maintaining independent control totals on the key fields been determined?					Examine the reasonableness of the method for maintaining independent control totals on key fields.	Control	Fact finding
8. Have tolerances been established on the degree of reliability expected from file integrity controls?					Confirm the reasonableness of the integrity tolerances with the organization's comptroller.	Control	Confirmation/examination

(continues)

TEST FACTOR: Reconstruction Requirements Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Does the organization's record retention policy include automated applications?					Review the applicability of the record retention policy to automated applications.	Control	Walkthroughs
2. Have the criteria for reconstructing transaction processing been determined?					Review the reasonableness of the reconstruction criteria with the application user.	Requirements	Fact finding
3. Have the criteria for reconstructing computer files been determined?					Verify the reasonableness of reconstruction procedures with the manager of computer operations.	Requirements	Fact finding
4. Is requirements documentation adequate and in compliance with standards?					Verify the completeness and adequacy of requirements documentation.	Requirements	Inspections
5. Have the criteria for reconstructing processing from a point of known integrity been determined?					Confirm the reasonableness of the processing reconstruction requirements with the manager of computer operations.	Requirements	Confirmation/ examination
6. Has the project stated a requirement to trace transactions to application control totals?					Verify that the system specifications include this requirement.	Control	Confirmation/ examination
7. Has the project stated a requirement specifying that control totals must be supportable by identifying all the transactions comprising that control total?					Verify that the system specifications include this requirement.	Control	Confirmation/ examination
8. Has the retention period for all of the reconstruction information been specified?					Confirm that the retention periods are in accordance with the organization's record retention	Requirements	Inspections

(continues)

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TEST FACTOR: Impact of Failure Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Has the dollar loss of an application system failure been defined?					Examine the reasonableness of the dollar loss.	Recovery	Fact finding
2. Has the dollar loss calculation for a failure been extended to show the loss at different time intervals, such as one hour, eight hours, one day, one week, etc.?					Examine the reasonableness of the loss amounts at various time intervals.	Recovery	Fact finding
3. Is the proposed system technology reliable and proven in practice?					Confirm with independent sources the reliability and track record of the recommended hardware and software.	Recovery	Confirmation/ examination
4. Has a decision been made as to whether it is necessary to recover this application in the event of a system failure?					Confirm the correctness of the decision with the system user.	Recovery	Confirmation/ examination
5. Are alternate processing procedures needed in the event that the system becomes unoperational?					Confirm with the user the need for alternate processing procedures.	Recovery	Confirmation/ examination
6. If alternate processing procedures are needed, have they been specified?					Confirm with the user the reasonableness of those alternate processing procedures.	Recovery	Confirmation/ examination
7. Has a procedure been identified for notifying users in the event of a system failure?					Confirm with the user the reasonableness of the notification procedure.	Recovery	Confirmation/ examination
8. Has the desired percent of up-time for the system been specified?					Confirm with the user the reasonableness of the up-time.	Recovery	Confirmation/ examination

(continues)

TEST FACTOR: Desired Service Level Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Has the response time for each transaction been identified?					Confirm with the user that the response times are reasonable.	Operations	Confirmation/examination
2. Has a schedule been established indicating which part of the system is run on which day?					Confirm with computer operations that there is sufficient capacity to meet these service levels.	Operations	Confirmation/examination
3. Do all vendor contracts indicate maintenance support for key hardware and software?					Review contractual specifications to ensure they include maintenance.	Operations	Confirmation/examination
4. Have processing tolerances been established for each part of the system?					Confirm with the user that these service level tolerances are correct.	Operations	Confirmation/examination
5. Can computer operations process the requirements within the expected tolerances?					Confirm with the manager of computer operations the reasonableness of the tolerances.	Operations	Confirmation/examination
6. Has the priority of each part of system processing been decided to determine which segment runs first in the event computer time is limited?					Confirm with the user the reasonableness of the priorities.	Operations	Confirmation/examination
7. Has the priority of each application been established in relationship to other applications to determine priority of processing after a failure and in the event of limited computer time?					Confirm with a member of executive management the reasonableness of the application system priority.	Operations	Confirmation/examination
8. Has the volume of processing require-ments been projected for a reason-able period of time in the future?					Confirm with the manager of operations there will be sufficient capacity to meet these increased volumes.	Operations	Confirmation/examination

(continues)

WORK PAPER 9-1 *(continued)*

TEST FACTOR: Access Defined

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Have the application resources been identified?					Confirm with the user that the identified resources are complete.	Security	Risk matrix & Confirmation/ examination
2. Have the users of those resources been identified?					Confirm with the individual responsible for those resources that the users are authorized.	Security	Risk matrix & Confirmation/ examination
3. Have the individuals responsible for those resources been identified?					Confirm with user management that these are the individuals responsible for those resources.	Security	Risk matrix & Confirmation/ examination
4. Has a profile been established matching resources with the users authorized to access those resources?					Examine the completeness of the user profile.	Security	Risk matrix & Peer review
5. Have procedures been identified to enforce the user profile?					Confirm with the manager of computer operations that the procedures are workable.	Security	Confirmation/ examination
6. Has the importance of each resource been identified?					Confirm with the individual responsible that the security classifications are correct.	Security	Confirmation/ examination
7. Has a procedure been established for monitoring access violations?					Evaluate the reasonableness of the monitoring procedures.	Control	Fact finding
8. Has a process been established to punish access violators?					Confirm with management that they intend to enforce violation procedures.	Control	Confirmation/ examination

(continues)

WORK PAPER 9-2   Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Are the defined requirements testable?				
2. Does the user agree the defined requirements are correct?				
3. Do the developers understand the requirements?				
4. Do the stated requirements meet the stated business objectives for the project?				
5. Have the project risks been identified?				
6. Was a reasonable process followed in defining the requirements?				
7. Are project control requirements adequate to minimize project risks?				
8. Was a project requirements walkthrough conducted?				

WORK PAPER 9-3   Computer Applications Risk Scoring Form[1]

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
System Scope and Complexity				
Organizational breadth				
a) Important functions	Must meet important conflicting needs of several organizational units.	Meets limited conflicting requirements of cooperative organizational units.	No significant conflicting needs, serves primarily one organizational unit.	
b) Unrelated organizational units deeply involved	Dependent upon data flowing from many organizational units not under unified direction.	Dependent upon data from a few organizational units with a common interest; if not unified control.	Virtually all input data comes from a small group of sections under unified control.	
Information services breadth				
a) Number of transaction types	More than 25	6 to 25	Fewer than 6	
b) Number of related record segments	More than 6	4 to 6	Fewer than 4	
c) Output reports	More than 20	10 to 20	Fewer than 10	
Margin of error				
a) Necessity for everything to work perfectly, for "split-second timing" for great cooperation (perhaps including external parties), etc.	Very demanding	Realistically demanding	Comfortable margin	
Technical complexity				
a) Number of programs including sort/merge	More than 35	20 to 35	Fewer than 20	

[1]Risk scoring method developed by the General Accounting Office.

(continues)

1

WORK PAPER 9-3 *(continued)*

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
b) Programming approach (number of module/functions interacting within an update/file maintenance program)	More than 20	10 to 20	Fewer than 10	
c) Size of largest program	More than 60K	25K to 60K	Fewer than 25K	
d) Adaptability of program to change	Low, due to monolithic program design.	Can support problems with adequate talent and effort.	Relatively high; program straightforward, modular, roomy, relatively unpatched, well-documented, etc.	
e) Relationship to equipment in use	Pushes equipment capacity near limits.	Within capacities.	Substantial unused capacity.	
f) Reliance on online data entry, automatic document reading, or other advanced techniques	Heavy, including direct entry of transactions and other changes into the master files.	Remote-batch processing under remote operations control.	None or limited to file inquiry.	
Pioneering aspects				
Extent to which the system applies new, difficult, and unproven techniques on a broad scale or in a new situation, thus placing great demands on the non-IS departments, systems and programming groups, IS operations personnel, customers, or vendors, etc.	More than a few relatively untried equipment or system software components or system techniques or objectives, at least one of which is crucial.	Few untried systems components and their functions are moderately important; few, if any, pioneering system objectives and techniques.	No untried system components; no pioneering system objectives or techniques.	

(continues)

2

WORK PAPER 9-3   *(continued)*

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
System stability				
a) Age of system (since inception or last big change)	Less than 1 year	1 to 2 years	Over 2 years	
b) Frequency of significant change	More than 4 per year	2 to 4 per year	Fewer than 2 per year	
c) Extent of total change in last year	Affecting more than 25% of programs.	Affecting 10 to 25% of programs.	Affecting less than 10% of programs.	
d) User approval of specifications	Cursory, essentially uninformed.	Reasonably informed as to general but not detailed specifications; approval apt to be informal.	Formal, written approval, based on informed judgment and written, reasonably precise specifications.	
Satisfaction of user requirements				
a) Completeness	Incomplete, significant number of items not processed in proper period.	Occasional problems but normally no great difficulties.	No significant data omitted or processed in wrong period.	
b) Accuracy	Considerable error problem, with items in suspense or improperly handled.	Occasional problems but normally not great difficulties.	Errors not numerous or of consequence.	
c) Promptness in terms of needs	Reports and documents delayed so as to be almost useless; forced to rely on informal records.	Reports and documents not always available when desired; present timetable inconvenient but tolerable.	Reports and documents produced soon enough to meet operational needs.	

(continues)

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
d) Accessibility of details (to answer inquiries, review for reasonableness, make corrections, etc.)	Great difficulty in obtaining details of transactions or balances except with much delay.	Complete details available monthly; in interim, details available with some difficulty and delay.	Details readily available.	
e) Reference to source documents (audit trail)	Great difficulty in locating documents promptly.	Audit trail excellent; some problems with filing and storage.	Audit trail excellent; filing and storage good.	
f) Conformity with established system specifications	Actual procedures and operations differ in important respects.	Limited tests indicate that actual procedures and operations differ in only minor respects and operations produce desired results.	Limited tests indicate actual procedures and operations produce desired results.	
Source data origin and approval				
a) People, procedures, knowledge, discipline, division of duties, etc. in departments that originate and/or approve data	Situation leaves much to be desired.	Situation satisfactory, but could stand some improvement.	Situation satisfactory.	
b) Data control procedures outside the information services organization	None or relatively ineffective; e.g., use of noncritical fields, loose liaison with IT department, little concern with rejected items.	Control procedures based on noncritical fields; reasonably effective liaison with IT department.	Control procedures include critical fields; good tie-in with IT department; especially good on rejected items.	
c) Error rate	Over 7% of transactions rejected after leaving source data department.	4–7% of transactions rejected after leaving source data department.	Less than 4% of transactions rejected after leaving source data department.	

(continues)

4

WORK PAPER 9-3   *(continued)*

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
d) Error backing	Many 30-day-old items.	Mostly 10–15-day-old items.	Items primarily less than 7 days old.	
Input data control (within IT department)				
a) Relationship with external controls	Loose liaison with external control units; little concern with rejected items; batch totals not part of input procedures; only use controls like item counts; no control totals of any kind.	Reasonably effective liaison with external data control units; good control over new items, but less satisfactory control over rejected items; batch totals received, but generated by computer.	Good tie-in with external control units for both valid and rejected items; batch totals received as part of input process.	
b) Selection of critical control fields	Control based on noncritical fields.	Control based on a mixture of critical and noncritical fields, with effective supplementary checks.	Control established on critical fields.	
c) Controls over key transcription	Control based on batch totals.	Control based on transmittal sheets; batch totals and key verification of critical fields not batch controlled.	Control based on transmittal sheets; batch totals maintained on data logs; key verification of all critical fields; written "sign-off" procedures.	
Data validation				
a) Edit tests	Alphanumeric tests.	Range and alphanumeric tests.	Range, alphanumeric, and check-digit tests.	
b) Sophistication	Simple, based on edit of one field at a time.	Simple editing, plus some editing based on the interrelationship of two fields.	Simple editing, plus extensive edit tests based on the interrelationship of two or more fields.	

(continues)

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
c) Application to critical data	A considerable amount of critical data is not edited.	A few critical fields are edited only indirectly.	Editing performed on critical fields.	
d) Error balancing, retrieval, and correction procedures	Error rejected by system and eliminated from controls; treated as new items when reintroduced.	Number and value of rejected items carried in suspense account without electronically maintained details.	Error carried in suspense account in total and in detail until removed by correction.	
Computer processing control procedure				
a) Controls within machine room	Informal operating instructions.	Written operating procedures.	Operations are based on a schedule and use up-to-date instructions.	
b) Manual and electronic safeguards against incorrect processing of files	Tape library controls by serial number; no programmed checks.	Tape library controls by serial number; programmed checks applied to file identification.	Programmed label check applied to serial number, expiration date, and the identification.	
c) Recording of run-to-run debit, credit, and balance totals for both transaction processing and master field records	Run-to-run totals not used.	Run-to-run totals printed and compared manually.	Run-to-run totals printed and compared by program.	
d) Documentation status	Poor or no standards; uneven adherence; not part of system and program development.	Adequate practices not uniformly adhered to; documentation done "after the fact."	Excellent standards closely adhered to and carried out as part of system and program development.	
e) System test practices	Some transaction paths not tested.	Each transaction path tested individually.	Each transaction path tested in combination with all other transactions.	

(continues)

WORK PAPER 9-3 *(continued)*

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
Output control				
a) Quantitative controls	Virtually nonexistent.	Hard to tie back meaningfully to input controls.	Tied back to input controls.	
b) Qualitative controls	Documents and reports accepted virtually without review.	Documents and reports receive limited review.	Documents and reports tested in detail, in addition to receiving a "common sense" review of reasonable data limits.	
c) Distribution controls	No routine report distribution procedures.	Routine procedures for distribution limited to list of users and frequency of report delivery.	Written procedures requiring that control log indicate receipt by user, time of accounting for each copy, etc.	
Online processing controls				
a) Data transmission controls, including error detection, error recovery, and data security	The front-end control program does not validate operator identification codes or message sequence number, and does not send acknowledgment to origin.	The front-end control program checks terminal and operator identification codes and message sequence number, sends acknowledgment to origin, and provides a transaction log.	The front-end control program validates terminal/operator identification codes plus transaction authorization codes and message sequence number and count, corrects errors, sends acknowledgment to origin, and provides log of transactions plus copies of updated master file records.	

(continues)

WORK PAPER 9-3 *(continued)*

SIGNIFICANT CHARACTERISTICS	INDICATIVE OF HIGH RISK	INDICATIVE OF MEDIUM RISK	INDICATIVE OF LOW RISK	COMMENTS
b) Data validation controls, including error detection and correction	Neither the front-end control nor the application processing program checks for authorization approval codes; no check digits are used with identification keys; little use of extensive data relationship tests; erroneous transactions are rejected without analysis or suspense entry.	The application program checks approval codes for key transaction types only, but check digits are not used with identification keys; extensive data relationship tests are used; erroneous transactions are sent back to terminal with a note, but no suspense entry is made.	The application program validates approval codes for all transactions, and check digits are used with identification keys; data relationship tests are used extensively; erroneous transactions are noted in error suspense file when sent back to terminal with note.	
c) Information services controls, including error detection, transaction processing, master file processing, and file recovery provisions	Application program produces a total number of transactions processed; no master file processing controls; file recovery provisions limited to periodic copy of master file.	Application program produces a summary record of all debit and credit transactions processed; no master file processing controls; file recovery provisions limited to transaction log and periodic copy of master file.	Stored validation range values are used to validate transaction fields; application program summarizes all transactions processed by type, with credit and debit values for each terminal, and uses a master file control trailer record that is balanced by program routine; end-of-processing file recovery provisions include transaction log of active master file records.	

8

WORK PAPER 9-4 Design Phase Test Process

TEST FACTOR: Data Integrity Controls Designed

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Are controls established over accuracy and completeness during the transaction origination process?					Review the adequacy of the transaction origination accuracy and completeness control.	Control	Risk matrix & Checklist
2. Are input transactions controlled, such as through a sequential input number, to ensure that all transactions are entered?					Review the adequacy of the input controls to ensure that all input is entered.	Control	Risk matrix & Checklist
3. Are communication controls established to ensure the accurate and complete transmission of data?					Review the adequacy of transmission accuracy and completeness controls.	Control	Risk matrix & Checklist
4. For key entry transactions, such as cash receipts, are batch control totals prepared?					Verify the adequacy of the batch control total procedures.	Requirements	Control flow analysis
5. For key entry input transactions, such as purchase orders, are batch numbers prepared to ensure that batches of input are not lost?					Verify the adequacy of the batch numbering procedures.	Requirements	Control flow analysis
6. Are check digits or equivalent controls used on key control fields, such as product number, to ensure the accurate entry of product number?					Verify that key fields use procedures that ensure the accurate entry of that information.	Requirements	Error guessing & Design-based functional testing

(continues)

WORK PAPER 9-4 *(continued)*

TEST FACTOR: Data Integrity Controls Designed *(continued)*

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. Is each field subject to extensive data validation checks?					Examine the type and scope of data validation checks for each key field to determine that they are adequate.	Error handling	Acceptance test criteria, Error guessing. Checklist, & Data dictionary
8. Are input numbers, batch numbers, and batch totals verified by the data validation programs to ensure the accurate and complete input of transactions?					Verify that the controls established at the time of manual input preparation are verified by the computer program.	Control	Inspections

(continues)

WORK PAPER 9-4   *(continued)*

TEST FACTOR: Authorization Rules Designed

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Has the method for authorizing each transaction been documented?					Review the documentation to ensure authorization rules are complete.	Security	Checklist & Inspections
2. For those documents whose authorization is dependent upon the source of origination as opposed to a signature, can that source of origination be verified by the application system?					Determine that for transactions whose entry itself indicates authorization, that those transactions can only originate from the properly authorized source.	Security	Checklist, Error guessing, & Inspections
3. In a multiuser system, has responsibility for authorization been assigned to a single individual?					Determine the adequacy of the assigned authorization responsibilities in a multiuser system.	Control	Inspections & Fact finding
4. Is the authorization method consistent with the value of the resources being authorized?					Review the reasonableness of the authorization method in relationship to the resources being controlled.	Requirements	Cause effect graphing, Walkthroughs, & Scoring
5. If passwords are used for authorization, are procedures adequate to protect passwords?					Review the adequacy of the password protection procedures.	Control	Error guessing
6. If passwords are used, will they be changed at reasonable frequencies?					Determine the reasonableness of the frequency for changing passwords.	Control	Error guessing

(continues)

WORK PAPER 9-4 *(continued)*

TEST FACTOR: Authorization Rules Designed *(continued)*

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. Are the authorization rules verified by the automated segment of the application?					Examine the documentation for verifying authorization rules.	Security	Checklist, Risk matrix, & Inspections
8. Are procedures established to report authorization violations to management?					Examine the reasonableness of the procedure to report authorization violations to management.	Control	Error guessing & Inspections

(continues)

4

TEST FACTOR: File Integrity Controls Designed

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Have the fields been identified that will be used to verify file integrity?					Confirm with users that there are sufficient file integrity checks based upon the importance of data.	Control	Error guessing Confirmation/ examination
2. Are procedures established to verify the integrity of key files?					Examine the documentation indicating the file integrity verification procedures to determine they are adequate.	Requirements	Inspections
3. Are procedures established to verify the integrity of files on a regular basis?					Confirm with the user that the file integrity verification frequency is adequate to protect the integrity of the file.	Requirements	Confirmation/ examination
4. Are procedures established to report file integrity variances to management?					Examine the specifications and procedures for reporting file integrity variances to management.	Control	Inspections
5. For key files, such as cash receipts, have procedures been establishment to maintain independent control totals?					Verify for key files that independent control total procedures are adequate.	Control	Checkpoint & Inspections
6. Have procedures been established to reconcile independent control totals to the totals produced by the automated segment?					Verify the adequacy of the reconciliation procedures.	Control	Cause-effect graphing, Checklist, & Desk checking
7. Will the independent control totals be reconciled regularly to the automated control totals?					Confirm with the user that the frequency of independent reconciliation is adequate.	Requirements	Confirmation/ examination

(continues)

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WORK PAPER 9-4   *(continued)*

TEST FACTOR: File Integrity Controls Designed   *(continued)*

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
8. Are simple accounting proofs performed regularly to ensure that the updating procedures are properly performed?					Review the adequacy of the methods to ensure that updating is performed correctly.	Error handling	Boundary value analysis & Desk checking

(continues)

7

TEST FACTOR: Audit Trail Designed

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Have the detailed specifications been documented for each audit trail objective?					Review the completeness of the documentation in relationship to the audit trail objectives.	Requirements	Walkthroughs
2. Have the data fields and records for each audit trail been defined?					Review the reasonableness of the included data fields to satisfy the audit trail objective.	Requirements	Walkthroughs
3. Has the length of time to save each audit trail been defined?					Verify that the length of time is consistent with the organization's record retention policy.	Control	Confirmation/ examination & Fact finding
4. Have the instructions been defined for utilizing the audit trail?					Review the completeness of the specifications to instruct people in using the audit trail.	Requirements	Checklist & Data flow analysis
5. Does the audit trail include both the manual and automated segments of the system?					Review the audit trail specifications to verify that both the manual and automated segments are included.	Requirements	Flowchart & Tracing
6. Is the audit trail stored in a sequence and format making the retrieval and use easy?					Confirm with audit trail users that the form and sequence are consistent with the use they would make of the audit trail.	Requirements	Confirmation/ examination & Fact finding
7. Will sufficient generations of the audit trail be stored away from the primary site so that if the primary site is destroyed processing can be reconstructed?					Examine the adequacy of the off-site facility.	Requirements	Inspections
8. Have procedures been established to delete audit trails in the prescribed manner at the completion of their usefulness?					Assess the adequacy of the audit trail destruction procedures.	Requirements	Checklist & Error guessing

(continues)

WORK PAPER 9-4   *(continued)*

TEST FACTOR: Contingency Plan Designed

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Has responsibility for the preparation of a contingency plan been assigned?					Verify that the assigned individual has the sufficient skills and time to prepare a contingency plan.	Operations	Fact finding
2. Does the contingency plan define all of the causes of failure?					Confirm with the computer operations manager that the list of potential failures is complete.	Operations	Error guessing & Confirmation/ examination
3. Does the contingency plan define responsibilities during the contingency period?					Review the completeness of the assigned responsibilities.	Operations	Checklist
4. Does the contingency plan identify contingency resources?					Confirm with the computer operations manager that the assigned resources will be available in the event of a failure.	Operations	Confirmation/ examination
5. Does the contingency plan predetermine the operating priorities after a problem?					Confirm with a member of executive management that the recovery priorities are reasonable.	Recovery	Confirmation/ examination
6. Are all the parties involved in a failure included in the development of the contingency plan?					Review the list of contingency plan participants for completeness.	Recovery	Checklist
7. Are procedures established to test the contingency plan?					Review the adequacy of the contingency plan test procedures.	Recovery	Checklist & Disaster test
8. Will the contingency plan be developed at the time the application goes operational?					Review the schedule for developing the contingency plan to ensure it will be complete	Recovery	Inspections

(continues)

8

WORK PAPER 9-4   *(continued)*

TEST FACTOR: Method to Achieve Service Level Designed

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Can the system design achieve the desired service level?					Either confirm the reasonableness with computer operations personnel or run a simulation of the system to verify service levels.	Execution	Confirmation/ examination & Modeling
2. Do peak period volumes impact upon the desired service level?					Develop a simulation to test service levels based upon maximum processed volumes.	Execution	Modeling
3. Can user personnel manually handle their part of peak volume periods?					Develop a model to demonstrate the amount of time required to perform the manual part of processing.	Execution	Modeling
4. Will expected errors impact upon service levels?					Determine the expected number of errors and include that in the system simulation.	Execution	Checklist, Error guessing, Inspections, & Modeling
5. Has the cost of failing to achieve service levels been determined?					Confirm with users that the cost of failure to meet service levels has been calculated.	Execution	Confirmation/ examination
6. Are desired and projected service levels recalculated as the system is changed?					Examine the requests for system changes and determine their impact on the service level.	Execution	Inspections & Modeling
7. Are procedures established to monitor the desired service level?					Review the adequacy of the monitoring procedure.	Execution	Checklist & Inspections
8. Will sufficient computer resources be installed to meet the service levels as the volumes increase?					Confirm with the computer operations manager that computer resources will be increased in proportion to increased volumes of data.	Operations	Confirmation/ examination & Fact finding

(continues)

TEST FACTOR: Access Procedures Designed

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have advanced security techniques such as cryptography been considered?					Confirm with the individual responsible for data security that advanced security measures have been considered and implemented where necessary.	Security	Confirmation/ examination
2. Have operating software features been evaluated for security purposes and implemented where necessary?					Confirm with system programmers that a systematic process was used to evaluate systems software features needed for security.	Security	Risk matrix & Confirmation/ examination
3. Have procedures been designed to protect the issuance and maintenance of passwords?					Confirm with the data security officer the adequacy of password protection procedures.	Security	Risk matrix & Confirmation/ examination
4. Are procedures defined to monitor security violations?					Review the adequacy of the procedures to monitor security violations.	Control	Checklist & Fact finding
5. Does senior management intend to prosecute security violators?					Confirm with senior management their intent to monitor security and prosecute violators.	Control	Confirmation/ examination
6. Have the security needs of each application resource been defined?					Review the completeness and adequacy of the security for each application resource.	Control	Risk matrix & Scoring
7. Has one individual been assigned the responsibility for security of the application?					Confirm that the individual appointed has sufficient skill and time to monitor security.	Security	Checklist & Confirmation/ examination
8. Is the system designed to protect sensitive data?					Confirm with the user the completeness of the design to protect sensitive data.	Security	Cause-effect graphing, Correctness proof, Inspections, & Scoring

(continues)

WORK PAPER 9-4 *(continued)*

TEST FACTOR: Design Complies with Methodology

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the appropriate methodology specifications been determined?					Confirm with the responsible party that the specifications are correct.	Compliance	Correctness proof, Error guessing, & Confirmation/ examination
2. Has the required level of compliance to the methodology been achieved?					Verify that the project complies with the methodology.	Compliance	Design reviews
3. Will the standards, policies, etc. be monitored during implementation?					Confirm with the involved parties that they will monitor compliance to the methodology.	Compliance	Confirmation/ examination & Fact finding
4. Has the cost of compliance been determined so that it can be measured against the benefit, sanction, etc.?					Review with the involved parties the cost/benefit of compliance.	Compliance	Fact finding
5. Are procedures established to substantiate compliance to the methodology?					Review the adequacy of the specified method of substantiating compliance.	Compliance	Fact finding
6. Will the methodology be in use when the system becomes operational?					Confirm with IT management the applicability of using all or part of the methodology based on the application's expected implementation date.	Compliance	Confirmation/ examination
7. Have deviations from the methodology been documented and approved?					Verify variances from the methodology are approved.	Compliance	Design reviews & Confirmation/ examination
8. Is design documentation adequate and in compliance with standards?					Verify the completeness and adequacy of design documentation.	Compliance	Design reviews

(continues)

TEST FACTOR: Design Conforms to Requirements

		ASSESSMENT					
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Has the systems design group made changes to the application system without gaining user approval?					Examine all of the program change requests to verify they have been approved by the user.	Requirements	Confirmation/ examination
2. Is there a formal change request procedure that must be followed to make all system changes?					Examine the adequacy and compliance to the program change procedure.	Control	Checklist & Inspections
3. Are the objectives of the system reevaluated and changed where necessary based on each approved change request?					Determine the effect of the approved system changes on the objectives, and determine if the objectives have been changed accordingly.	Requirements	Inspections & Walkthroughs
4. Does the user continually reevaluate the application system objectives in regard to changing business conditions?					Confirm with the user that the objectives are updated based on changing business conditions.	Requirements	Acceptance test criteria, Confirmation/ examination, & Fact finding
5. Are user personnel heavily involved in the design of the application system?					Confirm with the information services project personnel that the user is heavily involved in the system design.	Requirements	Confirmation/ examination & Fact finding
6. If user management changes, does the new management reconfirm the system objectives?					Verify that the design specifications achieve the intent of the application requirements.	Requirements	Acceptance test criteria, Confirmation/ examination

(continues)

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WORK PAPER 9-4 *(continued)*

TEST FACTOR: Design Conforms to Requirements *(continued)*

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. If the objectives are changed, is the means of measuring those objectives changed accordingly?					Verify that the criteria to measure the objectives are reasonable.	Requirements	Acceptance test criteria, Cause-effect graphing, Design-based functional testing, Executable specs, & Symbolic execution
8. Do the design specifications achieve the intent of the requirements?					Verify that the design specifications achieve the intent of the application requirements.	Requirements	Correctness proof, Data flow analysis, Design-based functional testing, Desk checking, Executable specs, & Symbolic execution

(continues)

WORK PAPER 9-4   *(continued)*

TEST FACTOR: Design Facilitates Use

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Have the people tasks been defined?					Examine the manual processing documentation.	Manual support	Inspections
2. Are the tasks realistic based on the skill level of the people?					Review the application system processing.	Manual support	Peer review
3. Is the timing of the tasks realistic?					Calculate the adequacy of manual turnaround time.	Requirements	Modeling
4. Will the information needed to do the people tasks be available?					Confirm with users the expected availability of needed information.	Requirements	Confirmation/ examination
5. Is the workload reasonable based on the expected staffing?					Estimate the time required to complete assigned tasks.	Requirements	Modeling
6. Have the people involved been presented their tasks for comment?					Confirm with users their independence in systems design.	Manual support	Confirmation/ examination
7. Could some of the people tasks be better performed on the computer?					Review the application system processing.	Requirements	Cause-effect graphing & Error guessing
8. Will adequate instruction manuals be prepared for these tasks?					Review the design specifications for preparation of instruction manuals.	Manual support	Checklist

(continues)

WORK PAPER 9-4 *(continued)*

TEST FACTOR: Design Is Maintainable

TEST CRITERIA	ASSESSMENT			RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Is system design logically constructed?					Review the application design structure.	Compliance	Peer review
2. Are data attributes fully defined?					Examine the data documentation for completeness.	Compliance	Inspections
3. Is computer logic presented in an easy-to-follow manner?					Review the application system logic.	Compliance	Peer review
4. Are changes to the system incorporated into the design documentation?					Trace changes to the system specifications.	Compliance	Inspections
5. Have areas of expected high frequency of change been designed to facilitate maintenance?					Review the maintainability of logic in areas of expected high change.	Compliance	Fact finding
6. Are business functions designed using a standalone concept?					Review the application design structure.	Compliance	Inspections
7. Is design documentation complete and usable?					Examine the design documentation for usability.	Compliance	Inspections
8. Are maintenance specialists involved in the design process?					Confirm with maintenance specialists that they are involved in the design process.	Compliance	Confirmation/ examination

(continues)

WORK PAPER 9-4   *(continued)*

TEST FACTOR: Design Is Portable

	ASSESSMENT						
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
1. Does the design avoid specialized hardware features?					Review hardware specifications for special features.	Operations	Inspections
2. Does the design avoid specialized software features?					Review software specifications for special features.	Operations	Inspections
3. Will the system be coded in a common computer language?					Examine coding rules for the project.	Operations	Fact finding
4. Will the system be restricted to common features of the language?					Examine coding rules for the project.	Operations	Fact finding
5. Does the system avoid the use of specialized software packages?					Review software specifications for specialized software.	Operations	Inspections
6. Are data values restricted to normal data structures?					Review data documentation for type of data structure used.	Operations	Inspections
7. Does documentation avoid specialized jargon?					Review documentation for use of specialized jargon.	Operations	Inspections
8. Have the portability implementation considerations been documented?					Review the adequacy of the portability documentation.	Operations	Inspections

(continues)

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WORK PAPER 9-4   *(continued)*

TEST FACTOR: Interface Design Complete

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the transactions to be received from other applications been defined?					Examine interfaced input data documentation.	Intersystems	Checklist
2. Have the transactions going to other applications been defined?					Examine interfaced output data documentation.	Intersystems	Checklist
3. Has the timing of interfaced transactions been defined?					Review system specifications for definition of timing.	Intersystems	Flowchart
4. Is the timing of interfaced transactions realistic?					Confirm with interfaced application personnel that timing is reasonable.	Operations	Confirmation/examination
5. Has the media for transferring data to interfaced applications been defined?					Review system specifications for documentation of media.	Operations	Inspections
6. Are common data definitions used on interfaced data?					Compare common data definitions of interfaced applications.	Control	Fact finding
7. Are common value attributes used on interfaced data?					Compare common value attributes of interfaced applications.	Control	Fact finding
8. Has interface documentation been exchanged with interfaced applications?					Confirm with interfaced projects that documentation has been exchanged.	Intersystems	Confirmation/examination

(continues)

TEST FACTOR: Design Achieves Criteria

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the systems development and acceptance criteria costs been recalculated based on the systems design?					Confirm with the user that the new system costs and acceptance criteria are reasonable.	Execution	Acceptance test criteria & Confirmation/ examination
2. Have the criteria for developing the manual processing segments been confirmed?					Confirm with the user that the manual effort has been defined and the cost confirmed.	Execution	Acceptance test criteria & Confirmation/ examination
3. Has the cost of operating the computer programs been confirmed based on the systems design?					Confirm with computer operations that the operational costs are reasonable.	Execution	Acceptance test criteria & Confirmation/ examination
4. Have the costs to operate the manual segments of the system been confirmed?					Confirm with the user that the cost to operate the manual segments of the application are reasonable.	Execution	Acceptance test criteria & Confirmation/ examination
5. Have the benefits of the system been confirmed based upon the systems design?					Confirm with the user the reasonableness of the benefits.	Execution	Acceptance test criteria & Confirmation/ examination
6. Has the useful life of the system been confirmed based upon the systems design?					Confirm with the user the reasonableness of the expected life of the application.	Execution	Acceptance test criteria & Confirmation/ examination

(continues)

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WORK PAPER 9-4   *(continued)*

TEST FACTOR: Design Achieves Criteria   *(continued)*

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. Has the cost-effectiveness of the new system been recalculated if changes in the factors have occurred?					Confirm with the organization's accountants that the cost is correct.	Execution	Confirmation/ examination
8. Does the cost-effectiveness after design warrant the continuance of the system?					Confirm with senior management that the system design is still cost-effective.	Execution	Confirmation/ examination

(continues)

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WORK PAPER 9-4 *(continued)*

TEST FACTOR: Needs Communicated to Operations

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have special hardware needs been defined?					Review specifications for special hardware needs.	Operations	Inspections
2. Have special software needs been defined?					Review specifications for special software needs.	Operations	Inspections
3. Have operations timing specifications been defined?					Review specifications for operations timing specifications.	Operations	Inspections
4. Have system volumes been projected over an extended time period?					Confirm with users the reasonableness of projections.	Compliance	Confirmation/ examination
5. Have operations capacity requirements been specified?					Review specifications to determine whether the capacity requirements are reasonable.	Operations	Checklist
6. Have computer test requirements been specified?					Examine test specifications for reasonableness.	Operations	Fact finding
7. Have supplies/forms been specified?					Review specifications to verify that all supplies/ forms have been identified.	Operations	Fact finding
8. Has computer operations been notified of the anticipated workload and other requirements?					Confirm with computer operations their awareness of operation requirements.	Operations	Confirmation/ examination

(continues)

WORK PAPER 9-5   Business System Design Review Checklist[2]

	YES	NO	N/A	COMMENTS
Systems Overview				
1. Is there a brief description of interfaces with other systems?				
2. Is there an outline of the major functional requirements of the system?				
3. Are the major functions defined into discrete steps with no boundary overlapping?				
4. Have manual and automatic steps been defined?				
5. Has the definition of what data is required to perform each step been indicated along with a description of how the data is obtained?				
System Description				
6. Has a system structure chart been developed, showing the logical breakdown into subsystems and interfaces with other systems?				
7. Have the major inputs and outputs been defined as well as the functional processing required to produce the output?				
8. Is there a narrative description of the major functions of the system?				
9. Have subsystem functional flow diagrams been developed showing the inputs, processing, and outputs relevant to the subsystem?				
10. Has subsystem narrative description been developed?				
11. Do the functional outlines follow the logical structure of the system?				
12. Are they hierarchical in nature—that is, by function and by steps within function?				
Design Input and Output Data—Data Structure				
13. Has the data been grouped into logical categories (i.e., customer product, accounting, marketing sales, etc.)?				
14. Has the data been categorized as follows: a) Static b) Historical data likely to be changed c) Transaction-related				
15. Have standard data names (if possible) been used?				
16. Has the hierarchical relationship among data elements been defined and described?				

[2]Based on case study included in *Effective Methods of EDP Quality Assurance*.

	YES	NO	N/A	COMMENTS
Design Output Documents				
17. Are there headings?				
18. Do the headings include report titles, department, date, page number, etc.?				
19. Are the output documents adaptable to current filing equipment?				
20. Are processing dates, system identification, titles, and page numbers shown?				
21. Has consideration been given to output devices?				
22. Is each data column identified?				
23. Where subtotals are produced (e.g., product within customer) are they labeled by control break?				
Design Input Elements				
24. Are the data elements clearly indicated?				
25. Has the source of the data been defined (department and individual)?				
26. Have input requirements been documented?				
27. Is the purpose of the input document clear?				
28. Is the sequence indicated?				
Design Computer Processing				
29. Has each function been described using functional terminology (e.g., if salary exceeds maximum, print message)?				
30. Has validity checking been defined with reference to the data element dictionary?				
31. In cases where the same data may be coming from several sources, have the sources been identified as to priorities for selection by the system?				
32. Has processing been classified according to type of function (e.g., transaction, calculation, editing, etc.)?				
Design Noncomputer Processing				
33. Has the preparation of input been described?				
34. Has the distribution of output been described?				
35. Has an error correction procedure been described?				
Organizational Controls				
36. Have organizational controls been established?				

2

	YES	NO	N/A	COMMENTS
37. Have controls been established across department lines?				
38. Have the control fields been designed?				
39. Are there control validation procedures prior to proceeding to the next step?				
Overall System Controls				
40. Have controls been designed to reconcile data received by the computer center?				
41. Have controls for error correction and reentry been designed?				
42. Have controls been designed that can be reconciled to those of another system?				
Input Controls				
43. Have some or all of the following criteria been used for establishing input controls?				
a) Sequence numbering				
b) Prepunched cards				
c) Turnaround documents				
d) Batch numbering				
e) Input type				
f) Predetermined totals				
g) Self-checking numbers				
h) Field length checks				
i) Limit checks				
j) Reasonability checks				
k) Existence/nonexistence checks				
44. Do controls and totals exist for:				
a) Each value column				
b) Cross-foot totals				
c) Counts of input transactions, errors, accepted transactions				
d) Input transactions, old master, new master				
45. Are the results of all updates listed for each transaction showing the before and after condition?				
46. As the result of an update, are the number of adds, deletes, and changes processed shown?				
47. If relationship tests have been used, are they grouped and defined?				
48. Have control total records been utilized to verify that all records have been processed between runs?				

(continues)

3

	YES	NO	N/A	COMMENTS
Output Controls				
49. Have output controls been established for all control fields?				
50. Is there a separate output control on errors rejected by the system?				
System Test Plan				
51. Have acceptance criteria been identified?				
52. Has a tentative user acceptance strategy been developed?				
53. Have test data requirements been defined?				
54. Have data element dictionary forms been completed?				
55. Have organizational changes been defined?				
56. Have new organizational charts or new positions been required?				
57. If required, have areas for special user procedures been identified?				
58. Has a timetable for operating the system been developed?				
59. Were separate timetables developed for different cycles (weekly, monthly)?				
60. Has the documentation been gathered and organized?				
61. Has a financial analysis been performed?				
Plan User Procedures—Conversion Design				
62. Have the scope, objectives, and constraints been developed?				
63. Has a plan for user procedures and conversion phases been completed?				
64. Has the plan been broken down into approximate work units (days) to serve as a basis for a schedule for the other phases?				
65. Have the resources and responsibilities been arranged?				
66. Have schedules been prepared for the next phases?				
67. Have appropriate budgets for the next phases been prepared?				
68. Has a project authorization been properly prepared for remaining phases?				

4

WORK PAPER 9-6   Computer Systems Design Review Checklist[3]

	YES	NO	N/A	COMMENTS
Develop Outline Design				
1. Has a detailed review of the business system design resulted in requiring additional information or changes?				
2. Have these revisions been reviewed by the user?				
3. Have existing sources of data been identified?				
4. Has a data management alternative been considered because of the nature of the system?				
5. Have the data elements been grouped by category?				
6. Have the record layout forms been used for listing the data elements?				
7. Has the file description form been used to show the characteristics of each file?				
8. Have the access methods been determined?				
9. Has use been made of blocking factors to reduce accesses for a sequential file?				
10. If a database has been used, has the relationship between segments (views of the database) been included?				
11. If new data elements have been required, have they been included as part of the data dictionary?				
12. Has the description of processing been translated into system flowcharts showing programs and their relationships, as well as reports?				
13. Has the processing been isolated by frequency as well as function?				
14. Does each file requiring updating have an associated, unique transaction file?				
15. Does each main file have a separate validation and update function?				
16. Have the following been addressed in order to reduce excessive passing of files:				
a) Sort verbs (statements)				
b) Input procedure				
c) Output procedure				
d) Random updating				
17. Has a matrix been prepared showing which programs create, access, and update each file?				

[3]ibid.

(continues)

1

	YES	NO	N/A	COMMENTS
18. Has a separate section been set up for each program in the system showing: a) Cover page showing the program name, systems and/or subsystem name, run number, and a brief description of the program b) Input/output diagram c) Processing description				
19. Does the processing description contain a brief outline of the processing that the program is going to perform?				
20. Has the content and format of each output been defined?				
21. Has the content and format of each input been defined?				
22. Have data items been verified against to the rules specified in the data dictionary?				
23. Have transactions that update master files been assigned record types?				
Hardware/Software Configuration				
24. Does the hardware configuration show the following: a) CPU b) Minimum core storage c) Number and type of peripherals d) Special hardware e) Numbers of tapes and/or disk packs f) Terminals, minicomputers, microfilm, microfiche, optical scanning, etc.				
25. Has the following software been defined: a) Operating system b) Telecommunications c) Database management				
26. If telecommunications equipment is involved, has a communications analyst been consulted regarding type, number, speed, etc.?				
File Conversion				
27. Have the file conversion requirements been specified?				
28. Have program specifications for the file conversion programs been completed?				
29. Can the main program(s) be utilized to perform the file conversion?				
30. Has a schedule been established?				

(continues)

	YES	NO	N/A	COMMENTS
Design System Tests				
31. Has the user's role for testing been defined?				
32. Have responsibilities and schedules for preparing test data been agreed to by the user?				
33. Has the input medium been agreed to?				
34. Is special hardware/software required, and if so, will programmers and/or users require additional training?				
35. Have turnaround requirements been defined?				
36. Have testing priorities been established?				
37. If an online system, has an investigation of required space as opposed to available space been made?				
38. Has an analysis of the impact upon interfacing systems been made and have arrangements been made for acquiring required information and data?				
39. Have testing control procedures been established?				
40. Has the possibility of utilizing existing code been investigated?				
41. Has a system test plan been prepared?				
42. Has the user prepared the system test data as defined by the conditions to be tested in the system test plan?				
43. Has computer operations been consulted regarding keypunching and/or verification?				
Revise and Complete Design				
44. Have all required forms from previous phases as well as previous task activities in this phase been completed?				
45. Has the processing description for program specifications been categorized by function?				
46. For validation routines, have the editing rules been specified for:				
a) Field format and content (data element description)				
b) Interfield relationships				
c) Intrafield relationships				
d) Interrecord relationships				
e) Sequence				
f) Duplicates				
g) Control reconciliation				

(continues)

3

	YES	NO	N/A	COMMENTS
47. Have the rejection criteria been indicated for each type of error situation, as follows:				
a) Warning message but transaction is accepted				
b) Use of the default value				
c) Outright rejection of record within a transaction set				
d) Rejection of an entire transaction				
e) Rejection of a batch of transactions				
f) Program abort				
48. Have the following validation techniques been included in the specifications:				
a) Validation of entire transaction before any processing				
b) Validation to continue regardless of the number of errors on the transaction unless a run abort occurs				
c) Provide information regarding an error so the user can identify the source and determine the cause				
49. Has a procedure been developed for correction of rejected input either by deletion, reversal, or reentry?				
50. Do the specifications for each report (output) define:				
a) The origin of each item, including the rules for the selection of optional items				
b) The rules governing calculations				
c) The rules for printing and/or print suppression				
51. Have the following been defined for each intermediate (work) file:				
a) Origins or alternative origins for each element				
b) Calculations				
c) Rules governing record types, sequence, optional records, as well as inter- and intrarecord relationships				
52. Have the following audit controls been built in where applicable:				
a) Record counts (in and out)				
b) Editing of all source input				
c) Hash totals on selected fields				
d) Sequence checking of input files				
e) Data checking				
f) Listing of errors and review				
g) Control records				

4

	YES	NO	N/A	COMMENTS
Determine Tentative Operational Requirements				
53. Has the impact of the system upon existing computer resources been evaluated?				
54. Have the computer processing requirements been discussed with computer operations?				
55. Have backup procedures been developed?				
Online Systems				
56. Have testing plans been discussed with computer operations to ensure that required resources (core, disk space) for "sessions" will be available?				
57. Have terminal types been discussed with appropriate technical support personnel?				
58. Have IMS considerations (if applicable) been coordinated with computer operations, technical support, and DBA representatives?				
59. Has a user training program been developed?				
60. Have run schedules been prepared to provide computer operations with the basic information necessary to schedule computer usage?				
61. Have run flowcharts including narrative (where required) been prepared?				
62. Have "first cut" estimates of region sizes, run times, etc. been provided on the flowcharts or some other documentations?				
63. Have restart procedures been described for each step of the job?				
64. Have restart procedures been appended to the security and backup section of the documentation?				
Plan Program Design				
65. Has all relevant documentation for each program been gathered?				
66. Has the sequence in which programs are to be developed been defined in accordance to the system test plan?				
67. Has the number of user and project personnel (including outside vendors) required been ascertained?				
68. Has computer time required for program testing (compiles, test runs) been estimated?				
69. Have data preparation requirements been discussed with computer operations regarding data entry?				

WORK PAPER 9-6   *(continued)*

	YES	NO	N/A	COMMENTS
70. Has a development cost worksheet been prepared for the next phase or phases?				
71. Have personnel been assigned and project work schedules been prepared?				
72. Has the project schedule and budget been reviewed and updated?				
Prepare Project Authorization				
73. Has a project authorization form been completed?				

WORK PAPER 9-7   Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Is the test team knowledgeable in the design process?				
2. Are the testers experienced in using design tools?				
3. Have the testers received all of the design phase deliverables needed to perform this test?				
4. Do the users agree that the design is realistic?				
5. Does the project team believe that the design is realistic?				
6. Have the testers identified the success factors, both positive and negative, that can affect the success of the design?				
7. Have the testers used those factors in scoring the probability of success?				
8. Do the testers understand the 15 design-related test factors?				
9. Have the testers analyzed those design test factors to evaluate their potential impact on the success of the design?				
10. Do the testers understand the design review process?				
11. Has a review team been established that represents all parties with a vested interest in the success of the design?				
12. Does management support using the design review process?				
13. Is the design review process conducted at an appropriate time?				
14. Were the items identified in the design review process reasonable?				
15. Does the project team agree that the identified items need to be addressed?				
16. Does management support performing inspections on project rework?				
17. Has appropriate time been allotted in the project scheduling for performing inspections?				
18. Have the individuals responsible for project rework been educated in the importance of participating in the inspection process?				

(continues)

1

	YES	NO	N/A	COMMENTS
19. Does management view inspections as an integral part of the process rather than as an audit to identify participants' performance?				
20. Has the inspection process been planned?				
21. Have the inspectors been identified and assigned their specific roles?				
22. Have the inspectors been trained to perform their role?				
23. Have the inspectors been given the necessary materials to perform the review?				
24. Have the inspectors been given adequate time to complete both the preparation and the review meeting inspection process?				
25. Did the individual inspectors adequately prepare for the inspection?				
26. Did the individual inspectors prepare a defect list?				
27. Was the inspection scheduled at a time convenient for all inspectors?				
28. Did all inspectors come to the inspection meeting?				
29. Did all inspectors agree on the final list of defects?				
30. Have the inspectors agreed upon one of the three acceptable inspection dispositions (i.e., certification, reexamination, or reinspection)?				
31. Were the defects identified during the review meeting recorded and given to the author?				
32. Has the author agreed to make the necessary corrections?				
33. Has a reasonable process been developed to determine that those defects have been corrected satisfactorily?				
34. Has a final moderator certification been issued for the product/deliverable inspected?				

WORK PAPER 9-8   Initial Supplier Capability Assessment

TEST FACTOR: Data Integrity Controls Implemented

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have procedures been written indicating how to record transactions for entry into the automated system?					Examine the usefulness of data error messages.	Manual support	Correctness proof, Exhaustive testing, & Flowchart
2. Have data validation checks been implemented to ensure that input complies with system specifications?					Review the completeness of the data validation checks.	Requirements	Compiler-based analysis, Data dictionary, & Inspections
3. Have anticipation controls been installed, where appropriate, to ensure that valid, but unreasonable, data is noted for manual investigation?					Examine the extensiveness of anticipation controls to identify potential problems.	Error handling	Correctness proof, Error guessing, & Inspections
4. Are errors properly identified and explained so that follow-up action can be readily conducted?					Examine the completeness of the data entry procedures.	Error handling	Exhaustive testing
5. Have procedures been established to take corrective action on data errors?					Examine the reasonableness of the procedures to take corrective action on identified errors.	Error handling	Cause-effect graphing
6. Are procedures established to ensure that errors are corrected on a timely basis?					Verify that the procedures will ensure that errors are corrected on a timely basis.	Error handling	Correctness proof & Flowchart

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Data Integrity Controls Implemented

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
7. Are run-to-run controls installed to ensure the completeness and accuracy of transactions as they move from point to point in the system?					Examine the reasonableness of the procedures that ensure accuracy and completeness of transactions as they flow through the system.	Requirements	Control flow analysis & Data flow analysis
8. Have procedures been implemented to ensure that complete and accurate input is recorded?					Verify the adequacy of the procedures to ensure that controls established during data origination are verified during processing.	Control	Correctness proof & Exhaustive testing

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Authorization Rules Implemented

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the authorization methods been divided between manual and automated?					Evaluate the reasonableness of the authorization method selected.	Security	Fact finding
2. Have procedures been prepared to specify the manual authorization process for each transaction?					Review the adequacy of the manual authorization procedures.	Security	Inspections
3. Have the methods been implemented for authorizing transactions in the automated segment of the system?					Examine the program specifications to determine that authorization method has been properly implemented.	Requirements	Inspections
4. Have procedures been established to indicate violations of manual authorization procedures?					Examine the reasonableness of the violation procedures for manual authorization.	Control	Checklist & Fact finding
5. Have procedures been established to identify and act upon violations of automated authorization procedures?					Examine the adequacy of the automated authorization violation procedures.	Requirements	Walkthroughs
6. Do the implemented authoriza-tion methods conform to the authorization rules defined in the requirements phase?					Verify compliance of implemented authorization methods to the defined authorization rules.	Requirements	Inspections

(continues)

WORK PAPER 9-8   *(continued)*

TEST FACTOR: Authorization Rules Implemented

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. Have procedures been imple-mented to verify the source of transactions where the source becomes the basis for authoriz-ing the transaction?					Verify that the system authenticates the source of transaction where that source itself authorizes the transaction.	Security	Inspections
8. Does the system maintain a record of who authorized each transaction?					Verify that procedures are implemented to identify the authorizer of each transaction.	Requirements	Inspections

(continues)

WORK PAPER 9-8   *(continued)*

TEST FACTOR: File Integrity Controls Implemented

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Has someone been appointed accountable for the integrity of each file?					Verify that the assigned individual has the necessary skills and time available.	Control	Fact finding
2. Have the file integrity controls been implemented in accordance with the file integrity requirements?					Compare the implemented controls to the integrity requirements established during the requirements phase.	Requirements	Inspections
3. Have procedures been established to notify the appropriate individual of file integrity problems?					Examine the adequacy of the procedures to report file integrity problems.	Error handling	Walkthroughs
4. Are procedures established to verify the integrity of files on a regular basis?					Review the reasonableness of the file integrity verification frequency.	Requirements	Walkthroughs
5. Are there subsets of the file that should have integrity controls?					Confirm with the user that all file subsets are appropriately safeguarded through integrity controls.	Control	Error guessing & Confirmation/ examination
6. Are procedures written for the regular reconciliation between automated file controls and manually maintained control totals?					Verify the reasonableness and timeliness of procedures to reconcile automated controls to manually maintained controls.	Control	Walkthroughs
7. Are interfile integrity controls maintained where applicable?					Confirm with the user that all applicable file relationships are reconciled as a means of verifying file integrity.	Control	Confirmation/ examination
8. Are sensitive transactions subject to special authorization controls?					Verify with legal counsel that sensitive transaction authorization controls are adequate.	Control	Confirmation/ examination

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Implement Audit Trail

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Has the audit trail relationship from source record to control total been documented?					Examine the completeness of the audit trail from source document to control total.	Requirements	Walkthroughs
2. Has the audit trail from the control total to the supporting source transaction been documented?					Examine the completeness of the audit trail from the control total to the source document.	Requirements	Walkthroughs
3. Have all the defined fields been included in the audit trail?					Verify that the audit trail records include all of the defined audit trail fields.	Requirements	Walkthroughs
4. Does the implemented audit trail satisfy the defined reconstruction requirements?					Verify that the implemented audit trail is in compliance with the reconstruction requirements phase.	Requirements	Inspections
5. Have procedures been defined to test the audit trail?					Verify that an audit trail test plan has been devised.	Requirements	Fact finding
6. Are procedures defined to store part of the audit trail off-site?					Examine the reasonableness of the procedures that require application audit trail records to be stored off-site.	Recovery	Cause-effect graphing & Peer review
7. Does the implemented audit trail permit reconstruction of transaction processing?					Review the completeness of the transaction reconstruction process.	Requirements	Exhaustive testing & Inspections
8. Does the audit trail contain the needed information to restore a failure?					Confirm with the computer operations manager that the audit trail information is complete.	Requirements	Confirmation/ examination

(continues)

6

TEST FACTOR: Write Contingency Plan

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Does the contingency plan identify the people involved in recovering processing after a failure?					Confirm with the operations manager that all the appropriate people are identified in the contingency plan.	Recovery	Confirmation/ examination
2. Has the contingency plan been approved by the operations manager?					Examine the evidence indicating the operations manager approves of the plan.	Recovery	Confirmation/ examination
3. Does the plan identify all the resources needed for recovery?					Confirm with the operations manager that all the needed resources are identified.	Recovery	Confirmation/ examination
4. Does the contingency plan include the priority for restarting operations after a failure?					Review the reasonableness of the priority with senior management.	Recovery	Error guessing & Fact finding
5. Does the recovery plan specify an alternate processing site?					Confirm that an alternate site is available for backup processing.	Recovery	Confirmation/ examination
6. Does the contingency plan provide for security during a recovery period?					Review the reasonableness of the security plan with the security officer.	Recovery	Inspections
7. Has a plan been developed to test the contingency plan?					Examine the completeness of the test plan.	Operations	Inspections
8. Has the role of outside parties, such as the hardware vendor, been included in the test plan and confirmed with those outside parties?					Confirm with outside parties that they can supply the support indicated in the contingency plan.	Operations	Confirmation/ examination

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Design System to Achieve Service Level

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Do the implemented programs perform in accordance with the desired service level?					Verify the performance criteria of the programs during testing.	Stress	Instrumentation
2. Does the system performance achieve the desired level of service?					Verify the performance of the system during testing.	Stress	Instrumentation
3. Have the training programs been prepared for the people who will use the application system?					Examine the completeness of the training programs.	Execution	Checklist & Inspections
4. Is the support software available and does it meet service-level requirements?					Confirm with computer operations personnel that the support software is available and does meet performance criteria.	Operations	Confirmation/ examination
5. Is the support hardware available and does it provide sufficient capacity?					Confirm with computer operations personnel that the support hardware is available and does meet the capacity requirements.	Operations	Confirmation/ examination
6. Is sufficient hardware and software on order to meet anticipated future volumes?					Confirm with computer operations that sufficient hardware and software is on order to meet anticipated future volumes.	Operations	Confirmation/ examination
7. Has a test plan been defined to verify that service-level performance criteria can be met?					Examine the completeness of the test plan.	Execution	Checklist & Inspections
8. Can the required input be delivered to processing in time to meet production schedules?					Confirm with the individuals preparing input that they can prepare input in time to meet production schedules.	Execution	Confirmation/ examination

(continues)

TEST FACTOR: Implement Security Procedures

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Is the required security hardware available?					Confirm with the security officer that the needed security hardware is available.	Security	Confirmation/examination
2. Is the required security software available?					Confirm with the security officer that the needed security software is available.	Security	Confirmation/examination
3. Has a procedure been established to disseminate and maintain passwords?					Examine the completeness and adequacy of the password dissemination and maintenance plan.	Security	Exhaustive testing
4. Have the involved personnel been trained in security procedures?					Examine the adequacy and completeness of the security training procedures.	Security	Exhaustive testing
5. Has a procedure been established to monitor violations?					Examine the completeness and adequacy of the test violation procedure.	Control	Exhaustive testing
6. Has management been instructed on the procedure for punishing security violators?					Confirm with management that they have been adequately instructed on how to implement security prosecution procedures.	Control	Confirmation/examination
7. Have procedures been established to protect the programs, program listings, data documentation, and other systems documentation defining how the system works?					Verify with the security officer the adequacy of the procedures to protect the system documentation and program.	Security	Risk matrix & Confirmation/examination
8. Has one individual been appointed accountable for security of the application when it becomes operational?					Verify that the accountable individual has the necessary skills and the time available.	Security	Fact finding

(continues)

WORK PAPER 9-8   *(continued)*

TEST FACTOR: Programs Comply with Methodology

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have the organization's policies and procedures been incorporated into the application programs?					Examine the programs to ensure that they comply with the necessary organization policies and procedures.	Compliance	Inspections
2. Have the organization's information services policies and procedures been incorporated into the application programs?					Examine the programs to ensure that they comply with the necessary information services policies and procedures.	Compliance	Inspections
3. Have the organization's accounting policies and procedures been incorporated into the application programs?					Examine the programs to ensure that they comply with the necessary accounting policies and procedures.	Compliance	Inspections
4. Have the governmental regulations been incorporated into the application program?					Examine the programs to ensure that they comply with the necessary government regulations.	Compliance	Inspections
5. Have the industry standards been incorporated into the application programs?					Examine the programs to ensure that they comply with the necessary industry standards.	Compliance	Inspections
6. Have the organization's user department policies and procedures been incorporated into the application programs?					Examine the programs to ensure that they comply with the user department's policies and procedures.	Compliance	Inspections

(continues)

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WORK PAPER 9-8 *(continued)*

TEST FACTOR: Programs Comply with Methodology

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
7. Are the policies, procedures, and regulations used as a basis for system specifications up-to-date?					Confirm with the appropriate party that the regulations used for specifications are current.	Compliance	Confirmation/ examination
8. Are there anticipated changes to the policies, standards, or regulations between this phase and the time the system will become operational?					Confirm with the involved parties the probability of changes to the policies, standards, or regulations prior to the system becoming operational.	Compliance	Confirmation/ examination

(continues)

TEST FACTOR: Programs Conform to Design (Correctness)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Have changes in user management affected their support of system objectives?					Confirm with user management that the stated objectives are still desired.	Requirements	Confirmation/ examination
2. Does the program implementation comply with stated objectives?					Compare program results to stated objectives.	Requirements	Design reviews
3. Will the implemented systems produce correct results?					Verify that the implemented systems will produce correct results.	Requirements	Correctness proof
4. Have the desired reports been produced?					Confirm that the reports produced by the application program comply with user-defined specifications.	Requirements	Design reviews
5. Does the system input achieve the desired data consistency and reliability objectives?					Confirm with the user that the input to the system achieves the desired consistency and reliability objectives.	Requirements	Design reviews
6. Are the manuals explaining how to use the computer outputs adequate?					Confirm with the user the adequacy of the output use manuals.	Requirements	Checklist & Confirmation/ examination
7. Are the input manuals and procedures adequate to ensure the preparation of valid input?					Confirm with the input preparers that the manuals appear adequate to produce valid input.	Requirements	Checklist & Confirmation/ examination
8. Has the user involvement in the developmental process continued through the programming phase?					Confirm with the project personnel that the user participation has been adequate.	Requirements	Checklist & Confirmation/ examination

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Programs Conform to Design (Ease of Use)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Do the application documents conform to design specifications?					Verify that the implemented ease of use segment of the application conforms to design.	Compliance	Design reviews
2. Have easy-to-use instructions been prepared for interfacing with the automated application?					Examine the usability of the people interface instructions.	Manual support	Checklist
3. Have provisions been made to provide assistance to input clerks?					Verify that provisions are implemented to assist input clerks in the proper entry of data.	Manual support	Checklist & Walkthroughs
4. Are the training sessions planned to train personnel on how to interact with the computer system?					Examine the course content to verify the appropriateness of the material.	Manual support	Walkthroughs
5. Are the output documents implemented for ease of use?					Verify the ease of use of the output documents.	Requirements	Checklist & Walkthroughs
6. Is the information in output documents prioritized?					Verify that the information in output documents is prioritized.	Requirements	Inspections
7. Are the input documents implemented for ease of use?					Verify the ease of use of the input documents.	Requirements	Checklist & Walkthroughs
8. Do clerical personnel accept the application system as usable?					Confirm with clerical personnel their acceptance of the usability of the application.	Manual support	Confirmation/ examination

(continues)

WORK PAPER 9-8   *(continued)*

TEST FACTOR: Programs Are Maintainable

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Do the programs conform to the maintenance specifications?					Verify that the programs conform to the maintenance specifications.	Compliance	Inspections
2. Is the program documentation complete and usable?					Review the documentation for completeness and usability.	Compliance	Compiler-based analysis & Inspections
3. Do the programs contain a reasonable number of explanatory statements?					Review the programs to determine they contain a reasonable number of explanatory statements.	Compliance	Inspections
4. Is each processing segment of the program clearly identified?					Verify that each processing segment of the program is adequately identified.	Compliance	Inspections
5. Do the programs avoid complex program logic wherever possible?					Review programs for complex programming logic.	Compliance	Checklist & Inspections
6. Are the expected high-frequency change areas coded to facilitate maintenance?					Determine ease of maintenance of high-change areas.	Compliance	Peer review
7. Have the programs been reviewed from an ease-of-maintenance perspective?					Review programs to determine their maintainability.	Compliance	Peer review
8. Are changes introduced during programming incorporated into the design documentation?					Review changes and verify that they have been incorporated into the design documentation.	Compliance	Design reviews & Confirmation/ examination

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Programs Conform to Design (Portable)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Does the system avoid the use of any vendor-specific hardware features?					Review application for vendor-specific hardware restrictions.	Operations	Inspections
2. Does the system avoid the use of any vendor-specific software features?					Review application for vendor-specific software restrictions.	Operations	Inspections
3. Are the programs written using the common program language statements?					Review programs for use of uncommon programming statements.	Compliance	Inspections
4. Are all portability restrictions documented?					Determine the completeness of the portability documentation.	Compliance	Inspections
5. Are all operating characteristics documented?					Determine the completeness of operating characteristics documentation.	Compliance	Inspections
6. Does program documentation avoid technical jargon?					Review documentation for use of technical jargon.	Compliance	Inspections
7. Are the data values used in the program machine independent?					Review data values to determine they are machine independent.	Compliance	Checklist, Confirmation/ examination & Fact finding
8. Are the data files machine independent?					Review data files to determine they are machine independent.	Compliance	Checklist, Confirmation/ examination & Fact finding

(continues)

WORK PAPER 9-8 *(continued)*

TEST FACTOR: Programs Conform to Design (Coupling)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Are common record layouts used for interfaced programs?					Verify that common record layouts are used by interfaced applications.	Intersystems	Inspections
2. Are the values in the data fields common to interfaced programs?					Verify that common data values are used by interfaced applications.	Intersystems	Inspections
3. Do the interfaced systems use the same file structure?					Verify that common file structures are used by interfaced applications.	Intersystems	Inspections
4. Have the interfaced segments been implemented as designed?					Verify that the interface segments of the application are implemented as designed.	Intersystems	Correctness proof, Desk checking, & Inspections
5. Have changes to the interfaced system been coordinated with any affected application?					Confirm that changes affecting interfaced applications are coordinated with those applications.	Intersystems	Exhaustive testing & Confirmation/examination
6. Is the program/interface properly documented?					Verify that the interface document is complete.	Intersystems	Error guessing & Inspections
7. Is the data transfer media common to interfaced applications?					Verify that common media is used for interfaced application files.	Operations	Confirmation/examination & Fact finding
8. Can the required timing for the transfer of data be achieved?					Verify that the data transfer timing between interfaced applications is reasonable.	Intersystems	Error guessing & Fact finding

(continues)

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TEST FACTOR: Develop Operating Procedures

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Ade-quate	Ade-quate	Inade-quate	N/A			
1. Has the size of the largest program been identified?					Review programs to determine their maximum size.	Operations	Inspections
2. Have changes made during programming affected operations?					Review changes to ascertain if they affect operations.	Operations	Inspections
3. Have any deviations from designed operations been communicated to computer operations?					Review application for operation design variations and confirm operations have been notified of these changes.	Operations	Error guessing
4. Have operations documentation been prepared?					Review the completeness of operations documentation.	Compliance	Design reviews
5. Have special forms and other needed media been ordered?					Determine if needed media has been ordered.	Operations	Confirmation/ examination & Fact finding
6. Have data media retention procedures been prepared?					Review the adequacy of data retention procedures.	Compliance	Inspections
7. Has needed computer time for tests been scheduled?					Examine the computer schedule to ascertain if needed test time has been scheduled.	Operations	Fact finding
8. Have off-site storage needs been defined?					Determine the reasonableness of off-site storage requirements.	Operations	Fact finding

(continues)

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WORK PAPER 9-8   *(continued)*

TEST FACTOR: Programs Achieve Criteria (Performance)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST	TEST TECHNIQUE	TEST TOOL
	Very Adequate	Adequate	Inadequate	N/A			
1. Has the cost to design and test the system approximated the cost estimate?					Examine the projected budget to verify that actual costs approximate budget costs.	Execution	Fact finding
2. Does the operational cost as represented by information services approximate the projected operational costs?					Use the data from the job accounting system to substantiate that the actual test operational costs approximate the projected operational costs.	Execution	Fact finding
3. Are the costs monitored during the developmental process?					Confirm with the information services manager that project costs are monitored.	Compliance	Confirmation/ examination
4. Will changes made during the programming phase affect anticipated system costs?					Confirm with the project manager that changes during the program phase will not affect operational costs.	Execution	Confirmation/ examination & Fact finding
5. Are the projected benefits still reasonable?					Confirm with user management that projected benefits are still reasonable.	Execution	Confirmation/ examination & Fact finding
6. Is the projected life of the project still reasonable?					Confirm with user management that the expected life of the project is still reasonable.	Execution	Confirmation/ examination
7. Is the project on schedule?					Compare the current status versus projected status in the schedule.	Execution	Fact finding
8. Are there any expected changes in the test or conversion phases that would impact the projected return on investment?					Confirm with the project leader whether there would be any changes during the test or conversion phase that could affect the projected return on investment.	Execution	Error guessing & Confirmation/ examination

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WORK PAPER 9-9   Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Is verifying and validating programs considered to be a responsibility of the programmer?				
2. Does the programmer understand the difference between static and dynamic testing?				
3. Will the program be subject to static testing as the primary means to remove defects?				
4. Does the programmer understand the process that will generate the program code?				
5. Does the programmer understand and use desk debugging?				
6. Does the programmer understand the 15 programming concerns, and will they be incorporated into testing?				
7. Is the program tested using either the peer review technique or code inspections?				
8. Will the program be subject to full testing prior to moving to a higher-level testing (e.g., string testing)?				
9. Are all of the uncovered defects recorded in detail?				
10. Are all of the uncovered defects corrected prior to moving to the next level of testing?				

Chapter 10

Step 4: Validation Testing

WORK PAPER 10-1 Developing Test Scripts

Test Item	Entered By	Sequence	Action	Expected Result	Operator Instructions

WORK PAPER 10-2　Test Phase Test Process

TEST FACTOR: Manual, Regressional, and Functional Testing (Reliability)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Has data that does not conform to individual data element specifications been tested?					Verify that data validation programs reject data not conforming to data element specifications.
2. Have tests been performed to reject data relationships not conforming to system specifications?					Verify that the system rejects data relationships that do not conform to system specifications.
3. Have invalid identifiers been tested?					Verify that program rejects invalid identifiers.
4. Have tests been conducted to verify that missing sequence numbers will be detected?					Confirm that the system detects missing sequence numbers.
5. Have tests been conducted to verify that inaccurate batch totals will be detected?					Verify that the system will detect inaccurate batch totals.
6. Have tests been conducted to determine that data missing from a batch or missing scheduled data will be detected?					Verify that the programs will defect data missing from batches and scheduled data that does not arrive on time.
7. Have tests been conducted to verify that the unchanged parts of the system are not affected by invalid data?					Conduct regression test to ensure that unchanged portions of the program are not affected by invalid data.
8. Are the results obtained from the recovery process correct?					Verify the correctness of the results obtained from the recovery process.

(continues)

1

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Compliance Testing (Authorization)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Do manual procedures ensure that the proper authorization is received?					Test manual procedures to verify that authorization procedures are followed.
2. Have automated authorization rules been tested?					Verify that programs enforce automated authorization rules.
3. Have the current authorization names and identifiers been included as part of the test?					Confirm that the actual identifiers for authorization are included in the programs.
4. Have unauthorized transactions been entered into the system to determine if they will be rejected?					Verify that the authorization programs reject Security unauthorized transactions.
5. If multiple authorization is required, do the procedures function properly?					Verify that multiple authorization procedures perform properly.
6. If authorizers are limited in the size of transactions they can testing authorize, have multiple transactions below that limit been entered to determine if the system checks against limit violations?					Verify that the system can identify potential violations of authorization limits caused by entering multiple transactions below the limit.
7. Have the procedures to change the name or identifier of individuals authorized to change a transaction been tested?					Verify that the procedure to change the authorization rules of a program performs properly.
8. Have the procedures to report authorization violations to management been tested?					Verify that the authorization reports are properly prepared and delivered.

(continues)

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Functional Testing (File Integrity)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Have the file balancing controls been tested?					Verify that the procedures to balance the files function properly.
2. Have the independently maintained control totals been tested?					Verify that the independently maintained control totals can confirm the automated file control totals.
3. Have integrity procedures been tested to ensure that updates are properly recorded?					Verify that the new control totals properly reflect the updated transactions.
4. Have tests been performed to ensure that integrity can be retained after a program failure?					Cause a program to fail to determine if it affects the file integrity.
5. Has erroneous data been entered to determine if it can destroy the file integrity?					Enter erroneous data to determine that it cannot affect the integrity of the file totals.
6. Have the manual procedures to develop independent control totals been tested?					Verify that the manual procedures can be properly performed to produce correct independent control totals.
7. If multiple files contain the same data, will all like elements of data be changed concurrently to ensure the integrity of all computer files?					Change a data element in one file that is redundant in several files to verify that the other files will be changed accordingly.
8. Have nil and one record file conditions been tested?					Run system with one and no records on each file.

(continues)

3

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Functional Testing (Audit Trail)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Has a test been conducted to verify that source documents can be traced to control totals?					Verify that a given source transaction can be traced to the appropriate control total.
2. Has a test been conducted to verify that all of the supporting data for a control total can be identified?					Determine for a control total that all the supporting transactions can be identified.
3. Can the processing of a single transaction be reconstructed?					Verify that the processing of a single transaction can be reconstructed.
4. Has a test been conducted to verify that the audit trail contains the appropriate information?					Examine the audit trail to verify that it contains the appropriate information.
5. Will the audit trail be saved for the appropriate time period?					Verify that a audit trail is marked to be saved for the appropriate time period.
6. Have tests been conducted to determine that people can reconstruct processing from the audit trail procedures?					Verify that by using the audit trail procedures people can reconstruct processing.
7. Have tests been conducted to verify that the audit trail is economical to use?					Determine the cost of using the audit trail.
8. Does the audit trail satisfy review requirements?					Verify with the auditors that the audit trail is satisfactory for their purpose.

(continues)

4

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Recovery Testing (Continuity of Processing)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Has a simulated disaster been created to test recovery procedures?					Simulate a disaster to verify that recovery can occur after a disaster.
2. Can people perform the recovery operation from the recovery procedures?					Verify that a recovery can be performed directly from the recovery procedures.
3. Has a test been designed to determine recovery can occur within the desired frame?					Conduct a recovery test to determine that it can be performed within the required time frame.
4. Have operation personnel been trained in recovery procedures?					Confirm with operation personnel that they have received appropriate recovery training.
5. Has each type of system failure been tested?					Verify that the system can recover from each of the various types of system failures.
6. Have the manual backup procedures been tested using full volume for system failures?					Simulate a system disaster to verify that the manual procedures are adequate.
7. Have the manual procedures been tested for entering data received during downtime into the system after the integrity of the system has been restored?					Verify that the system users can properly enter data that has been accumulated during system failures.
8. Can alternate processing procedures be performed using the manual procedures?					Require the manual alternate processing procedures to be performed exclusively from the procedures.

(continues)

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WORK PAPER 10-2   *(continued)*

TEST FACTOR: Stress Testing (Service Level)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Have the limits of all internal tables and other restrictions been documented?					Confirm with the project leader that all the project limits are documented.
2. Have each of the documented units been tested?					Verify that the application limits have been tested.
3. Have programmed procedures been included so that transactions that cannot be processed within current capacity are retained for later processing?					Confirm that when more transactions are entered than the system can handle they are stored for later processing.
4. Has the input portion of the system been subject to stress testing?					Verify that excessive input will not result in system problems.
5. Has the manual segment of the system been subject to stress testing?					Verify that when people get more transactions than they can process, no transactions will be lost.
6. Have communication systems been stress tested?					Verify that when communication systems are required to process more transactions than their capability, transactions are not lost.
7. Have procedures been written outlining the process to be followed when the system volume exceeds capacity?					Evaluate the reasonableness of the excess capacity procedures.
8. Have tests using backup personnel been performed to verify that the system can process normal volumes without the regular staff present?					Test the functioning of the system when operated by backup personnel.

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Compliance Test (Performance)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Can systems be operated at expected volumes with the anticipated manual support?					Verify that the systems can be operated with anticipated manual support.
2. Can transactions be processed at expected volumes for the expected cost?					Verify that the transaction processing costs are within expected tolerances.
3. Has the test phase been conducted within the test budget?					Verify from the accounting reports that the test phase has been performed within budget.
4. Have problems been encountered in testing that will affect the cost-effectiveness of the system?					Confirm with the project leader that uncovered problems will not significantly affect the cost effectiveness of the system.
5. Does the test phase indicate that the expected benefits will be received?					Confirm with user management that the expected benefit should be received.
6. Will projected changes to hardware and software significantly reduce operational or maintenance costs?					Confirm with computer operations whether projected changes to hardware and software will significantly reduce operations and maintenance costs.
7. Does a test phase schedule exist that identifies tasks, people, budgets, and costs?					Examine the completeness of the test phase work program.
8. Is the technology used for implementation sound?					Confirm with an independent source the soundness of the implementation technology.

(continues)

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WORK PAPER 10-2 *(continued)*

TEST FACTOR: Compliance Testing (Security)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Do the identified security risks have adequate protection?					Examine the completeness of the protection against the identified security risks.
2. Have tests been conducted to violate physical security?					Attempt to violate physical security.
3. Have tests been conducted to violate access security?					Attempt to violate access security.
4. Have tests been conducted to determine if computer resources can be used without authorization?					Attempt to utilize computer resources without proper authorization.
5. Have tests been conducted to determine if security procedures are adequate during off hours?					Conduct security violations during nonworking hours.
6. Are repetitive tests conducted to attempt to violate security by continual attempts?					Conduct repetitive security violations.
7. Are tests conducted to obtain access to program and system documentation?					Attempt to gain access to program and system documentation.
8. Are employees adequately trained in security procedures?					Verify that employees know and follow security procedures.

WORK PAPER 10-2   *(continued)*

TEST FACTOR: Test Complies with Methodology

	ASSESSMENT				
TEST CRITERIA	Very Ade-quate	Ade-quate	Inade-quate	N/A	RECOMMENDED TEST
1. Does testing verify that the system processing is in compliance with the organization's policies and procedures?					Verify that the operational system results comply with the organization's policies and procedures.
2. Does testing verify that the system processing is in compliance with the information services processing policies and procedures?					Verify that the operational system results comply with the information services policies and procedures.
3. Does testing verify that the system processing is in compliance with the accounting policies and procedures?					Verify that the operational system results comply with the accounting policies and procedures.
4. Does testing verify that the system processing is in compliance with governmental regulations?					Verify that the operational system results comply with the governmental regulations.
5. Does testing verify that the system processing is in compliance with industry standards?					Verify that the operational system results comply with the industry standards.
6. Does testing verify that the system processing is in compliance with the user procedures?					Verify that the operational system results comply with the user department policies and procedures.
7. Did testing procedures conform to the test plan?					Verify that the test plan was fully implemented.
8. Has the testing verified that sensitive data is adequately protected?					Confirm with the user the completeness of the test to verify sensitive data is protected.

(continues)

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WORK PAPER 10-2 *(continued)*

TEST FACTOR: Functional Testing (Correctness)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Do the normal transaction origination procedures function in accordance with specifications?					Verify that the transaction origination procedures perform in accordance with systems requirements.
2. Do the input procedures function in accordance with specifications?					Verify that the input procedures perform in accordance with systems requirements.
3. Do the processing procedures function in accordance with specifications?					Verify that the processing procedures perform in accordance with systems requirements.
4. Do the storage retention procedures function in accordance with specifications?					Verify that the storage retention procedures perform in accordance with systems requirements.
5. Do the output procedures function in accordance with specifications?					Verify that the output procedures perform in accordance with systems requirements.
6. Do the error-handling procedures function in accordance with specifications?					Verify that the error-handling procedures perform in accordance with systems requirements.
7. Do the manual procedures function in accordance with specifications?					Verify that the manual procedures perform in accordance with systems requirements.
8. Do the data retention procedures function in accordance with specifications?					Verify that the data retention procedures perform in accordance with systems requirements.

(continues)

WORK PAPER 10-2   *(continued)*

TEST FACTOR: Manual Support Testing (Ease of Use)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Do the clerical personnel understand the procedures?					Confirm with clerical personnel that they understand the procedures.
2. Are the reference documents easy to use?					Examine results of using reference documents.
3. Can input documents be completed correctly?					Examine processing for correctness.
4. Are output documents used properly?					Examine correctness of use of output documents.
5. Is manual processing completed within the expected time frame?					Identify time span for manual processing.
6. Do the outputs indicate which actions should be taken first?					Examine outputs for priority of use indications.
7. Are documents clearly identified regarding recipients and use?					Examine documents for clarity of identification.
8. Are the clerical personnel satisfied with the ease of use of the system?					Confirm with clerical personnel the ease of use of the system.

(continues)

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WORK PAPER 10-2 *(continued)*

TEST FACTOR: Inspections (Maintainability)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Do the programs contain nonentrant code?					Determine all program statements are entrant.
2. Are the programs executable?					Examine the reasonableness of program processing results.
3. Can program errors be quickly located?					Introduce an error into the program.
4. Does the program conform to the documentation?					Verify the executable version of the program conforms to the program documentation.
5. Is a history of program changes available?					Examine the completeness of the history of program changes.
6. Are test criteria prepared so that they can be used for maintenance?					Examine the usability of test data for maintenance.
7. Are self-checking test results prepared for use during maintenance?					Examine the usability of expected test results for maintenance.
8. Are all errors detected during testing corrected?					Verify that errors detected during testing have been corrected.

(continues)

WORK PAPER 10-2 *(continued)*

TEST FACTOR: Disaster Testing (Portability)

	ASSESSMENT				
TEST CRITERIA	Very Adequate	Adequate	Inadequate	N/A	RECOMMENDED TEST
1. Have alternate processing sites and/or requirements been identified?					Confirm that alternate site requirements have been identified.
2. Are data files readable at the new facilities?					Execute data files at the new facilities.
3. Are programs executable at the new facilities?					Execute programs at the new facilities.
4. Are operating instructions usable at the new facilities?					Request that normal operators execute system at the new facilities.
5. Are outputs usable at the new facilities?					Examine usability of outputs produced using the new facilities.
6. Is execution time acceptable at the new facilities?					Monitor execution time at the new facility.
7. Are programs recompilable at the new facilities?					Recompile programs at the new facility.
8. Are the user procedures usable at the new facilities?					Request users to operate system at the new facilities.

(continues)

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WORK PAPER 10-2 *(continued)*

TEST FACTOR: Functional and Regression Testing (Coupling)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Are inputs from other appliance systems correct?					Verify correctness of computerized data.
2. Are outputs going to other applications correct?					Verify correctness of computerized data.
3. Does input from other applications conform to specifications documents?					Verify actual input conforms to specifications.
4. Does output going to other applications conform to specifications documents?					Verify actual output conforms to specifications.
5. Does input from other applications impact nonrelated functions?					Perform appropriate regression testing.
6. Can the intersystem requirements be processed within time frame specifications?					Monitor time span of processing for adherence to specifications.
7. Are intersystem operation instructions correct?					Verify intersystem operation instructions are correct.
8. Are the retention dates on intersystem files correct?					Confirm that intersystem file retention dates are correct.

(continues)

WORK PAPER 10-2   *(continued)*

TEST FACTOR: Operations Test (Ease of Operations)

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Ade-quate	Ade-quate	Inade-quate	N/A	
1. Are operating instructions in the proper format?					Verify documented instructions conform to standards.
2. Have operators been instructed in how to operate the new applications?					Confirm with operators completeness of instructions.
3. Has a trouble call-in list been prepared?					Examine call-in list.
4. Are operating instructions complete?					Determine operator instructions are complete.
5. Has appropriate operations and test time been scheduled?					Examine schedule for reasonable allocation of time.
6. Are data retention procedures prepared?					Verify completeness of retention procedures.
7. Have normal operators successfully executed the application?					Verify that operators can operate the system by only using operator instructions.
8. Have operator recommendations for improvements been reviewed?					Verify that operator recommendations have been adequately reviewed.

15

WORK PAPER 10-3   Test Problem Documentation

Name of Software Tested

**Problem
Description**

Actual Results

Expected Results

Effect of Deviation

Cause of Problem

Location of Problem

**Recommended
Action**

1

WORK PAPER 10-4   Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Has an appropriate test environment been established to perform the dynamic test of the application software?				
2. Are the testers trained in the test tools that will be used during this step?				
3. Has adequate time been allocated for this step?				
4. Have adequate resources been assigned to this step?				
5. Have the methods for creating test data been appropriate for this system?				
6. Has sufficient test data been developed to adequately test the application software?				
7. Have all the testing techniques that were indicated in the test plan been scheduled for execution during this step?				
8. Have the expected results from testing been determined?				
9. Has a process been established to determine variance/deviation between expected results and actual results?				
10. Have both the expected and actual results been documented when there's a deviation between the two?				
11. Has the potential impact of any deviation been determined?				
12. Has a process been established to ensure that appropriate action/resolution will be taken on all identified test problems?				

1

Chapter 11

Step 5: Analyzing and Reporting Test Results

WORK PAPER 11-1   Defect Reporting

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Software/System Tested	Name of software being tested.
Date	Date on which the test occurred.
Defect Found	The name and type of a single defect found in the software being tested.
Location Found	The individual unit or system module in which the defect was found.
Severity of Defect	Critical means the system cannot run without correction; major means the defect will impact the accuracy of operation; minor means it will not impact the operation.
Type of Defect	Whether the defect represents something missing, something wrong, or something extra.
Test Data/Script Locating Defect	Which test was used to uncover the defect.
Origin of Defect/ Phase of Development	The phase in which the defect occurred.
Date Corrected	The date on which the defect was corrected.
Retest Date	The date on which the testers were scheduled to validate whether the defect had been corrected.
Result of Retest	Whether the software system functions correctly and the defect no longer exists; or if additional correction and testing will be required.

(continues)

Software/System Tested: _____

_____

Date: _____

_____

Defect Found: _____

_____

Location Found: _____

_____

Severity of Defect: ❑ Critical
                        ❑ Major
                        ❑ Minor

Type of Defect: ❑ Missing
                        ❑ Wrong
                        ❑ Extra

Test Data/Script Locating Defect:

_____

_____

Origin of Defect/Phase of Development: _____

_____

Date Corrected: _____

_____

Retest Date: _____

_____

Result of Retest: _____

_____

WORK PAPER 11-2 Report Writing Quality Control Checklist

Field Requirements

	YES	NO	N/A	COMMENTS
Part 1: Quality Control over Writing Status Reports				
1. Has management been involved in defining the information to be used in the decision-making process?				
2. Have the existing units of measure been validated?				
3. Are software tools in place for collecting and maintaining a database to support the project reporting process?				
4. Has the completed requirements document been signed off by management and project personnel?				
5. Have management and project personnel been trained in collecting quantitative data and using the reports?				
Part 2: Quality Control for Developing Interim Test Result Reports				
1. Do the report writers have the expected results from testing?				
2. Is there a method of reporting uncovered defects?				
3. Is there a method of reporting the status of defects?				
4. Is there a method to relate the defects to the function that is defective?				
5. Have the testers consulted with management to determine what type of reports are wanted?				

(continues)

1

	YES	NO	N/A	COMMENTS
6. Have the following reports been prepared? • Function Test/Matrix • Functional Testing Status • Function Working Timeline • Expected vs. Actual Defects Uncovered Timeline • Defects Uncovered vs. Corrected Gap Timeline • Average Age of Uncorrected Defects by Type • Defect Distribution • Normalized Defect Distribution • Testing Action				
7. Do the reports appear reasonable to those involved in testing?				
8. Have the reports been delivered to the person desiring the report?				
9. Have the reports been delivered on a timely basis?				
Part 3: Control over Writing Final Test Reports				
1. Have reports been issued for the final results of individual project testing?				
2. Have reports been issued for the final results of integration testing?				
3. Has a summary report been issued on the overall results of testing?				
4. Did these reports identify the scope of testing?				
5. Did these reports indicate what works and what doesn't?				
6. Do these reports provide recommendations on actions to take if appropriate?				
7. Do these reports provide an opinion to management on whether the software system should be placed into the production?				

WORK PAPER 11-3   Guidelines for Writing Test Reports

	YES	NO	N/A	COMMENTS
Reporting Complete				
1. Does it give all necessary information?				
2. Is it written with the reader in mind, and does it answer all his or her questions?				
3. Is there a plan for a beginning, middle, and end?				
4. Are specific illustrations, cases, or examples used to best advantage?				
5. Are irrelevant ideas and duplications excluded?				
6. Are the beginning and the ending of the report effective?				
Clarity				
7. Are the ideas presented in the best order?				
8. Does each paragraph contain only one main idea?				
9. Is a new sentence started for each main idea?				
10. Are the thoughts tied together so the reader can follow from one to another without getting lost?				
11. Are most sentences active? Are the verbs mostly action verbs?				
12. Is the language adapted to the readers; are the words the simplest to carry the thought?				
13. Is underlining used for emphasis, or parentheses for casual mention?				
14. Will your words impart exact meaning to the reader?				

	YES	NO	N/A	COMMENTS
Concise				
15. Does report contain only essential facts?				
16. Are most of the sentences kept short?				
17. Are most paragraphs kept short?				
18. Are unneeded words eliminated?				
19. Are short words used for long ones?				
20. Are roundabout and unnecessary phrases eliminated?				
21. Is the practice followed of using pronouns instead of repeating nouns?				
22. Is everything said in the fewest possible words?				
Correct				
23. Is the information accurate?				
24. Do the statements conform to policy?				
25. Is the writing free from errors in grammar, spelling, and punctuation?				
Tone				
26. Is the tone natural? Is conversational language used?				
27. Is it personal? Are the "we" and "you" appropriately emphasized?				
28. Is it friendly, courteous, and helpful?				
29. Is it free from words that arouse antagonism?				
30. Is it free from stilted, hackneyed, or technical words and phrases?				
Effectiveness				
31. Is there variety in the arrangement of words, sentences, and pages so that it is interesting to read?				
32. Was it given the "ear" test?				
Conclusion				
33. Is the report satisfactory and ready for publication?				

Chapter 12

Step 6: Acceptance and Operational Testing

WORK PAPER 12-1 Acceptance Criteria

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Hardware/Software Project	The name of the project being acceptance-tested. This is the name the user/customer calls the project.
Number	A sequential number identifying acceptance criteria.
Acceptance Requirement	A user requirement that will be used to determine whether the corrected hardware/software is acceptable.
Critical	Indicate whether the acceptance requirement is critical, meaning that it must be met, or noncritical, meaning that it is desirable but not essential.
Test Result	Indicates after acceptance testing whether the requirement is acceptable or not acceptable, meaning that the project is rejected because it does not meet the requirement.
Comments	Clarify the criticality of the requirement; or indicate the meaning of test result rejection. For example, the software cannot be run; or management will make a judgment after acceptance testing as to whether the project can be run.

Hardware/Software Project: _____

Number	Acceptance Requirement	Critical		Test Result		Comments
		Yes	**No**	**Accept**	**Reject**	

1

WORK PAPER 12-2   System Boundary Diagram

Software Under Test: _____

System Boundary	Boundary Description	Actor Description	Name of Individual/Group Representing Actor

WORK PAPER 12-3   Use Case Definition

Last Updated By: Last Updated On:

Use Case Name: UC ID:

Actor:

Objective:

Preconditions:

Results (Postconditions):

Detailed Description

Action	Model (System) Response
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Exceptions:

Alternative Courses:

Original Author: Original Date:

1

WORK PAPER 12-4   Test Case Work Paper

Test Case ID: Original Author: Last Updated By:

Parent Use Case ID: Original Date: Last Updated On:

Test Objective:

Item No.	Test Condition	Operator Action	Input Specifications	Output Specifications (Expected Results)	Pass or Fail	Comments

WORK PAPER 12-5   Installation Phase Test Process

TEST CRITERIA	ASSESSMENT				RECOMMENDED TEST
	Very Adequate	Adequate	Inadequate	N/A	
1. Have the accuracy and completeness of the installation been verified?					Examine the completeness of, and the results from, the installation plan.
2. Have data changes been prohibited during installation?					Compare old and new versions of important data data files.
3. Has the integrity of the production files been verified?					Confirm their integrity with the users of the production files.
4. Does an audit trail exist showing installation activity?					Verify the completeness of the audit trail.
5. Will the integrity of the previous system/version be maintained until the integrity of the new system/version can be verified?					Perform parallel processing.
6. Ensure that a fail-safe installation plan is used for installation?					Determine that the option always exists to revert to the previous system/version.
7. Ensure that adequate security will occur during installation to prevent compromise?					Review the adequacy of the security procedures.
8. Verify that the defined installation process has been followed?					Confirm compliance on a sampling basis.
9. Verify that the proper system/version is placed into production on the correct date?					Determine the adequacy of the version control procedures.
10. Verify that user personnel can understand and use the documentation provided to use the new system/version?					Confirm with users during acceptance testing that their user documentation is adequate.
11. Verify that all the needed documentation has been prepared in accordance with documentation standards?					Verify on a sampling basis that specified documentation exists and meets standards.
12. Ensure that all involved with the installation are aware of the installation dates and their installation responsibilities?					Confirm with a sample of involved parties their knowledge of installation date(s) and responsibilities.
13. Ensure that the installation performance will be monitored?					Examine the monitoring process.
14. Ensure that the needed operating procedures are complete and installed when needed?					Examine the operating procedures and process for placing those procedures into operation.

1

WORK PAPER 12-6   Restart/Recovery Planning Data

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application is known.
Ident. Number	The application numerical identifier.
Change Ident. #.	The sequence number that uniquely identifies the change.
	Note: Restart/recovery planning data, necessary to modify the recovery procedures, comprises the remainder of the form.
Impact on Estimated Total Downtime	If the change affects the downtime, the entire recovery process may have to be reevaluated.
Impact on Estimated Downtime Frequency	The number of times the recovery process will probably have to be executed. An important factor in determining backup data and other procedures. If the change will affect the frequency of downtime, the entire recovery process may have to be reevaluated.
Change in Downtime Risk	The probable loss when a system goes down. May be more important than either the total downtime or downtime frequency. If the loss is potentially very high, management must establish strong controls to lessen the downtime risk. If the change will probably cause a loss, the entire recovery process may have to be reevaluated.
New Program Versions for Recovery	Each new program version must be included in the recovery plan. This action documents the needed changes.
New Files/Data for Recovery	Changes in data normally impact the recovery process. This section documents those changes.
New Recovery Instructions/Procedures	If operating procedures or instructions have to be modified, this section provides space to document those changes.
Date New Version Operational	The date the new programs, files, data, recovery instructions, and procedures must be included in the recovery process.
Comments	Any additional information that may be helpful in modifying the recovery program to better reflect the changed application system.

(continues)

Application   Ident.   Change
System: _____   Number: _____   Ident. # _____

Impact on Estimated Total Downtime

_____

Impact on Estimated Downtime Frequency

_____

Change in Downtime Risk

_____

New Program Versions for Recovery

_____

New Files/Data for Recovery

_____

New Recovery Instructions/Procedures

_____

Date New Version Operational

_____

Comments

_____

WORK PAPER 12-7   Program Change History

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application is known.
Ident. Number	The numerical application identifier.
Program Name	A brief description of the program or its name.
Ident. Number	The program identifier.
Coded by	The programmer who originally coded the program.
Maintained by	The programmer who now maintains the program.
Date Entered into Production	The date on which the program was first used in production.
Version #	The original version number. *Note:* Program change history provides an audit trail of changes to a program; and is contained in the following fields.
Change ID #	The sequence number that uniquely identifies the change.
New Version #	The program version number used to code the change.
Coded by	The name of the programmer who coded the change.
Date Entered into Production	The date on which this version went into production.
Comments	Additional information valuable in tracing the history of a change to a program.

(continues)

Application System: _____ Ident. Number _____

_____

Program Name: _____ Ident. Number _____

_____

Coded by: _____

_____

Maintained by: _____

_____

Date Entered into Production: _____ Version # _____

Program Change History

Change ID #	New Version #	Coded by	Date Entered into Production	Comments

WORK PAPER 12-8   Production Change Instructions

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Sent To	The name of the person in operations who controls the application system being changed.
Application Control #	A number issued sequentially to control the changes to each application system.
Application Name	The name by which the application is known.
Number	The numerical application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
	Note: The following production change information includes instructions to computer operations to move programs, job control statements, operator manual procedures, and other items associated with the change to production status. The specific instructions provide both for adding and deleting information.
Resource	The resource that needs to be added to or deleted from the production environment. The most common resources involved in a production change include programs, job statements, and operator manual procedures.
Task	Instructs whether to add or delete the resource from the production status. The Add column indicates that it is to be moved from test status to production status; the Delete column indicates that it is to be removed from production status.
Effective Dates	The date on which the tasks are to be performed.
Comments	Additional instructions that help operations personnel perform their assignments. For example, this column might include the location or the source of new pages for the operator's manual.
Prepared By	Usually, the name of the project leader.
Date	The date on which the form was prepared.

(continues)

Sent To: _____   Application Control #: _____

Application Name
_____ Number: _____ Change Ident. # : _____

Production Change Instructions

Resource	Task		Effective Dates	Comments
	Add	**Delete**		
Program #				
Program #				
Program #				
Program #				
Job Statements #				
Job Statements #				
Operator Manual procedure #				
Operator Manual procedure #				
Other: _____				
Other: _____				
Other: _____				

Prepared By: _____ Date: _____

WORK PAPER 12-9   Deletion Instructions

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Ident. Number	The numerical application identifier.
Deletion Control Number	A number sequentially issued to control the form.
Sent To	Typically, the person in operations responsible for deleting a program from the application.
Date	The date on which the form was prepared.
From	Usually, the name of the project leader.
Department	The organization or department authorizing the deletion of the program.
Library	The name or number that identifies the library in which the program resides.
Program Version to Delete	The program number and version of that program that is to be deleted.
Deletion Date	The date on which the program version may be deleted.
Comments	Any additional information helpful to operations staff in performing the required tasks.
Prepared By	The name of the person who prepared the form.
Date	The date on which the form was prepared.

(continues)

Application
Name: _____

Ident.
Number: _____

Deletion
Control #: _____

Sent To: _____ Date: _____

From: _____ Department: _____

Deletion Instructions

Library	Program Version to Delete	Deletion Date	Comments

Prepared By: _____ Date: _____

WORK PAPER 12-10   Form Completion Instructions: Program Change Monitor Notification

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Description of Change	A description which helps the people monitoring the application gain perspective on the areas impacted.
Date of Change	The date on which the change goes into production. This is the date when the monitoring should commence.
Monitoring Guidelines	The description of the type of problems to be anticipated. The information should be descriptive enough to tell the monitors both what to look for and what action to take if they find problems. Obviously, those potential problems which are identified are those most likely to occur. However, the monitors should be alert to any type of problem that might occur immediately following introduction of a new program version. The information about the high-probability items is:

- Area potentially impacted: the report, transactions, or other area in which the individuals monitoring should be looking.

- Probable impact: this section describes the type of problems that are most likely to occur within the impacted area.

- Action to take if problem occurs: the people to call, correction to make, or any other action that the individual uncovering the problem should take.

- Comments: any additional information that might prove helpful to the monitors in attempting to identify problems associated with the program change.

Prepared By	The name of the person who prepared the form, normally the software maintenance analyst.
Date	The date on which the form was prepared.

Application
System: _____ Number: _____ Change
Ident. # _____

<u>Description of Change</u>   Date of Change

                                                              _____

Monitoring Guidelines

Area Potentially Impacted	Probable Impact	Action to Take If Problem Occurs	Comments

Prepared By: _____ Date: _____

WORK PAPER 12-11   Form Completion Instructions: System Problem Caused by System Change

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Problem Date	The date on which the problem was located.
Problem Time	The time the problem was encountered.
Problem Control #	A sequential number that controls the form.
Description of Problem	A brief narrative description. Normally, examples of the problem are attached to the form.
Area of Application Affected	This segment is designed to help the software maintenance analyst identify the source of the problem. If it is one of the problems outlined on the program change monitor notification form, the individual completing the form can be very specific regarding the affected area. Otherwise, the individual should attempt to identify areas such as report writing or input validation where the problem seems to originate.
Impact of Problem	The individual identifying the problem should attempt to assess the impact of that problem on the organization. This information is very valuable in determining how fast the problem must be fixed. Ideally, this risk would be expressed in quantitative units, such as number of invoices incorrectly processed, dollar loss, number of hours lost because of the problems. It is often helpful to divide the problem into various time periods. This is because some risks are not immediately serious but become serious if they are not corrected by a certain time or date. Some suggested time spans included on the form are:
	• If not fixed within one hour
	• If not fixed within one day
	• If not fixed within one week
Recommendation	The suggestions from the individual uncovering the problem as to what should be done to fix it. This recommendation can either be to correct the errors that have occurred and/or to correct the problems in the application system.
Prepared By	The name of the person who uncovered the system problem caused by the system change.
Date	The date on which the form was prepared.

(continues)

1

Application Name:	Number:	Change Ident. #

Problem Date	Problem Time	Problem Control #

Description of Problem

Area of Application Affected

Impact of Problem

If not fixed within 1 hour:

If not fixed within 1 day:

If not fixed within 1 week:

Recommendation

Prepared By: _____   Date: _____

WORK PAPER 12-12   Form Completion Instructions: Acceptance Test Plan

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Individual Responsible for Test	The name of the individual or individuals who will be conducting the test. This normally is the user and the application systems analyst/programmer.
Test Plan	The steps that need to be followed in conducting the test. For the functional, regression, stress, and performance types of testing, these test characteristics need to be defined:
	• Change objective: the description of the objective of the change that was installed. This should be specific so that test planning can be based on the characteristics of the objective.
	• Method of testing: the type of test that will be conducted to verify that the objective is achieved.
	• Desired result: the expected result from conducting the test. If this result is achieved, the implementation can be considered successful, while failure to meet this result means an unsuccessful implementation.
Regression Test Plan	The tests and procedures to be followed to ensure that unchanged segments of the application system have not been inadvertently changed by software maintenance.
Intersystem Test Plan	The tests to be conducted to ensure that data flowing from and to other systems will be correctly handled after the change.
Comments	Additional information that might prove helpful in conducting or verifying the test results.
Individual Who Accepts Tested Application	The name of the individual who should review this test plan because of the responsibility to accept the change after successful testing.
Date	The date on which the form was completed.

Application
Name: _____   Number: _____   Change
Ident. # _____

Individual Responsible for Test: _____

TEST PLAN

Change Objective	Method of Testing	Desired Results

Regresssion Test Plan

Intersystem Test Plan

Comments

Individual Who Accepts Tested Application	Date

WORK PAPER 12-13   Change Control Form

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application system is known.
Application Ident. #	The identification number of the application system.
Change Ident. #	The control number for the change.
Description of Change	The solution and general terms for the change, such as issue a new report, add an input data edit, or utilize a new processing routine.
Changes Required	All impacted areas with instructions for the changes to be made or investigations to be undertaken regarding the impact of the proposed solution. The type of items affected include:

- data elements
- programs
- job control language
- operations manuals
- user training
- user manuals

For each of the affected items, the following information should be provided:

- Item affected: the program, data element, job control or other
- Item identification: the program number or other method of identifying the affected item

FIELD	INSTRUCTIONS FOR ENTERING DATA
Prepared By	The name of the person completing the form.
Date	The date on which the form was completed.

Application
System: _____   Application
Ident. #: _____   Change
Ident. # _____

Description of Change:

_____

Change Overview:

_____

Changes Required

Item	Item Identification	Comments

Prepared By: _____   Date: _____

WORK PAPER 12-14   Data Change Form

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application is known.
Application Ident. #	The number used to identify the application system.
Change Ident. #	The sequential number used to identify the change.
Data Element Name	The name by which the data element is known.
Data Ident. #	The number used to uniquely identify the data element. In a data dictionary system, this should be the data dictionary data element number.
Record Name	The record or records in which the data element is contained.
Record Ident. #	The number that describes the record or records in which the data element is contained.
File Name	The file or files in which the data element is contained.
File Ident. #	The numbers that uniquely describe the file or files in which the data element is contained.
Assigned To	The name of the person, function, or department responsible for making the change to the data element and the associated records and files.
Date Required	The date by which the change should be made (pending user approval).
Data Change	The type of change to be made on the data element.
Description of Change	A detailed narrative description (with examples when applicable) explaining the type of change that must be made to the data element. When a data dictionary is used, the data dictionary form should be attached to the data change form.
Comments	Information helpful in implementing the data change.
Prepared By	The name of the person who completed the form.
Date	The date on which the form was completed.

(continues)

1

Application System:	Application Ident. #:	Change Ident. #:

Data Element Name:		Data Ident. #:

Record Name:		Record Ident. #:

File Name:		File Ident. #:

Assigned To:	Date Required:

Data Change
❏ Add element.
❏ Delete element.
❏ Modify element attributes.
❏ Modify element description.

Description of Change

Comments

Prepared By: _____ Date: _____

WORK PAPER 12-15   Program Change Form

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application System	The name by which the application to be changed is known.
Application Ident. #	The identifier that uniquely describes the application system.
Change Ident. #	The sequential number used to identify the change.
Program Name	The name by which the program to be changed is known.
Number	The number that uniquely identifies the program.
Version Number	The version number that will be assigned to the altered program.
Date Required	The date on which the change is to be implemented, assuming the user approves the changes.
Assigned To	The name of the person who will make the change in the program.
Description of Change	A narrative description of the change to be made to this specific program. It should provide examples of programs produced before and after the change.
Source Statement Affected	A description of the source statement or statements that should be changed, together with the change to be made. The change may be described in terms of specifications rather than specific source statements.
Comments	Tips and techniques on how best to install the change in the application system.
Prepared By	The name of the person who completed the form.
Date	The date on which the form was completed.

Application
System: Application
                                     Ident. #:   Change
                                                                            Ident. #:
_____

Program Name: Number: Version #:
_____

New Version #:   Date
                        Required: Assigned
                                               To:
_____

Description of Change
_____

Source Statement Affected
_____

Comments
_____

Prepared By: Date:
_____

1

WORK PAPER 12-16   Form Completion Instructions: Acceptance Test Checklist

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Administrative Data	The administrative data relates to the management of the test.
Technical Data	The resources needed to conduct the acceptance test and the location of those resources. The information that should be documented about the needed resources includes:

- Resource needed: the exact resource needed.
- Location: the physical location of that resource. In many acceptance tests, the resources are marshalled in a common area to await conducting the test.

(continues)

Application
Name: _____ Number: _____ Change Ident. # _____

Administrative Data

Date of test   _____

Location of test   _____

Time of test   _____

Information services person in charge of test   _____

User person in charge of test   _____

Computer time available   _____

Technical Data

	Resource Needed	Location	Available Yes	No	N/A
1.	Test transactions				
2.	Master files/data base				
3.	Operator instructions				
4.	Special media/forms				
5.	Acceptance criteria				
6.	Input support personnel				
7.	Output support personnel				
8.	Control group				
9.	External control proof				
10.	Backup/recovery plan				
11.	Security plan				
12.	Error message actions				

Prepared By: _____ Date: _____

WORK PAPER 12-17 Form Completion Instructions: Training Material Inventory

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Training Material Name	The name or number by which the training material is known.
Training Material Description	A brief narrative description of what is contained in the training material.
Needs Updating	Columns to be completed whenever a change is installed. The columns provide an indication of whether the training material needs updating (Yes column) or does not need updating (No column).
Prepared By	The name of the individual responsible for maintaining the inventory.
Date	The last date on which the inventory was updated.

(continues)

Application
Name: _____   Number: _____   Change
Ident. # _____

Training Material Name/Number	Training Material Description	Needs Updating	
		Yes	No

Prepare By: _____   Date: _____

WORK PAPER 12-18   Form Completion Instructions: Training Plan

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Individual Responsible for Training	The individual with the overall responsibility for ensuring that all the training material is prepared, taught, and evaluated prior to the implementation of the change.
Training Plan	The details of why, who, what, where, when, how, and the results to be derived from the training plan. The remainder of the form deals with this plan.
Group Needing Training	The name of the individual, type of person, or department requiring training. The groups to consider include:

- Transaction origination staff: the people who originate data into the application system.
- Data entry clerk: the person who transcribes data to computer media.
- Control group—information services: the group responsible for ensuring that all input is received and that output is reasonable.
- Control group—user: the group in the user area responsible for the accuracy, completeness, and authorization of data.
- Computer operations: the group responsible for running the application on computer hardware.
- Records retention: the group or groups responsible for saving backup data.
- Third-party customers: people with unsatisfied needs or people who are the ultimate recipients of reports.
- User management and staff: the group responsible for the application.
- Other: any other involved party requiring training.

FIELD	INSTRUCTIONS FOR ENTERING DATA
Training Approach	The why, what, where, when, and how of the training plan.
Desired Results	The expected result, behavior change, or skills to be gained from the training material.
Training Dates	Important dates for implementing the training plan.
Comments	Any material helpful in designing, teaching, or evaluating the training material.
Individual Who Accepts Training as Sufficient	The name of the individual or department who must agree that the training is adequate. This individual should also concur with the training plan.
Date	The date the training plan was developed.

(continues)

1

Application
Name: _____ Number: _____ Change
Ident. # _____

Individual Responsible for Training _____

<table>
<tr><th colspan="3" align="center">Training Plan</th></tr>
<tr><th>Group Needing Training</th><th>Training Approach</th><th>Desired Result</th></tr>
<tr><td>1. Transaction origination staff</td><td></td><td></td></tr>
<tr><td>2. Data entry clerk</td><td></td><td></td></tr>
<tr><td>3. Control group—information services</td><td></td><td></td></tr>
<tr><td>4. Control group—user</td><td></td><td></td></tr>
<tr><td>5. Computer operations</td><td></td><td></td></tr>
<tr><td>6. Records retention</td><td></td><td></td></tr>
<tr><td>7. Third-party customers</td><td></td><td></td></tr>
<tr><td>8. User management and staff</td><td></td><td></td></tr>
<tr><td>9. Other: _____</td><td></td><td></td></tr>
<tr><td>10. Other: _____</td><td></td><td></td></tr>
</table>

<u>Training Dates</u>

Date training material prepared   _____

Date training can commence   _____

Date training to be completed   _____

<u>Comments</u>

<u>Individual Who Accepts Testing as Sufficient</u>   <u>Date</u>

_____   _____

2

WORK PAPER 12-19 Form Completion Instructions: New/Modified Training Modules

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Training Module Inventory	The remainder of the information on the form describes the modules.
Training Module Description	A brief narrative of the training module. The location of the training material should be identified so that it can be easily obtained.
Description of Change	As the training module becomes modified, this column should contain a sequential listing of all the changes made. In effect, it is a change history for the training module.
Training Material	The course material included in the training module.
Who Should Be Trained	The individual(s) to whom the training module is directed.
Method of Training	The recommended way in which the training module should be used.
Prepared By	The name of the individual who prepared the module.
Date	The date on which it was last updated.

(continues)

Application
Name: _____   Number: _____   Change Indent. # _____

Training Module Inventory

Training Module Description	Description of Change	Training Material	Who Should Be Trained	Method of Training				
				Meeting	Class-room	Self-study	New Proced-ure	Super-visor	Other

Prepared By: _____   Date: _____

WORK PAPER 12-20   Form Completion Instructions: Conduct Training Checklist

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Training Checklist	The remainder of the form contains the checklist information, which is:

- Name of individual requiring training: whenever possible, actual names should be used, as opposed to groups of people, so records can be maintained as to whether or not the people actually took the training.
- Department: the department/organization with which the individual is affiliated.
- Training required: the training modules and/or material to be given the individual.
- Dates: the dates on which the course is to be given or the training material to be disseminated to the individual. The schedules dates should be listed, as well as the date the individual actually took the course or received the material.
- Location: the location of the course or the location to which the training material should be distributed.
- Instructor: the name of the responsible individual should be listed.
- Comments: any other information that would verify that training took place. In classroom situations where examinations are given, the space could be used to record that grade.

Prepared By	The name of the individual preparing the form who should be the one responsible for ensuring the training is given.
Date	The date on which the form was prepared.

(continues)

Application
Name: _____   Number: _____   Change Ident. # _____

Training Checklist

Name of Individual Requiring Training	Department	Training Required	Dates		Location	Instructor	Com-ments
			Sched-uled	Taken			

Prepared By: _____   Date: _____

WORK PAPER 12-21 Acceptance Testing Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Has acceptance testing been incorporated into the test plan?				
2. Is acceptance testing viewed as a project process, rather than as a single step at the end of testing?				
3. Have the appropriate users of the software or hardware components been selected to develop the acceptance criteria for those components?				
4. Does the group that defines the acceptance criteria represent all uses of the component to be tested?				
5. Do those individuals accept the responsibility of identifying acceptance criteria?				
6. Have the acceptance criteria been identified early enough in the project so that they can influence planning and implementation?				
7. Has an acceptance test plan been developed?				
8. Does that plan include the components of acceptance test plan as outlined in this chapter?				
9. Is the acceptance test plan consistent with the acceptance criteria?				
10. Have appropriate interim products been reviewed by the acceptance testers before being used for the next implementation task?				
11. Have the appropriate testing techniques been selected for acceptance testing?				
12. Do the acceptance testers have the skill sets necessary to perform acceptance testing?				
13. Have adequate resources for performing acceptance testing been allocated?				
14. Has adequate time to perform acceptance testing been allocated?				
15. Have interim acceptance opinions been issued?				
16. Has the project team reacted positively to the acceptance testers' concerns?				
17. Has a final acceptance decision been made?				

	YES	NO	N/A	COMMENTS
18. Is that decision consistent with the acceptance criteria that have been met and not met?				
19. Have the critical acceptance criteria been identified?				
20. Are the requirements documented in enough detail that the software interfaces can be determined?				
21. Does both user management and customer management support use case testing?				
22. Has a system boundary diagram been prepared for the software being tested?				
23. Does the system boundary diagram identify all of the interfaces?				
24. Have the individuals responsible for each interface on the new system boundary diagram been identified?				
25. Do the actors agree to participate in developing use cases?				
26. Has a use case been defined for each system boundary?				
27. Do the users of the software agree that the use case definitions are complete?				
28. Have at least two test cases been prepared for each use case?				
29. Have both a successful and unsuccessful test condition been identified for each use case?				
30. Do the users of the software agree that the test case work paper identifies all of the probable scenarios?				

WORK PAPER 12-22   Pre-Operational Testing Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Is each change reviewed for its impact upon the restart/recovery plan?				
2. If a change impacts recovery, is the newly estimated downtime calculated?				
3. If the change impacts recovery, is the new downtime risk estimated?				
4. Are the changes that need to be made to the recovery process documented?				
5. Is the notification of changes to the production version of an application documented?				
6. Are changes to application systems controlled by an application control change number?				
7. Are there procedures to delete unwanted program versions from the source, test, and object libraries?				
8. Are program deletion requests documented so that production is authorized to delete programs?				
9. Are procedures established to ensure that program versions will go into production on the correct day?				
10. If it affects operating procedures, are operators notified of the date new versions go into production?				
11. Are procedures established to monitor changed application systems?				
12. Do the individuals monitoring the process receive notification that an application system has been changed?				
13. Do the people monitoring changes receive clues regarding the areas impacted and the probable problems?				
14. Do the people monitoring application system changes receive guidance on what actions to take if problems occur?				
15. Are problems that are detected immediately following changes documented on a special form so they can be traced to a particular change?				
16. Are the people documenting problems asked to document the impact of the problem on the organization?				

(continues)

1

	YES	NO	N/A	COMMENTS
17. Is software change installation data collected and documented?				
18. Does information services management review and use the feedback data?				
19. Does information services management periodically review the effectiveness of installing the software change?				

WORK PAPER 12-23   Testing and Training Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Are software maintenance analysts required to develop a test plan?				
2. Must each change be reviewed to determine if it has an impact on training?				
3. If a change has an impact on training, do procedures require that a training plan be established?				
4. Is an inventory prepared of training material so that it can be updated?				
5. Does the training plan make one individual responsible for training?				
6. Does the training plan identify the results desired from training?				
7. Does the training plan indicate the who, why, what, where, when, and how of training?				
8. Does the training plan provide a training schedule, including dates?				
9. Is an individual responsible for determining if training is acceptable?				
10. Are all of the training modules inventoried?				
11. Does each training module have a history of the changes made to the module?				
12. Is one individual assigned responsibility for testing?				
13. Does the test plan list each measurable change objective and the method of testing that objective?				
14. Does the training plan list the desired results from testing?				
15. Does the training plan address regression testing?				
16. Does the training plan address intersystem testing?				
17. Is someone responsible for judging whether testing is acceptable?				
18. Is an acceptance testing checklist prepared to determine the necessary resources are ready for the test?				

(continues)

1

	YES	NO	N/A	COMMENTS
19. Does the acceptance testing checklist include the administrative aspects of the test?				
20. Is a training checklist prepared which indicates which individuals need training?				
21. Is a record kept of whether or not individuals receive training?				
22. Is each test failure documented?				
23. Is each training failure documented?				
24. Are test failures corrected before the change goes into production?				
25. Are training failures corrected before the change goes into production?				
26. If the change is put into production before testing/training failures have been corrected, are alternative measures taken to assure the identified errors will not cause problems?				
27. Is feedback data identified?				
28. Is feedback data collected?				
29. Is feedback data regularly reviewed?				
30. Are control concerns identified?				
31. Does information services management periodically review training and testing software changes?				

2

WORK PAPER 12-24 Form Completion Instructions: Automated Application Segment Test Failure Notification

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Description of Failure	A brief description of the condition that is believed to be unacceptable. In most instances, the detailed information would be presented orally, as would the documentation supporting the failure. The purpose of the form is to record the problem and control the implementation. The information contained in this section includes:
	• Failure #: a sequentially increasing number used to control the identification and implementation of problems. If a form is lost or mislaid, it will be noticed because a failure number will be missing.
	• Test date: the date of the test.
	• System change objective failed: the measurable change objective that was not achieved.
	• Description of failure: a brief description of what is wrong.
Recommended Correction	Corrections suggested by the individual uncovering the failure or the software maintenance analyst after an analysis of the problem. The type of information included in the recommendation is:
	• Programs affected: all the programs that contributed to the failure.
	• Data affected: all the data elements, records, or files that contributed or were involved in the failure.
	• Description of correction: a brief description of the recommended solution.
Correction Assignments	This section is completed by the software maintenance analyst to assign the correction of the failure to a specific individual. At a minimum, this should include:
	• Correction assigned to: the individual making the correction.
	• Date correction needed: the date by which the correction should be made.
	• Comments: suggestions on how to implement the solution.
Prepared By	The name of the individual who uncovered the failure.
Date	The date on which the form was prepared.

(continues)

1

WORK PAPER 12-24   *(continued)*

Application
Name: _____ Number: _____ Change Ident. # _____

Description of Failure

Test Date _____ Failure # _____

System Change Objective Failed _____

_____

Desciption of Failure _____

_____

_____

Recommended Correction

Programs Affected _____

_____

Data Affected _____

_____

Description of Correction _____

_____

Correction Assignments

Correction Assigned To _____

Date Correction Needed _____

Comments _____

_____

_____

_____

Prepared By: _____ Date: _____

2

WORK PAPER 12-25   Form Completion Instructions: Training Failure Notification

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Application Name	The name by which the application is known.
Number	The application identifier.
Change Ident. #	The sequence number that uniquely identifies the change.
Description of Failure	The details of the training failure need to be described. At a minimum, this would include: • Failure #: a sequentially increasing number used to control the failure form. • Test date: the date on which the test occurred. • People not adequately trained: the name of individuals, categories of people or departments who could not adequately perform their tasks. • Failure caused by lack of training: a description of why the training was inadequate.
Recommended Correction	Suggestions for correcting the failure. This section can be completed either by the individual uncovering the failure and/or by the systems analyst. The type of information helpful in correcting the training failure includes: • Training material needing revisions: the specific material that should be modified to correct the problem. • New method of training needed: suggestions for varying the training method. • People needing training: all of the people that may need new training. • Description of correction: a brief explanation of the recommended solution.
Correction Assignments	Assignments made by the individual responsible for training. At a minimum, each assignment would include: • Correction assigned to: name of individual who will make the necessary adjustments to training material. • Training material corrections needed: the specific training document(s) that need changing. • Comments: recommendations on how to change the training material.
Prepared By	The name of the individual who uncovered the failure.
Date	The date on which the failure occurred.

(continues)

1

Application
Name: _____ Number: _____ Change Ident. # _____

<u>Description of Failure</u>

Test Date _____ Failure # _____

People Not Adequately Trained _____

_____

Failure Caused By Lack of Training _____

_____

<u>Recommended Correction</u>

Training Materials Needing Revisions _____

_____

New Method of Training Needed _____

_____

People Needing Training _____

_____

Description of Correction _____

_____

<u>Correction Assignments</u>

Correction Assigned To _____

_____

Training Material Needing Correction _____

_____

Comments _____

_____

_____

_____

Prepared By _____ Date: _____

Chapter 13

Step 7: Post-Implementation Analysis

WORK PAPER 13-1   Post-Implementation Analysis Quality Control Checklist

		YES	NO	N/A	COMMENTS
1.	Does management support the concept of continuous improvement to test processes?				
2.	Have resources been allocated to improving the test processes?				
3.	Has a single individual been appointed responsible for overseeing the improvement of test processes?				
4.	Have the results of testing been accumulated over time?				
5.	Do the results of testing include the types of items identified in the input section of this chapter?				
6.	Do testers have adequate tools to summarize, analyze, and report the results of previous testing?				
7.	Do the results of that analysis appear reasonable?				
8.	Is the analysis performed on a regular basis?				
9.	Are the results of the analysis incorporated into improved test processes?				
10.	Is data maintained so there can be a determination as to whether those installed improvements do in fact improve the test processes?				

Chapter 14

Software Development Methodologies

WORK PAPER 14-1   Self Assessment of the Components of Software Development That Impact Testing

	YES	NO

Type of Development Process

1. Has a process been developed that identifies the criteria that will be used to select the most appropriate type of software development methodology for the software project being developed?

2. Does the developmental methodology selected have quality-control processes integrated into the development methodology?

3. Does the development methodology have both entrance and exit criteria?

4. Will management require compliance to the developmental methodology selected?

5. Does the developmental methodology selected have the appropriate management checkpoints so that go/no go decisions can be made at those checkpoints?

Specifying Requirements

1. Is there a standard for requirements that definitively defines the attributes of a requirement?

2. If so, is that standard consistent with good practices and industry standards for requirement definition?

3. Are there enterprise-wide requirements, such as security, privacy, and control that will be incorporated into all software projects?

4. Is there a process that will trace requirements from the requirements phase through implementation of the software project?

5. Is there a process in place that states that the requirements-definition phase of software development will not be complete until someone attests that the requirements are testable?

Maturity of the IT Processes

1. Does your organization have all of the processes specified for CMMI level 2?

2. Does your organization have all of the processes specified for CMMI level 3?

3. Does your organization have all of the processes specified for CMMI level 4?

4. Does your organization have all of the processes specified for CMMI level 5?

5. Does your organization have a process in place that will continuously improve the processes specified in the CMMI maturity methodology?

Competency of the Project Staff

1. Is the project staff competent in selecting the software development methodology used for building a specific software system?

2. Is the project staff competent in software testing?

3. Is the project staff competent in the procedures to be followed in developing software?

4. Is the software project staff competent in managing people?

5. Is the software project staff competent in managing projects?

(continues)

1

WORK PAPER 14-1 *(continued)*

	YES	NO
Experience of the Project Staff		

Experience of the Project Staff

1. Is the project staff experienced and knowledgeable in the business of the user?

2. Is the user associated with the project competent in the methodology used by the IT organization to develop software?

3. Will the users be involved throughout the entire software development methodology as needed, and will they be involved when needed?

4. Is the project staff experienced in using the selected software development methodology?

5. Have one or more members of the project staff been recognized for their experience and competency by being awarded a professional certification?

Configuration-Management Controls

1. Does the configuration management consist of these four elements:
   Configuration identification
   Configuration control
   Configuration-status accounting
   Configuration audits

2. Are there internal configuration-control measures to control each configuration item?

3. Has a configuration-management plan been developed (or will one be) for the software project being developed?

4. Does the configuration-management system include a version control?

5. Does the configuration-management system restrict access to authorized individuals to protect data rights, security requirements, and data-status level?

2

WORK PAPER 14-2   Analysis Footprint of the Impact of the Software Development Methodology on Testing

Configuration
Management

Type of
Process

⑤
④
③
②
①

Staff
Experience

Requirements

Staff
Competency

Process
Maturity
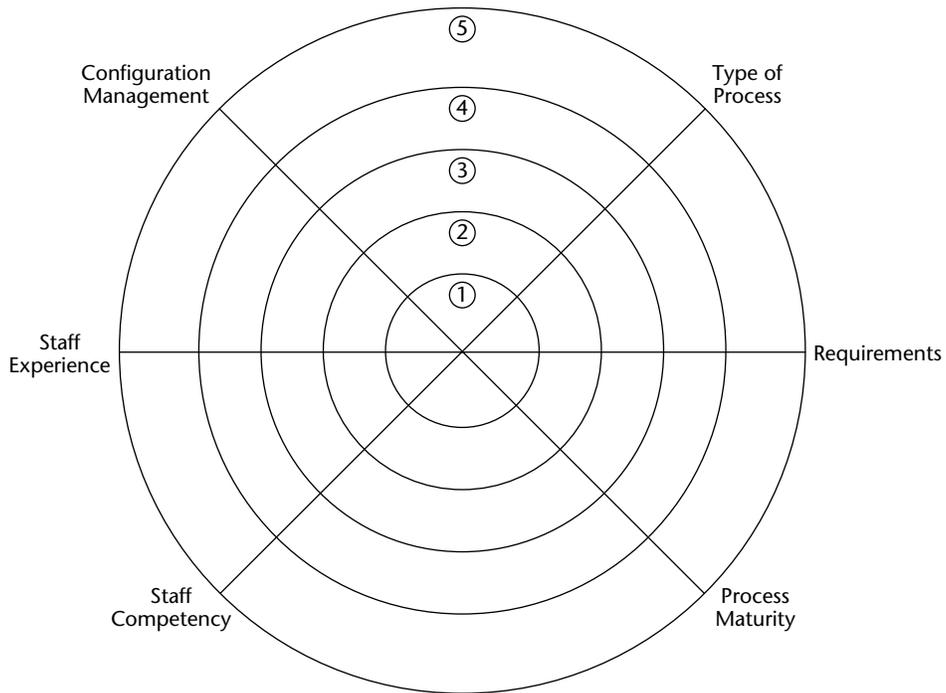
Chapter 15

Testing Client/Server Systems

WORK PAPER 15-1 Client/Server Readiness Assessment

	YES	NO	N/A	COMMENTS
Installing Client System				
1. Has a personal computer installation package been developed? (If this item has a No response, the remaining items in the checklist can be skipped.)				
2. Is the installation procedure available to any personal computer user in the organization?				
3. Does the personal computer installation program provide for locating the personal computer?				
4. Does the program provide for surge protection for power supplies?				
5. Does the installation program provide for necessary physical protection?				
6. Does the installation program identify needed supplies and accessories?				
7. Does the installation program provide for acquiring needed computer media?				
8. Does the installation program address storing computer media?				
9. Does the installation program address storage area for printer supplies, books, and so on?				
10. Does the installation program address noise from printers, including providing mats and acoustical covers?				
11. Does the installation program address converting data from paper to computer media?				
12. Does the installation program arrange for off-site storage area?				
13. Does the installation program arrange for personal computer servicing?				

(continues)

1

	YES	NO	N/A	COMMENTS
14. Does the installation program arrange for a backup processing facility?				
15. Does the installation program arrange for consulting services if needed?				
16. Are users taught how to install personal computers through classes or step-by-step procedures?				
17. Do installation procedures take into account specific organizational requirements, such as accounting for computer usage?				
18. Is the installation process customized depending on the phase of maturity of personal computer usage?				
19. Has a means been established to measure the success of the installation process?				
20. Have potential installation impediments been identified and counter strategies adopted where appropriate?				
21. Has the organization determined their strategy in the event that the installation of standard personal computer is unsatisfactory to the user?				
22. Has the needed client software been supplied?				
23. Has the needed client software been tested?				

Client/Server Security

	YES	NO	N/A	COMMENTS
1. Has the organization issued a security policy for personal computers?				
2. Have standards and procedures been developed to ensure effective compliance with that policy?				
3. Are procedures established to record personal computer violations?				
4. Have the risks associated with personal computers been identified?				
5. Has the magnitude of each risk been identified?				
6. Has the personal security group identified the type of available countermeasures for the personal computer security threats?				
7. Has an awareness program been developed to encourage support of security in a personal computer environment?				

		YES	NO	N/A	COMMENTS
8.	Have training programs been developed for personal computer users in security procedures and methods?				
9.	Does the audit function conduct regular audits to evaluate personal computer security and identify potential vulnerabilities in that security?				
10.	Does senior management take an active role in supporting the personal computer security program?				
11.	Have security procedures been developed for operators of personal computers?				
12.	Are the security programs at the central computer site and coordinated?				
13.	Has one individual at the central site been appointed responsible for overseeing security of the personal computer program?				
14.	Have operating managers/personal computer users been made responsible for security over their personal computer facilities?				
15.	Is the effectiveness of the total personal computer security program regularly evaluated?				
16.	Has one individual been appointed responsible for the security of personal computers for the organization?				

Client Data

		YES	NO	N/A	COMMENTS
1.	Has a policy been established on sharing data with users?				
2.	Is data recognized as a corporate resource as opposed to the property of a single department or individual?				
3.	Have the requirements for sharing been defined?				
4.	Have profiles been established indicating what user wants which data?				
5.	Have the individuals responsible for that data approved use by the proposed users of the data?				
6.	Has a usage profile been developed that identifies whether data is to be uploaded and downloaded?				

(continues)

		YES	NO	N/A	COMMENTS
7.	Has the user use profile been defined to the appropriate levels to provide the needed security?				
8.	Have security standards been established for protecting data at personal computer sites?				
9.	Has the personal computer user been made accountable and responsible for the security of the data at the personal computer site?				
10.	Does the user's manager share this security responsibility?				
11.	Have adequate safeguards at the central site been established to prevent unauthorized access to data?				
12.	Have adequate safeguards at the central site been established to prevent unauthorized modification to data?				
13.	Are logs maintained that keep records of what data is transferred to and from personal computer sites?				
14.	Do the communication programs provide for error handling?				
15.	Are the remote users trained in accessing and protecting corporate data?				
16.	Have the appropriate facilities been developed to reformat files?				
17.	Are appropriate safeguards taken to protect diskettes at remote sites containing corporate data?				
18.	Is the security protection required for data at the remote site known to the personal computer user?				
19.	Are violations of data security/control procedures recorded?				
20.	Is someone in the organization accountable for ensuring that data is made available to those users who need it? (In many organizations this individual is referred to as the data administrator.)				

Client/Server Standards

		YES	NO	N/A	COMMENTS
1.	Are standards based on a hierarchy of policies, standards, procedures, and guidelines?				

(continues)

4

	YES	NO	N/A	COMMENTS
2. Has the organization issued a personal computer policy?				
3. Have the standards been issued to evaluate compliance with the organization's personal computer policy?				
4. Have policies been developed for users of personal computers that are supportive of the organization's overall personal computer policy?				
5. Have personal computer policies been developed for the following areas:				
a. Continuity of processing				
b. Reconstruction				
c. Accuracy				
d. Security				
e. Compliance				
f. File integrity				
g. Data				
6. Are all standards tied directly to personal computer policies?				
7. Has the concept of ownership been employed in the development of standards?				
8. Can the benefit of each standard be demonstrated to the users of the standards?				
9. Are the standards written in playscript?				
10. Have quality control self-assessment tools been issued to personal computer users to help them comply with the standards?				
11. Has a standards notebook been prepared?				
12. Is the standards notebook divided by area of responsibility?				
13. Are the standards explained to users in the form of a training class or users-group meeting?				
14. Does a representative group of users have an opportunity to review and comment on standards before they are issued?				
15. Are guidelines issued where appropriate?				
16. Is the standards program consistent with the objectives of the phase of maturity of the personal computer in the organization?				

WORK PAPER 15-2   Client/Server Readiness Results

#	READINESS DIMENSION		READINESS RATING			
	NAME	DESCRIPTION	HIGH	MEDIUM	LOW	NONE
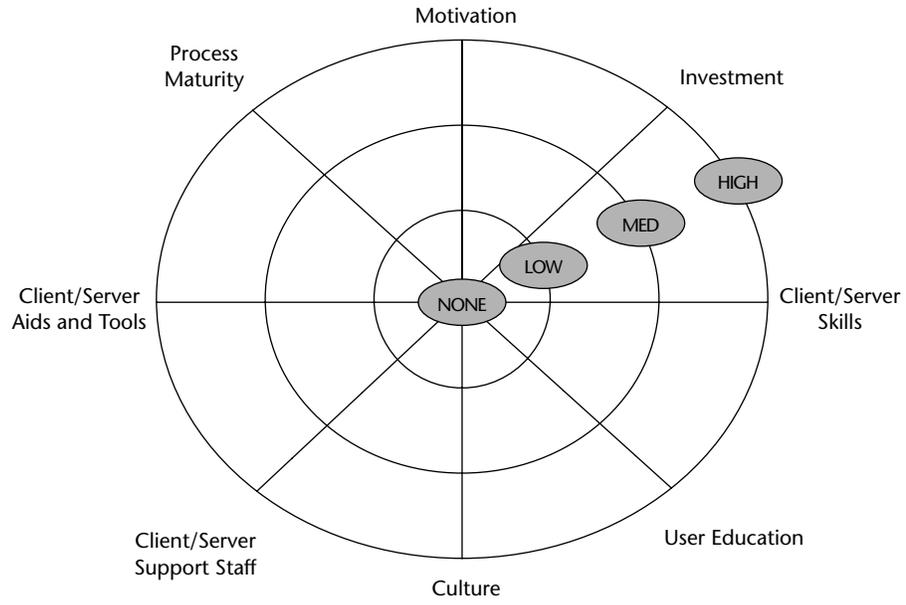
WORK PAPER 15-4   Client/Server Systems Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Does the test team in total have team members who understand client/server technology?				
2. Have the test team members acquired knowledge of client/server system to be tested?				
3. Has the readiness of the organization who installs client/server technology been evaluated?				
4. If the organization is not deemed ready to install client/server technology, have the appropriate steps been taken to achieve a readiness status prior to installing the client/server system?				
5. Has an adequate plan been developed and implemented to ensure proper installation of client technology?				
6. Are the communication lines adequate to enable efficient client/server processing?				
7. Has the server component of the system been developed adequately so that it can support client processing?				
8. Are security procedures adequate to protect client hardware and software?				
9. Are security procedures adequate to prevent processing compromise by employees, external personnel, and acts of nature?				
10. Are procedures in place to adequately protect client data?				
11. Are procedures in place to ensure that clients can only access data for which they have been authorized?				
12. Are standards in place for managing client/server systems?				
13. Does management support and enforce those standards?				

Chapter 16

Rapid Application Development Testing

WORK PAPER 16-1   RAD Applicability Checklist

	YES	NO	COMMENTS
1. Is the system being designed a user business applications?			
2. Is the technical risk low?			
3. Is the project team familiar with the user business application?			
4. Is the project team skilled in the use of the RAD developmental tools?			
5. Is the developmental team highly motivated to develop this application using the RAD model?			
6. Can the system being developed be modularized?			
7. Are the requirements for the software system reasonably well known?			
8. Is the cost of the development not a critical concern?			
9. Is the implementation schedule not a critical concern?			
10. Is the software project small enough that it can be developed within about 60 days?			
11. Can the software functionality be delivered in increments?			
12. Is the software system relatively small in comparison to other systems developed by the IT organization?			
13. Are the users willing to become heavily involved in the development?			
14. Will the users be available during the developmental cycle?			

WORK PAPER 16-2   RAD Inspection Checklist for Task 2

	INSPECTION RESULT			DESCRIPTION/LOCATION OF NOTED DEFECT
	PASS	FAIL	N/A	
Define Purpose and Scope of System				
1. Is the defined system within the context of the organization's goals?				
2. Is the defined system within the context of the organization's information requirements?				
3. Have the objectives that are critical to the success of the organization been identified in the RAD purpose and scope?				
4. Does the system scope identify the user environment?				
5. Does the system scope identify the hardware environment?				
6. Does the system scope identify the other systems that interact with this system (e.g., regarding input and output)?				
7. Does the RAD system scope define available funding?				
8. Does the RAD system scope identify time constraints?				
9. Does the RAD system scope identify the available resources to build the system?				
10. Does the RAD system scope state the security needs for the data and software?				
11. Has the RAD team been established?				
12. Is the RAD team trained in the techniques of RAD and the use of specific fourth-generation language for implementing RAD?				
13. Is the RAD software development group enthusiastic about the RAD concept?				
14. Does the RAD team know how to control RAD?				

(continues)

1

	INSPECTION RESULT			DESCRIPTION/LOCATION
	PASS	FAIL	N/A	OF NOTED DEFECT
Develop System Conceptual Model				
1. Does the RAD team use a graphic method (e.g., a data flow diagram) to construct a model of the system to be developed?				
2. Are the data definitions used for the RAD included in the data dictionary?				
3. Are the critical system objectives defined in the project scope related to specific components of the conceptual model?				
4. Has the major business input been defined?				
5. Has the major business output been defined?				
6. Has the cost to implement the system using traditional systems development processes been estimated?				
7. Has the cost of the RAD been estimated? (The RAD should cost no more than 6% to 10% of the full-scale development effort.)				
8. Have the benefits of the RAD system been developed?				
9. Have the risks associated with developing this system when it goes into production been identified?				
10. Have the files needed to support the RAD system when it goes into production been identified?				
11. Has a database administrator been consulted to determine whether the needed data will be available?				
12. Has the computer operations department been consulted to determine whether it could run the system if it were implemented?				
13. Are there sufficient communications lines to support the system?				

2

WORK PAPER 16-2 *(continued)*

| | INSPECTION RESULT | | | DESCRIPTION/LOCATION |
	PASS	FAIL	N/A	OF NOTED DEFECT
Develop Logical Data Model				
1. Has a model of the local information flow for individual subsystems been designed?				
2. Has a model for the global information flow for collections of subsystems been designed?				
3. Have the conceptual schemas for the RAD system been defined?				
4. Does the conceptual schema define the attributes of each entity in the subschema?				
5. Has a model been developed for each physical external schema?				
6. Has the physical database been designed to provide optimum access for the prototype transactions?				
7. Does the physical database design provide efficiency in operation?				
8. Is the RAD design restricted to accessing the database at the logical level?				
9. Have the functions to be performed by the RAD system been defined?				
10. Has the sequence of performing the functions been defined?				
11. Has the potential source of input transactions and data been defined?				
12. Has a determination been made that the needed data can be prepared in time to meet RAD processing schedules?				

3

WORK PAPER 16-3   RAD Inspection Checklist for Task 3

	INSPECTION RESULT			DESCRIPTION/LOCATION OF NOTED DEFECT
	PASS	FAIL	N/A	
Develop and Demonstrate RAD System				
1. Have the basic database structures derived from the logical data modeling been defined?				
2. Have the report formats been defined?				
3. Have the interactive data entry screens been defined?				
4. Have the external file routines to process data been defined?				
5. Have the algorithms and procedures to be implemented by the RAD been defined?				
6. Have the procedure selection menus been defined?				
7. Have the test cases to ascertain that data entry validation is correct been defined?				
8. Have report and screen formatting options been defined?				
9. Has a RAD system been developed using a fourth-generation language?				
10. Has the RAD been demonstrated to management?				
11. Has management made strategic decisions about the application based on RAD appearance and objectives?				
12. Has the RAD been demonstrated to the users?				
13. Have the users been given the opportunity to identify problems and point out unacceptable procedures?				
14. Has the prototype been demonstrated before a representative group of users?				
15. If the RAD is unacceptable to management or users, have requests for changes or corrections been documented?				
16. Has a decision been made concerning whether to develop another RAD iteration?				

WORK PAPER 16-4 RAD Inspection Checklist for Task 4

	INSPECTION RESULT			DESCRIPTION/LOCATION OF NOTED DEFECT
	PASS	FAIL	N/A	
Revise and Finalize Specifications				
1. Is someone on the RAD team responsible for reviewing each component for inconsistencies, ambiguities, and omissions?				
2. Has the statement of goals and objectives been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
3. Has the definition of system scope been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
4. Have the system diagrams been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
5. Has the data dictionary report been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
6. Has the risk analysis been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
7. Has the logical data model been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				

(continues)

1

| | INSPECTION RESULT | | | DESCRIPTION/LOCATION |
	PASS	FAIL	N/A	OF NOTED DEFECT
8. Have the data entry screens been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
9. Have the report layouts been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
10. Have the selection menus and operational flow been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
11. Has the physical database structure been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
12. Has the draft user manual been reviewed to ensure that all elements are present, that all components have been defined, and that there are no conflicts?				
13. Have all of the RAD elements been indexed?				
14. Have all of the RAD elements been cross-referenced by subject and component?				
15. Does the RAD documentation contain sample reports?				
16. Does the RAD documentation contain sample data entry screens?				
17. Does the RAD documentation contain a listing of the fourth-generation commands for each programmed function?				

Develop Production System

	PASS	FAIL	N/A	
1. Has a decision been made by the end user regarding putting the system in production?				
2. If so, have all the significant system problems been resolved?				
3. If the RAD is very inefficient, is it discarded in place of a production system built using traditional methods?				
4. If the RAD does not have adequate controls, is it thrown away and a new system developed using traditional methods?				
5. If the RAD is placed into production, does it have adequate data validation?				

(continues)

2

		INSPECTION RESULT		DESCRIPTION/LOCATION OF NOTED DEFECT
	PASS	FAIL	N/A	
6. If the RAD is placed into production, does it have adequate system controls?				
7. If the RAD is placed into production, does it have adequate documentation for maintenance purposes?				
8. If the system is rebuilt using traditional methods, does the developmental project team believe that the RAD documentation is adequate for developing a production system?				

Release Test System

	PASS	FAIL	N/A	
1. Has the system been approved by the test team before being released for test?				
2. Has the system design been documented in detail?				
3. Have the user manuals been revised?				
4. Has a training plan been developed?				
5. Are the users involved in the testing?				
6. Is the system put under full production conditions during testing?				
7. Does the existing system remain in place until the new system has passed testing?				
8. Have all end users been trained in the operation of the system?				
9. If the output is crucial to the organization, has a parallel operation test been performed?				
10. Are errors noted during testing documented?				
11. Are needed changes noted during testing documented?				
12. Has a formal decision procedure been developed to determine when to move the system out of testing?				

Release Production System

	PASS	FAIL	N/A	
1. Have the users accepted the system before it is placed into production?				
2. Have the final user manuals been prepared?				
3. Have the final user manuals been distributed to the end users?				
4. Have the end users been trained in any changes occurring between testing and placement of the system into production?				

(continues)

3

WORK PAPER 16-5   RAD Systems Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Does the test team contain a collective knowledge and insight into how RAD systems are developed?				
2. Does the test team collectively understand the tool that is used in RAD?				
3. Do the testers understand that the RAD's requirements will be continually changing as development progresses?				
4. Does the test team collectively understand how to use the inspection tools?				
5. Is the inspection process used at the end of each iteration of RAD?				
6. Are new requirements documented prior to developing each RAD iteration?				
7. Did the testers test each RAD iteration?				
8. Is the tester's input incorporated into the process of updating requirements for the next iteration of a RAD?				

Chapter 17

Testing Internal Controls

WORK PAPER 17-1   Internal Control Questionnaire

QUESTION	YES	NO	COMMENTS
A. Documentation			

Documentation consists of work papers and records that describe the system and procedures for performing a processing task. It is the basic means of communicating the essential elements of the data processing system and the logic followed by the computer programs. Preparing adequate documentation is a necessary, although frequently neglected, phase of data processing. A lack of documentation indicates a serious weakness within the management control over a data processing installation.

■ Is the program supported by an adequate documentation file? A minimum acceptable level of documentation should include the following:

Problem statement
System flowchart
Transactions and activity codes
Record layouts
Operator instructions
Program flowchart
Program listing
Approval and change sheet
Description of input and output forms

B. Input Controls

Input controls are designed to authenticate the contents of source documents and to check the conversion of this information into machine-readable formats or media. Typically, these controls will not be designed to detect 100 percent of all input errors because such an effort would be either too costly or physically impractical. Therefore, an economic balance must be maintained between the cost of error detection and the economic impact of an undetected error. This should be considered when evaluating input control. Judgment must be used when identifying essential information, the accuracy of which must be verified.

The following questions can also be used to evaluate internal control practices:

■ Are procedures adequate to verify that all transactions are being received for processing? To accomplish this, there must be some systematic procedure to ensure all batches entered for processing or conversions are returned. Basic control requirements are being met if the answer to one of the following questions is "yes."

(continues)

QUESTION	YES	NO	COMMENTS
■ Are batch controls (at least an item count) being established before source documents are sent for processing?			
■ If batch controls are established, is there some other form of effective control (such as prenumbered documents) that ensures that all documents have been received?			
■ If no batch control is used, is there some other means of checking the receipt of all transactions? If yes, describe. (For example, in a payroll operation, the computer may match attendance time cards and corresponding job tickets for each employee as the master file is updated.)			
■ Are procedures adequate to verify the recording of input data? Control is being maintained if the answer to one of the following questions is "yes."			
■ Are important data fields subject to verification?			

■ If only some (or none) of the important data fields are verified, is an alternate checking technique employed? Acceptable alternate techniques include the following:
    Self-checking digits
    Control totals
    Has totals
    Editing for reasonableness			

■ If input data is converted from one form to another prior to processing on the computer system, are controls adequate to verify the conversion? Normal conversion controls include the following: Record counts Has totals Control totals			
■ If data transmission is used to move data between geographic locations, are controls adequate to determine transmission is correct and no messages are lost? Controls would normally include one or more of the following: Message counts Character counts Dual transmission			
■ Is the error correction process and the re-entry of the corrected data subject to the same controls as is applied to original data?			

(continues)

QUESTION	YES	NO	COMMENTS
■ Are source documents retained for an adequate period of time in a manner that allows identification with related output records and documents?			

C. Program and Processing Controls

Programs should be written to take the maximum advantage of the computer's ability to perform logical testing operations. In many cases, tests that could be employed are not used because the programmer does not know the logical limits of the data to be processed.

■ Is adequate control exercised to ensure that all transactions received are processed by the computer? Note: The answer to one of the following two questions should be "yes."

 ■ If predetermined batch control techniques are being used, does the computer accumulate matching batch totals in each run wherein the corresponding transactions are processed, and is there adequate provision for systematic comparison of computer totals with predetermined totals?

 (Note: Having the computer internally match totals is more accurate than external visual matching. In addition, note that original batch totals are often internally combined into pyramid summary totals as different types of input transactions are merged during progressive stages. This is acceptable if it does not create a serious problem when attempting to locate errors when the overall totals are compared.)

 ■ If no batch total process is in use, is there an effective substitute method to verify that all transactions are processed? (Example: Any application where source documents are serially numbered and the computer system checks for missing numbers.)

■ Is adequate use being made of the system's ability to make logical data validity tests on important fields of information? These tests may include the following:

 ■ Checking code or account numbers against a master file or table

 ■ Using self-checking numbers

 ■ Testing for alpha or blanks in a numeric field

(continues)

3

QUESTION	YES	NO	COMMENTS
■ Comparing different fields within a record to see whether they represent a valid combination of data			
■ Checking for missing data			
■ Is sequence checking employed to verify sorting accuracy of each of the following:			
■ Transactions that were presorted before entry into the computer (sequence check on the first input run)			
■ Sequenced files (sequence check incorporated within processing logic that detects out-of-sequence condition when files are updated or otherwise processed)			

D. Output Control

Output control is generally a process of checking whether the operation of input control and program and processing controls has produced the proper result. The following questions should be answered regarding all controls in effect:

■ Are all control totals produced by the computer reconciled with predetermined totals? (Basically, control totals on input plus control totals on files to be updated should equal the control totals generated by the output.)

■ Are control total reconciliations performed by persons independent of the department originating the information and the data processing department?

■ Are error corrections and adjustments to the master file:

■ Prepared by the serviced department's personnel?

■ Reviewed and approved by a responsible official who is independent of the data processing department?

■ Are procedures adequate to ensure that all authorized corrections are promptly and properly processed and that the corrections result in a file that matches the control totals?

(continues)

4

QUESTION	YES	NO	COMMENTS
E. File Control Because data files can be destroyed by careless handling or improper processing, proper file control is vital in all data processing installations. ■ Are control totals maintained on all files and are such totals verified each time the file is processed? ■ Are all files backed up to permit file re-creation in case files are lost/destroyed during processing? ■ Are all files physically protected against damage by fire or other accidental damage? ■ Are there adequate provisions for periodic checking of the contents of master files by printout and review, checking against physical counts, comparison to underlying data, or other procedures?			

Chapter 18

Testing COTS and Contracted Software

WORK PAPER 18-1   Test of Completeness of Business Requirements

Legend:

SA = Strongly agree

A = Agree

N = Neither agree nor disagree

D = Disagree

SD = Strongly disagree

	ASSESSMENT					COMMENTS
	SA (5)	A (4)	N (3)	D (2)	SD (1)	
1. The system will experience few changes over time.						
2. All involved parties agree the needs are well defined.						
3. The use of the results of the application will require very little judgment on the part of the users of the computer outputs.						
4. The input to the system is well defined.						
5. The outputs from the system and the decision material are well defined.						
6. The users of the system are anxious to have the area automated.						
7. The users want to participate in the selection and implementation of the software.						
8. The users understand data processing principles.						
9. The application does not involve any novel business approach (i.e., an approach that is not currently being used in your business).						
10. The users do not expect to find other good business ideas in the selected software.						

Assessment Score =

1

WORK PAPER 18-2   Test of Fit

Business Application

NUMBER	CRITICAL SUCCESS FACTORS	MEETS CSF		
		YES	NO	COMMENTS

WORK PAPER 18-3   Functional Test Condition Checklist

	YES	NO	N/A	COMMENTS
Have tests for the following conditions been prepared?				
1. Test conditions for each input transaction				
2. Variations of each input transaction for each special processing case				
3. Test conditions that will flow through each logical processing path				
4. Each internal mathematical computation				
5. Each total on an output verified				
6. Each functional control (e.g., reconciliation of computer controls to independent control totals)				
7. All the different computer codes				
8. The production of each expected output				
9. Each report/screen heading and column heading				
10. All control breaks				
11. All mathematical punctuation and other editing				
12. Each user's preparation of input				
13. Completeness of prepared input				
14. User's use of output, including the understanding and purpose for each output				
15. A parallel test run to verify computer results against those which were produced manually				
16. Matching of two records				
17. Nonmatching of two records				

WORK PAPER 18-4   Structural Test Condition Checklist

	YES	NO	N/A	COMMENTS
Have tests for each of the following conditions been prepared?				
1. Addition of a record before the first record on a file				
2. Addition of a record after the last record on a file				
3. Deletion of the first record on a file				
4. Deletion of the last record on a file				
5. Change information on the first record on a file				
6. Change information on the last record on a file				
7. Cause the program to terminate by predetermined conditions				
8. Accumulate a field larger than the mathematical accumulators can hold				
9. Verify that page counters work				
10. Verify that page spacing works				
11. Enter invalid transaction types				
12. Enter invalid values in fields (e.g., put alphabetic characters in a numeric field)				
13. Process unusual conditions (of all types)				
14. Test principle error conditions				
15. Test for out-of-control conditions (e.g., the value of records in the batch does not equal the entered batch total)				
16. Simulate a hardware failure forcing recovery procedures to be used				
17. Demonstrate recovery procedures				
18. Enter more records than disk storage can hold				
19. Enter more values than internal tables can hold				
20. Enter incorrect codes and transaction types				
21. Enter unreasonable values for transaction processing				
22. Violate software rules not violated by above structural test conditions				

WORK PAPER 18-5   Off-the-Shelf Software Testing Quality Control Checklist

	YES	NO	N/A	COMMENTS
Have tests for each of the following conditions been prepared?				
1. Addition of a record before the first record on a file				
2. Addition of a record after the last record on a file				
3. Deletion of the first record on a file				
4. Deletion of the last record on a file				
5. Change information on the first record on a file				
6. Change information on the last record on a file				
7. Cause the program to terminate by predetermined conditions				
8. Accumulate a field larger than the mathematical accumulators can hold				
9. Verify that page counters work				
10. Verify that page spacing works				
11. Enter invalid transaction types				
12. Enter invalid values in fields (e.g., put alphabetic characters in a numeric field)				
13. Process unusual conditions (of all types)				
14. Test principle error conditions				
15. Test for out-of-control conditions (e.g., the value of records in the batch does not equal the entered batch total)				
16. Simulate a hardware failure forcing recovery procedures to be used				
17. Demonstrate recovery procedures				
18. Enter more records than disk storage can hold				
19. Enter more values than internal tables can hold				
20. Enter incorrect codes and transaction types				
21. Enter unreasonable values for transaction processing				
22. Violate software rules not violated by above structural test conditions				

(continues)

1

	YES	NO	N/A	COMMENTS
Task 1: Test Business Fit				
1. Have the business needs been adequately defined?				
2. Does the selected software package meet those needs?				
3. Have the critical success factors for the business application been defined?				
4. Is there a high probability that the software package under consideration will satisfy the critical success factors?				
5. Is the software being evaluated designed to meet this specific business need?				
6. Does the software under consideration push the critical success factors to their limit?				
7. Do you personally believe the software under consideration is the right software for you?				
8. Do you believe this software package will provide your business with one of the four benefits attributable to software (i.e., perform work cheaper, perform work faster, perform work more reliably, or perform tasks not currently being performed)?				
9. Does the business approach, and the software package, fit into your business' long-range business plan?				
10. Is your business system that is being considered for computerization relatively stable in terms of requirements?				
Task 2: Testing System Fit				
1. Will the selected software package operate on your computer hardware?				
2. Will the selected software package operate on your equipment's operating system?				
3. Is the proposed software package compatible with your other computer programs (applicable programs only)?				
4. Can the proposed software package utilize applicable existing data files?				

(continues)

2

	YES	NO	N/A	COMMENTS
5. Is the method in which the software operates consistent with your business cycle?				
6. Are you willing to have you and your personnel perform the business steps needed to make the software function correctly?				
7. Is the computer work flow for this area consistent with the general work flow in your business?				
8. Were the software demonstrations satisfactory?				
9. Do you believe that the software has staying power (i.e., the vendor will continue to support it as technological and business conditions change)?				
10. Are you pleased with the fit of this software package into your computer and systems environment?				

Task 3: Testing People Fit

	YES	NO	N/A	COMMENTS
1. Were the workers exposed to or involved in the decision to acquire a computer, and specifically the applications that affect their day-to-day job responsibilities?				
2. Have your and your staff's jobs been adequately restructured after the introduction of the computer?				
3. Have the people involved with the computer been trained (or will they be trained) in the skills needed to perform their new job function?				
4. Has each worker been involved in the establishment of the procedures that he or she will use in performing day-to-day job tasks?				
5. Have the workers been charged with the responsibility for identifying defects in computer processing?				
6. Does each worker have appropriate feedback channels to all of the people involved with his or her work tasks?				
7. Are your people enthusiastic over the prospects of involving a computer in their work?				

	YES	NO	N/A	COMMENTS
8. Have supervisors been properly instructed in how to supervise computer staff?				
9. Have adequate controls been included within computer processing?				
10. Do you believe your people have a positive attitude about the computer and will work diligently to make it successful?				

Task 4: Validate Acceptance Test Software Process

	YES	NO	N/A	COMMENTS
1. Were test conditions created for all of the test methods included in the test matrix?				
2. Were both static and dynamic tests used as test methods?				
3. Have functional test conditions been prepared which are consistent with the functional requirements and critical success factors?				
4. Have you prepared structural test conditions which address the more common computer architectural problems and incorrect data entry?				
5. Has the sequence in which test conditions will be executed been determined?				
6. Are the test conditions prepared using the most economical source of data?				
7. Have the test conditions been prepared by the appropriate "stakeholder"?				
8. Have the test conditions been prepared in an easy-to-use format?				
9. Has the validity of the test process been adequately challenged?				
10. Do you believe that the test conditions when executed will adequately verify the functioning of the software?				

Chapter 19

Testing in a Multiplatform Environment

WORK PAPER 19-1   Multiplatform Concerns and Configurations

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Concern	A narrative description of the concerns that need to be addressed in multi-platform testing.
Recommended Test to Address Concern	This field should include any tests that the group developing the concerns believes could be made to determine the validity of that concern.
Needed Test Platform	Detailed description of the platform on which the software will be executed. The description should include at a minimum: Hardware vendor Memory size Hard disk size Peripheral equipment Operating system Supporting software
Available Test Platform	This column should indicate whether the needed test platform is available, and if not, what actions will be taken for test purposes.

Part 1 Multiplatform Testing Concerns

Concern	Recommended Test to Address Concern

Part 2 Needed versus Available Platform Configurations

Needed Test Platform	Available Test Platform	Acceptable	
		Yes	No

1

WORK PAPER 19-2   Test to Validate Platform-Affected Software Structure

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Structural Component	The name or identifier of the structural component affected by a platform.
Platform	The specific platform or platforms that may affect the correct processing of the identified structural component.
How Affected	A narrative explanation of how the platform may affect the structural component should be documented.
Test(s) to Validate Structural Component	The test group should recommend one or more tests to validate whether the platform affects the structural component. Note that these tests may be different for different platforms.

Software Structure Affected by Platform			Test(s) to Validate Structural Component
Structural Component	Platform	How Affected	

WORK PAPER 19-3   Test(s) to Validate Platform-Affected Interfaces

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Software Package	The name of the software package that is being tested.
Platform	Description of the platform that may affect an interface.
Interface Affected	A brief narrative name or description of the interface affected, such as "retrieving a product price from the pricing database."
Interface	The interface should be described to indicate the movement of data or processing from one point to another. For example, a product price will be moved from the product price database to the invoice pricing software package.
Effect	This field should explain the potential risk or effect that could be caused by a specific platform. For example, platform X may not have adequate space for over 1,000 product prices.
Test(s) to Validate Interface	This column should describe in detail each task that should be performed to validate interface processing. For example, put 1,001 product prices into the pricing database to validate that the platform can support a pricing database that contains over 999 product prices.

Interfaces Affected by Platform						Test(s) to Validate Interface
Software Package	Platform	Interface Affected	Interface			
			From	To	Effect	

1

WORK PAPER 19-4   Multiplatform Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Have all of the platforms in which the software is intended to be run been identified?				
2. Has each platform configuration been described?				
3. Have the concerns for correct multiplatform processing been identified?				
4. If so, are those concerns reasonable and complete?				
5. Has a determination been made that the identified platforms will be available for test?				
6. If not, has a decision been made on how to handle the potential risk associated with platforms not being tested?				
7. Have the structural components of the software to be tested been identified?				
8. Are those structural components complete?				
9. Has a determination been made as to how each of the identified platforms may impact those structural components?				
10. Have the interfaces for the software package been identified and documented?				
11. Has a determination been made as to whether any or all of the platforms may affect those interfaces?				
12. Was multiplatform testing conducted under real-world conditions?				

(continues)

1

WORK PAPER 19-4 *(continued)*

	YES	NO	N/A	COMMENTS
13. Did acceptance testing prove that the procedures were correct and usable?				
14. Did the acceptance test process verify that people are adequately trained to perform their job tasks on multiple platforms?				
15. Did acceptance testing verify that the software performs the functional and structural tasks correctly (i.e., those tested)?				
16. Did acceptance testing verify that the products produced by the computer system are correct and usable?				
17. Did acceptance testing verify that the operations personnel could correctly and effectively operate the software on the multiple platforms?				
18. Did the acceptance test process verify that the operational software system satisfied the predefined critical success factors for the software?				
19. Did the acceptance test process verify that the users/operators of the system can identify problems when they occur, and then correctly and on a timely basis correct and reenter those transactions?				
20. Have all the problems identified during acceptance testing been adequately resolved?				

2

Chapter 20

Testing Software System Security

WORK PAPER 20-1   Test Security Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Has a team of three or more people been put together to prepare and use the penetration-point matrix?				
2. Is there a reasonable possibility that the team members can identify all the major potential perpetrators?				
3. Do the team members have knowledge of the location/information system under investigation?				
4. Is there a high probability that the team will identify all the major potential points of penetration?				
5. Will the team use a synergistic tool to facilitate brainstorming/discussion to identify potential perpetrators/penetration points?				
6. Does the prepared penetration-point matrix include the identified potential perpetrators and potential points of penetration?				
7. Has the team used appropriate synergistic tools to rate the probability that a given perpetrator will penetrate a specific point?				
8. Has every perpetrator and penetration point been analyzed?				
9. Has the accumulation of points been performed correctly?				
10. Have the high-risk penetration points been identified?				
11. Has there been a reasonable challenge that the identified high-risk points are in fact the high-risk points of penetration?				

1

Chapter 21

Testing a Data Warehouse

WORK PAPER 21-1   Rating the Magnitude of Data Warehouse Concerns

Worksheet Concern #1:   <u>Inadequate Assignment of Responsibilities</u>

Description of Concern:

There is inappropriate segregation of duties or failure to recognize placement of responsibility.

	YES	NO	COMMENTS
1. Has a charter been established for the database administration function outlining the role and responsibilities for the function?			
2. Have the user responsibilities regarding the integrity of the data warehouse been defined?			
3. Have job descriptions been modified for all individuals interfacing with the data warehouse to define their data warehouse responsibilities?			
4. Have job descriptions been developed for full-time data warehouse administration personnel?			
5. Has a formal method of resolving data warehouse disputes been established?			
6. Does the organization have a data policy which outlines organizational data responsibility?			
7. Are the functions being performed by data warehouse administration within that administration's formal role and responsibility?			
Percent of No responses		%	

(continues)

1

Worksheet Concern #2:   Inaccurate or Incomplete Data in a Data Warehouse

Description of Concern:
The integrity of data entered in the data warehouse is lost due to inadvertent or intentional acts.

	YES	NO	COMMENTS
1. Has each element of data in the data warehouse been identified?			
2. Have the data validation rules for each data element been documented?			
3. Have the data validation rules for each data element been implemented?			
4. Are the data validation rules adequate to ensure the accuracy of data?			
5. Have procedures been established to ensure the consistence of redundant data elements?			
6. Have procedures been established for the timely correction of data entry errors?			
7. Are procedures established to promptly notify all users of the data warehouse when an inaccuracy or incomplete data condition has been identified?			
8. Are the data warehouse administration tools and techniques adequate to ensure the consistency of redundant data elements?			
Percent of No responses		%	

(continues)

2

Worksheet Concern #3:   <u>**Losing an Update to a Single Data Item**</u>

Description of Concern:

One or more updates to a single data item can be lost due to inadequate concurrent update procedures.

	YES	NO	COMMENTS
1. Does the data warehouse software in use have a lockout feature to prevent concurrent updates to a single data item?			
2. Does the data warehouse software have a feature to resolve deadlock in accessing data (for example, user A has item 1 and wants item 2, while user B has item 2 and wants item 1)?			
3 Has the sequencing of updates to the data warehouse been defined?			
4. Are there controls in the data warehouse software to ensure that events can only be recorded in the predetermined sequence?			
5. Have the parties that can create, update, or delete a data element been identified?			
Percent of No responses		%	

Worksheet Concern #4:   <u>**Inadequate Audit Trail**</u>

Description of Concern:

The use of data by multiple applications may split the audit trail among those applications and the data warehouse software audit trail.

		YES	NO	COMMENTS
1.	Has the audit trail for data warehouse applications been identified and documented?			
2.	Has the retention period for each part of the data warehouse audit trail been determined?			
3.	Is a data warehouse software log maintained?			
4.	Does management determine what information will be maintained in the data warehouse software log?			
5.	Can the audit trail trace source transactions to control totals and trace control totals back to the initiating transactions?			
6.	Can the audit trail provide the evidence needed to reconstruct transaction processing?			
7.	Is the audit trail in operation whenever the data warehouse is in operation?			
8.	Are all overrides of normal data warehouse software procedures recorded on the data warehouse software log?			
9.	Can the application audit trail records be cross-referenced to the data warehouse software log audit trail records?			
	Percent of No responses		%	

(continues)

4

Worksheet Concern #5: _Unauthorized Access to Data in a Data Warehouse_

Description of Concern:

The concentration of sensitive data may make it available to anyone gaining access to a data warehouse.

		YES	NO	COMMENTS
1.	Have all of the data elements requiring security procedures been identified?			
2.	Have all of the data warehouse users been identified?			
3.	Has a user profile been established indicating which resources can be accessed by which users?			
4.	Has the enforcement of the user profile been automated?			
5.	Is the access mechanism, such as passwords, protected from unauthorized manipulation?			
6.	Has the organization established a data warehouse security officer function (note that this need not be a full-time function)?			
7.	Are security violators promptly punished?			
8.	Are formal records maintained on security violations?			
9.	Are security violation summaries presented to management in regular reports?			
	Percent of No responses		%	

5

Worksheet Concern #6: **Inadequate Service Level**

Description of Concern:

Multiple users contesting for the same resources may degrade the service to all due to excessive demand or inadequate resources.

		YES	NO	COMMENTS
1.	Has the level of service that is desired been documented?			
2.	Are procedures established to monitor the desired level of service to users?			
3.	Are users encouraged, by the use of such techniques as varying chargeout rates, to spread out their nonurgent processing?			
4.	Have the identified options to improve service when it degrades been identified?			
5.	Does the data warehouse administrator continually monitor the service level and make adjustments where appropriate?			
6.	Are steps to take established at points where service level degrades?			
7.	Do procedures identify the cause of degradation in service, such as a single user consuming exorbitant amounts of resources, so that action can be taken to eliminate those causes where appropriate?			
	Percent of No responses		%	

(continues)

Worksheet Concern #7:   Placing Data in the Wrong Calendar Period

Description of Concern:
Identifying transactions with the proper calendar period is more difficult in some on-line data warehouse environments than in others.

		YES	NO	COMMENTS
1.	Do procedures identify the criteria for determining into which accounting period transactions are placed?			
2.	Are all postdated transactions date-stamped to identify the accounting period in which they belong?			
3.	Are procedures established to cut off processing at the end of significant accounting periods, such as at year-end?			
4.	For applications where data must be segregated into accounting periods, are significant transactions entered both immediately before and immediately after the accounting cutoff period manually reviewed to ensure they are in the appropriate accounting period?			
5.	Are formal procedures established to move data from one accounting period to another if appropriate?			
	Percent of No responses		%	

(continues)

Worksheet Concern #8:   **Failure of Data Warehouse Software to Function as Specified**

Description of Concern:

Most data warehouse software is provided by vendors, making the data administrator dependent on the vendor to assure the proper functioning of the software.

	YES	NO	COMMENTS
1. Have the processing expectations been determined?			
2. Is the data warehouse software evaluated to determine that it performs in accordance with the predetermined requirements?			
3. Is each new release of data warehouse software thoroughly tested?			
4. Has a maintenance contract for the data warehouse software been established?			
5. Are procedures established to identify data warehouse software problems?			
6. Are operations personnel trained to identify and report data warehouse software problems?			
7. Have backup procedures been developed for use in the event of a data warehouse software failure?			
8. Are data warehouse software failures recorded and regularly reported to the data warehouse administrator?			
9. Are the vendors promptly notified in the event of a data warehouse software problem so that they can take appropriate action?			
Percent of No responses		%	

(continues)

Worksheet Concern #9:   <u>**Fraud/Embezzlement**</u>

Description of Concern:
Systems that control resources are always subject to fraud and embezzlement.

	YES	NO	COMMENTS
1. Do data warehouse administration personnel have access to the data in the data warehouse?			
2. Has methodology been established for designing data warehouse controls?			
3. Has the data warehouse been reviewed within the last year by an independent reviewer?			
4. Have procedures been established to identify and report errors, omissions, and frauds to senior management?			
5. Are all data warehouse resources access controlled?			
6. Are passwords or other access control procedures changed at least every six months?			
7. Are all error messages acted upon in a timely fashion?			
8. Are deviations from normal processing investigated?			
9. Do data validation routines anticipate and report on unusual processing?			
Percent of No responses		%	

(continues)

Worksheet Concern #10:   Lack of Independent Data Warehouse Reviews

Description of Concern:

Most reviewers are not skilled in data warehouse technology and thus have not evaluated data warehouse installations; in addition, many auditor software packages cannot access data warehouse software.

	YES	NO	COMMENTS
1. Is there an internal audit function having jurisdiction over reviewing data warehouse technology?			
2. Is there an EDP quality assurance group having jurisdiction over reviewing data warehouse technology?			
3. Does either of these groups have adequate skills to perform such a review?			
4. Has an independent review of data warehouse technology been performed within the last 12 months?			
5. Was a report issued describing the findings and recommendations from that review?			
6. Were the findings and recommendations reasonable based upon the current use of data warehouse technology?			
7. Is an independent review of data warehouse technology planned during the next 12 months?			
Percent of No responses		%	

(continues)

Worksheet Concern #11: <u>**Inadequate Documentation**</u>

Description of Concern:

Documentation of data warehouse technology is needed to ensure consistency of understanding and use by multiple users.

	YES	NO	COMMENTS
1. Do data documentation standards exist?			
2. Are data documentation standards enforced?			
3. Is a data dictionary used to document the attributes of data elements?			
4. Is a data dictionary integrated into the data warehouse software operation, so that the only entry into data warehouse software-controlled data is through the data dictionary?			
5. Does the data warehouse administration group provide counsel in documenting and using data?			
6. Does the data documentation contain the data validation rules?			
Percent of No responses		%	

(continues)

Worksheet Concern #12:   Continuity of Processing

Description of Concern:

Many organizations rely heavily on data warehouse technology for the performance of their day-to-day processing.

	YES	NO	COMMENTS
1. Have the potential causes of data warehouse failure been identified?			
2. Has the impact of each of those failures on the organization been assessed?			
3. Have procedures been developed to continue processing during a data warehouse failure?			
4. Are procedures established to ensure that the integrity of the data warehouse can be restored after data warehouse failure?			
5. Has the sequence of actions necessary to restore applications after a data warehouse failure been documented?			
6. Have computer operations personnel been trained to data warehouse recovery procedures?			
7. Is sufficient backup data stored off-site to permit reconstruction of processing in the event of a disaster?			
8. Are records maintained on data warehouse failures so that specific analysis can be performed?			
Percent of No responses		%	

(continues)

Worksheet Concern #13:   <u>**Lack of Performance Criteria**</u>

Description of Concern:

Without established performance criteria, an organization cannot be assured that it is achieving data warehouse goals.

		YES	NO	COMMENTS
1.	Have measurable objectives for data warehouse technology been established?			
2.	Are those objectives monitored to determine whether they are achieved?			
3.	Can the cost associated with data warehouse technology be identified?			
4.	Can the benefits associated with data warehouse technology be identified?			
5.	Was a cost/benefit analysis prepared for the installation and operation of data warehouse technology?			
6.	Has the cost/benefit projection been monitored to measure whether those projections have been achieved?			
7.	Is the achievement of the performance criteria evaluated by an independent group, such as EDP quality assurance?			
	Percent of No responses		%	

(continues)

13

Worksheet Concern #14: **Lack of Management Support**

Description of Concern:
Without adequate resources and "clout," the advantages of data warehouse technology may not be achieved.

		YES	NO	COMMENTS
1.	Has a member of senior management been appointed responsible for managing data for the organization?			
2.	Was senior management involved in the selection of the organization's data warehouse technology approach?			
3.	Has a review board been established comprising users, EDP personnel, and senior managers to oversee the use of data warehouse technology?			
4.	Has data processing management attended courses on the use of data warehouse technology?			
5.	Has senior management requested regular briefing and/or reports on the implementation and use of data warehouse technology?			
6.	Has senior management been involved in the preparation of a long-range plan for use of information in the organization?			
7.	Is senior management involved in the settlement of disputes over the attributes or use of information in the organization?			
	Percent of No responses		%	

(continues)

WORK PAPER 21-2   Magnitude of Data Warehouse Concerns

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
% of No Responses	This column divides the percentage of No responses into three categories: low, medium, and high.
Concern Ratings	The rating for the concerns listed on this work paper represents the percentages of No responses calculated for those concerns on Work Paper 21-1.
Data Warehouse Concerns	These are the 14 data warehouse concerns described earlier in this chapter.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Inadequate assignment of responsibilities	Inaccurate or incomplete data in a database	Losing an update to a single database	Inadequate audit trail	Unauthorized access in a database	Inadequate service level	Placing data in the wrong calendar period	Failure of DBMS to function as specified	Fraud/embezzlement	Lack of independent database reviews	Inadequate documentation	Continuity of processing	Lack of performance criteria	Lack of management support

WORK PAPER 21-2 *(continued)*

% OF NO RESPONSES	CONCERN RATINGS													
100%	High													
68%														
67%	Medium													
34%														
33%	Low													
0%														

WORK PAPER 21-3   Data Warehouse Activity Process

	APPROPRIATE			COMMENTS
	YES	NO	N/A	
1. Organizational Process				
2. Data Documentation Process				
3. System Development Process				
4. Access Control Process				
5. Data Integrity Process				
6. Operations Process				
7. Backup/Recovery Process				

WORK PAPER 21-4   Data Warehouse Quality Control Checklist

	YES	NO	N/A	COMMENTS
1. Does someone assigned to the test team have data warehouse skills?				
2. Does the tester understand the generic data warehouse concerns?				
3. Does the final list of data warehouse concerns represent the true concerns of your organization?				
4. Has the vocabulary in all of the work papers and figures been adjusted to the vocabulary in use in your organization?				
5. Does the test team understand the criteria that are used to determine the magnitude of the data warehouse concerns?				
6. Do the ratings of the magnitude of the concerns seem reasonable?				
7. Have the data warehouse activity processes been identified?				
8. Do the identified processes appear to represent the actual processes in use in the data warehouse activity?				
9. Does the test team understand the controls that are needed to minimize failure in each of the data warehouse activities processes?				
10. Does the final assessment of the test team regarding the data warehouse appear reasonable to the test team?				
11. Does the assessment report issued by the test team appear to represent the results of the test?				

Chapter 22

Testing Web-Based Systems

WORK PAPER 22-1   Web-Based Risks to Include in the Test Plan

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Web-based Risks	This field lists the eight web-based risks described in this chapter. The description implies that "lack of" is associated with the risk.
Include in Test	The web-based testing should determine whether any or all of the eight identified web-based risks need to be addressed in the test plan. A check in the Yes column indicates that it should be included in the plan, and a check in the No column indicates it is not needed in the plan.
How risk will be included in the web-based test plan	This column is designed to be used in two ways. If the risk is not to be included in test plan, a justification as to why not could be included in this column. The second use is the test team's preliminary thoughts on how this risk will be included in the test plan. The description might involve the types of tests, the types of tools, and/or the approach to be used in testing.

WEB-BASED RISKS (LACK OF)	INCLUDE IN TEST		HOW RISK WILL BE INCLUDED IN WEB-BASED TEST PLAN
	YES	NO	
Security			
Performance			
Correctness			
Compatibility (Configuration)			
Reliability			
Data Integrity			
Usability			
Recoverability			

WORK PAPER 22-2   Types of Web-Based Testing to Perform

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Types of Web-based Testing	This column contains the more common types of web-based testing. The names may need to be modified for your culture. Additional types of testing performed by your test group may need to be added to this column.
Perform	This field is used for the web-based test team to indicate which types of testing will be used during web-based testing. A check mark in the Yes column indicates the type of testing that will be performed, and check mark in the No column indicates that type of testing will not be performed.
Risk Focus	The web-based test team should indicate the risk that this test type will be used to address. The type of risk to be incorporated into the test plan has been identified on Work Paper 22-1. In addition, the column can be used to indicate the justification for not using various types of web-based testing, if appropriate.
How to Be Used	The web-based test team should write a brief narrative description of how they plan to use this test type to address the risks that will be incorporated into the test plan.

TYPES OF WEB-BASED TESTING	PERFORM		RISK FOCUS	HOW TO BE USED
	YES	NO		
Unit/Component				
Integration				
System				
User Acceptance				
Performance				
Load/Stress				
Regression				
Usability				
Compatibility				

1

WORK PAPER 22-3   Select Web-Based Test Tools

Field Requirements

FIELD	INSTRUCTIONS FOR ENTERING DATA
Web-based Test Tool	All of the test tools available to your web-based test team should be listed in this column. The column contains generic types of test tools, but they should be replaced by specific test tools.
Perform	The web-based test team should identify which web-based test tool will be used during testing. A check in the Yes column indicates that the tool is to be used, and check in the No column indicates that the tool is not to be used.
Test Type Focus	The test team should indicate in this column which type of testing will be performed using this test tool. The test types are those indicated by the check mark in the Yes column on Work Paper 22-3. All of the test types with a Yes check mark on Work Paper 22-2 should be addressed in this column. Note that a single test tool may be used for multiple test types.
How to Be Used	The web-based test team should indicate in this test column how they plan to use a specific test tool during web-based testing. The testers should be as specific as possible in completing this column.

WEB-BASED TEST TOOLS	PERFORM		TEST TYPE FOCUS	HOW TO BE USED
	YES	NO		
HTML text tool				
Site validation test tool				
Java test tool				
Load/stress test tool				
Test case generator				
Other (list tools)				

WORK PAPER 22-4   Web-Based Test Quality Control Checklist

		YES	NO	N/A	COMMENTS
1.	Has a web-based test team been organized?				
2.	Does the web-based test team understand the differences between client/server and web-based technology?				
3.	Does the web-based test team understand web terminology?				
4.	Does the web-based test team understand the risk associated with web technology?				
5.	Has the web-based test team reached consensus on which risks are applicable to this specific web-based system?				
6.	Has a determination been made as to how the identified risks will be incorporated in the test plan?				
7.	Is there a consensus that the web-based risks not included in the test plan are of minimal concern to this web-based system?				
8.	Has the web-based test team identified the types of testing required for this system?				
9.	If so, how have those testing types been correlated to the web-based risks?				
10.	Has the web-based test team reached consensus on how the web-based types of testing will be used for test purposes?				
11.	Is there a portfolio of web-based test tools available in the organization?				
12.	Are the available test tools adequate for the web-based system being tested?				
13.	Has each type of testing that will be included in the test plan been supported by a specific web-based test tool?				
14.	Has the test team reached consensus on how the test tools will be used during testing?				
15.	Have all of the web-based testing decisions made by the test team been incorporated into the test plan?				

1

Chapter 23

Using Agile Methods to Improve Software Testing

WORK PAPER 23-1   Readiness Assessment for Compressing Software Testing Time

Readiness Criteria: Management Support	YES	NO	COMMENTS
Does the IT culture support using work process to test software systems?			
Would IT management support and encourage the more-effective testers to document their best testing practices?			
Would IT management be willing to become personally involved in the efforts to compress software testing time?			
Would IT management reward those who invest time and effort to compress software testing time?			
Do the IT strategic and tactical annual work plans include goals and objectives for compressing software testing time?			
TOTAL			
Readiness Criteria: A Software Testing Process in Place	YES	NO	COMMENTS
Does a software testing process exist?			
Do most of the software testing projects follow the software testing process from, at least, an intent perspective?			
Have the software testers been trained in using the process?			
Is the process divided into self-contained testing activities?			
If so, do each of these self-contained activities contain entrance and exit criteria?			
TOTAL			

(continues)

1

Readiness Criteria: Need for Time Compression	YES	NO	COMMENTS
Do the users/customers of IT software want a shorter testing time?			
Does IT management want a shorter software testing time?			
Do IT project personnel want a shorter software testing time?			
Is there a backlog of software testing projects waiting to be undertaken?			
Is the inability to get software testing projects completed on a timely basis negatively affecting the business?			
TOTAL			

Readiness Criteria: Surmountable Barrier/Obstacle Identification	YES	NO	COMMENTS
Are the cultural barriers against compliance to work processes surmountable?			
Are political obstacles to time compression surmountable?			
Are organizational barriers to time compression surmountable?			
Are budget and schedule constraint barriers to time compression surmountable?			
Are management hot buttons and red flags related to time compression surmountable?			
TOTAL			

(continues)

Readiness Criteria: Requisite Resources	YES	NO	COMMENTS
Are the tools needed for time compression available (e.g., consensus techniques)?			
Are the necessary skill sets available?			
Is the staff time needed available?			
Are the resources of the process engineering/standards committee available?			
Because compressing software testing time is achieved through many small efforts, will resources be available over an extended period of time?			
TOTAL			

Chapter 24

Building Agility into the Testing Process

WORK PAPER 24-1   Define the Timeline Software Testing Workbenches

	WORKBENCH 1	WORKBENCH 2	WORKBENCH 3	WORKBENCH 4	WORKBENCH 5
Input(s)					
Workbench Name					
Workbench Objective(s)					
Output(s)					
Approximate Estimated Workdays Timeline					

1

WORK PAPER 24-2   Workbench Completion Calendar Day Timeline

Workbench Name:

Project Timelines:

Project(s)	Start Date	Date "Do" Procedures Completed First Time	Date Workbench Completed	Minimal Timeline Calendar Days	Actual Timeline Calendar Days

Average No Rework Calendar Days Timeline:	No Rework Calendar Days Variability:
Average Actual Calendar Days Timeline:	Actual Calendar Days Variability:

WORK PAPER 24-3   Completion Timeline Variability Analysis

Workbench Name:

Variability Analyzed: Below Average   Above Average

Workbench Component	Source of Variability		Root Cause
	Yes	No	
Input Criteria			
Checking Input Criteria			
Do Procedures			
Check Procedures			
Toolbox			
Worker Competency			
Internal Rework			
External Rework			
Exit Criteria			
Other (specify)			

WORK PAPER 24-4   Software Testing Completion Timeline Process

	Ideas for Completion Timeline Improvement	Reference Number	Priority	
			High	**Low**
1.				
2.				
3.				
4.				
5.				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

WORK PAPER 24-5   Quality Control Checklist for Step 1

	Item	YES	NO	COMMENTS
1.	Has an agile implementation team been established?			
2.	If so, are the members of the team respected individuals in the IT organization?			
3.	If so, does the team comprise no less than two members and no more than five members?			
4.	Does the agile implementation team understand the relationship of process variability to performing processes effectively?			
5.	Does the agile implementation team understand that the skill sets of the individual performing a professional process are assumed and not incorporated into the software testing process?			
6.	Does the agile implementation team understand that a process is broken up into steps/tasks?			
7.	Does the agile implementation team understand the concept of a process workbench and the various components in the workbench?			
8.	Does the agile implementation team understand the time-compression workbench?			
9.	Has the agile implementation team identified the key workbenches in the software testing process?			
10.	Has the agile implementation team eliminated from consideration those software testing workbenches that do not affect the time to complete the software testing process?			
11.	Have the inputs and outputs for each identified workbench been defined?			
12.	Have the objectives for each identified workbench been stated in a manner in which the results are measurable?			
13.	Is there general consensus on the approximate estimated completion timeline for each of the key workbenches?			
14.	Has a reasonable number of workbenches been selected to provide reliable information on the completion timeline for that workbench? (Note: This assumes a reasonable process is used for selecting the workbenches for investigation.)			

(continues)

1

		YES	NO	COMMENTS
15.	For the workbenches selected for completion time analysis, has a reasonable number of projects been identified and the calendar dates for those projects been documented?			
16.	Have the projects for the identified workbenches that are significantly better or significantly worse than the average calendar days been identified?			
17.	For each workbench where projects have been identified that were implemented more efficiently than the average timeline, has a variability completion timeline analysis been performed?			
18.	For each workbench where projects have been identified that were implemented less efficiently than the average timeline, has a variability completion timeline analysis been performed?			
19.	For each of the workbench components for the identified projects, have the source of variability and the probable cause been determined?			
20.	Has a reasonable process been followed to identify ideas for completion time improvement?			
21.	For those ideas identified for completion timeline improvement, has the agile implementation team assigned a high or low priority to that idea?			
22.	Are measurements and analysis performed for testing workbenches executed for software project of equal size and complexity?			

**WORK PAPER 24-6   Criteria Recommended to Measure Software
Testing Effectiveness and Efficiency**

Criteria	Description	Measuring		Rank
		Efficiency	Effectiveness	

WORK PAPER 24-7   Measuring Software Testing Effectiveness/Efficiency

Software Project Name:

Efficiency Criteria	Method to Calculate Criteria Score	Weight	Efficiency Score
		Total 100%	

Total Efficiency Score

Effectiveness Criteria	Method to Calculate Criteria Score	Weight	Effectiveness Score
		Total 100%	

Total Effectiveness Score

100% (High)

Efficient
Software
Testing

0% (Low)

0% (Low)   Effective Software Testing   100% (High)
                    (meets customer needs)

1
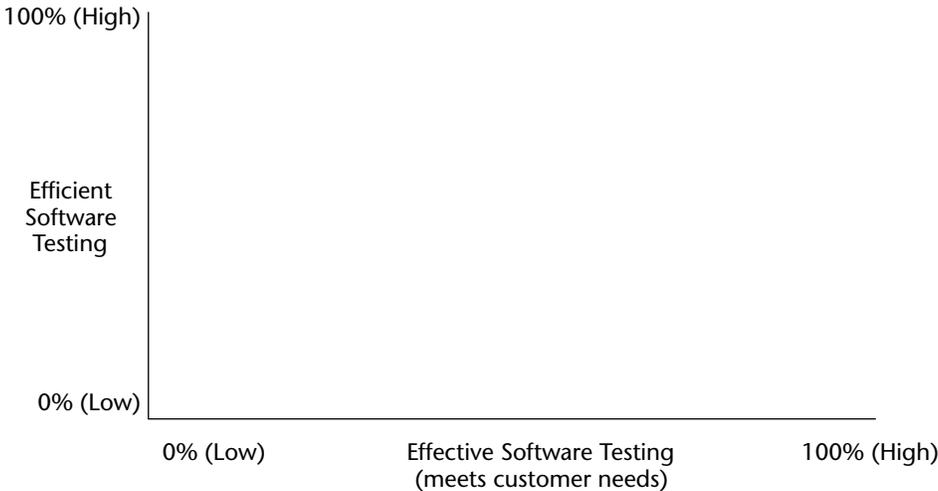
WORK PAPER 24-9   Potential Best Practices for Compressing Software Testing Completion Time

Best Practice	Description	Project Used In	Application Efficiency	Application Effectiveness

WORK PAPER 24-10   Best Practices Shopping List

	Best Practices for Time Improvement	Reference #	Priority High	Low
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

1

WORK PAPER 24-11   Quality Control Checklist for Step 2

	YES	NO	COMMENTS
1. Have the roles and responsibilities of the testers been identified?			
2. Does an appropriate relationship exist between the customer/ user, project development team, testers, and IT management to ensure that the project is tested correctly?			
3. Are the quality factors understood by the agile implementation team?			
4. Are the quality factors applicable to the projects being tested in your IT organization?			
5. Are the quality factors complete for assessing the quality of the projects in your IT organization, or are additional factors needed?			
6. Is the concept of trade-offs understood by the agile implementation team?			
7. In each software development project is someone responsible for making trade-offs? (It may be more than one group, depending on the type of trade-off.)			
8. Does the time-compression team understand the type of trade-offs that exist in all software testing projects?			
9. Does the software testing team understand the impact of not making the trade-offs during software testing?			
10. Does the agile implementation team understand the criteria that can be used to evaluate effectiveness and efficiency of a software testing project?			
11. Does the agile implementation team understand the software testing capability barrier chart?			
12. Does the agile implementation team understand why a capability barrier exists, and why it is difficult to break through that barrier?			
13. Has the agile implementation team developed an inventory of criteria that they believe will be applicable for measuring testing efficiency and effectiveness?			
14. Has the agile enhancement team selected 3–5 criteria to evaluate projects for efficiency?			

(continues)

1

		YES	NO	COMMENTS
15.	Has the agile enhancement team selected 3–5 criteria to evaluate projects for effectiveness?			
16.	Has the agile implementation team determined how they will create a score for each criterion?			
17.	Has the agile implementation team weighted the criteria for both effectiveness and efficiency?			
18.	Has the agile implementation team developed efficiency and effectiveness scores for a reasonable number of projects?			
19.	Are the projects selected by the agile implementation team representative of the type of testing projects undertaken by the IT organization?			
20.	Has the agile implementation team posted the scored projects to the capability barrier chart?			
21.	Using the capability barrier chart, has the agile implementation team identified some best practices for both efficiency and effectiveness?			
22.	Has the agile implementation team identified which of those best practices they believe has the greatest probability for time compression?			
23.	Have the selected best practices been recorded on the improvement shopping list work paper?			

WORK PAPER 24-12 Software Testing Process Self-Assessment

Criteria 1: Management Commitment to Software Testing

	YES	NO	COMMENTS
1. Does management devote as much personal attention and involvement to software testing as it does for software development?			
2. Does management understand the challenges and impediments it will face in moving their IT organization to a quality software testing culture?			
3. Does IT management demonstrate its belief in the software testing process by allocating adequate resources to ensure the testing process is used effectively?			
4. Does management support processes such as management checkpoints, software reviews, inspections, checklists, and other methods that support implementing software testing principles and concepts in day-to-day work?			
5. Does management, on a regular basis, make decisions that reinforce and reward software testing initiatives, such as ensuring that quality will not be compromised for schedule and budget constraints? (Note: This does not mean that requirements and standards will not be negotiated; it means there will be agreement on quality if it conflicts with schedule or budget.)			
Number of Yes Responses			

Criteria 2: Software Testing Environment

	YES	NO	COMMENTS
1. Does the IT organization have a software testing policy that clearly defines the responsibilities and objectives as the software testing function?			
2. Are the software testers organizationally independent from the software developers, except for unit testing?			
3. Does the IT organization allot as many resources for acquisition and development of software testing process and tools as it does for software development processes and tools?			
4. Does the IT organization have a detailed plan to promote and improve software testing throughout the IT organization?			
5. Does the IT organization have an educational plan for all staff members in software testing principles, concepts, and other methods; and is that plan operational?			
Number of Yes Responses			

Criteria 3: Process to Do Work

|	YES	NO	COMMENTS
1. Are there formal work processes outlining the detailed step-by-step procedures to perform all software testing projects within the IT organization?			
2. If so, are those work processes comprised of a policy, standards, and procedures to both do and check work?			
3. Does management both enforce compliance to work processes and reward compliance to work processes?			
4. Are the work processes developed and/or approved by those that will use the work processes in their day-to-day work?			
5. Are IT staff members hired to use specific work processes, and then trained sufficiently so that they can perform those work processes to a high level of competence?			
Number of Yes Responses			

(continues)

Criteria 4: Processes to Check Work

	YES	NO	COMMENTS
1. Are check procedures developed in a formal manner for each work process?			
2. Is the combination of the work and check procedures integrated so that they are included in the project budget, and executed in a manner so that both become part of the day-to-day work of the IT staff?			
3. Are the check procedures developed commensurate with the degree of risk associated with not performing the "do work procedures" correctly?			
4. Are the results of the check procedures provided to the appropriate decision-makers so they can make any needed changes to the software in order to ensure they will meet the customer's needs?			
5. Are the workers adequately trained in the performance of the check procedures so that they can perform them in a highly competent manner?			
Number of Yes Responses			

Criteria 5: Continuous Improvement to the Software Testing Process

	YES	NO	COMMENTS
1. Is information regarding defects associated with the software testing products and processes regularly gathered, recorded, and summarized?			
2. Is an individual or an organizational unit such as quality assurance charged with the responsibility of maintaining defect information and initiating quality improvement efforts?			
3. Does the IT budget include the money and staff necessary to perform continuous quality improvement?			
4. Is there a process in place that establishes a baseline for the current process, and then measures the variance from that baseline once the processes are improved?			
5. Are resources and programs in place to adequately train workers to effectively use the new and improved work processes?			
Number of Yes Responses			

WORK PAPER 24-13   Software Testing Process Assessment Footprint Chart

Test Execution

Test Planning

Test Analysis & Reporting

① ② ③ ④ ⑤

Test Environment
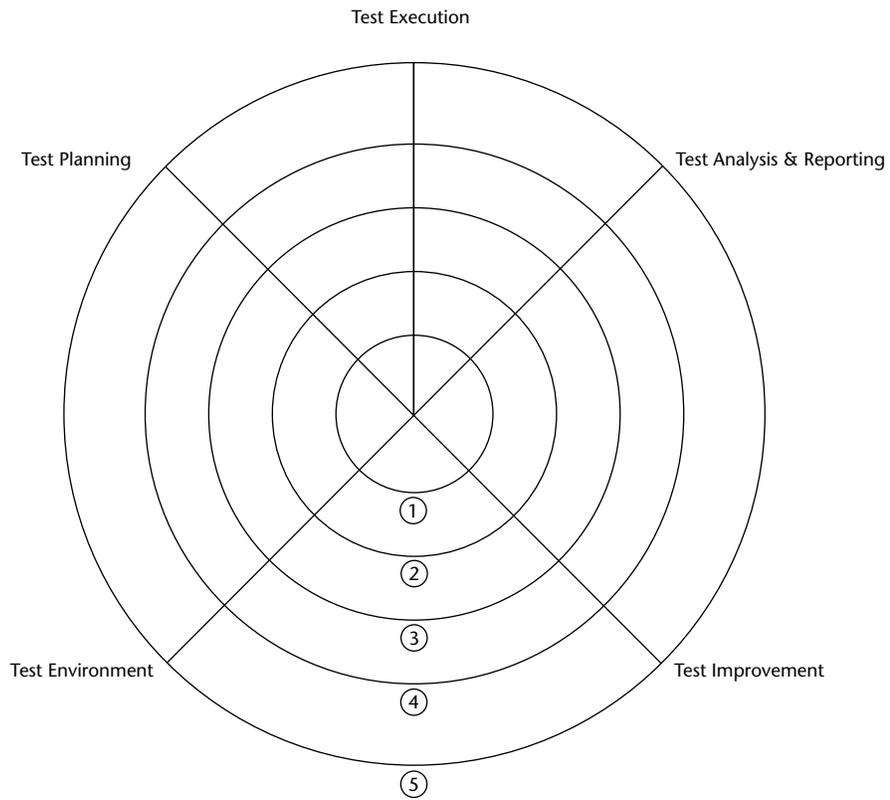
Test Improvement

Footprint may look
similar to this:
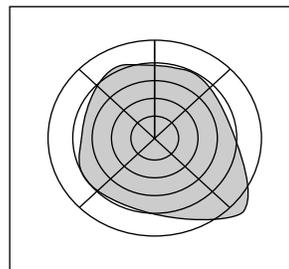
**WORK PAPER 24-14   Delivery Timeline Process Improvement
                     Shopping List**

	Ideas for Delivery Timeline Improvement	Reference #	Priority	
			High	Low
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

WORK PAPER 24-15   Quality Control Checklist for Step 3

	YES	NO	COMMENTS
1. Is the software testing process self-assessment being performed by the agile implementation team?			
2. Does the agile implementation team know the software testing process?			
3. Does the agile implementation team know management's attitude about the use of the software testing process (e.g., rewarding for use of the process)?			
4. Does the agile implementation team know the type of support a tester would get if they use the software testing process (e.g., type of training, who can answer the questions, etc.)?			
5. Did the agile implementation team follow the self-assessment process as described in this chapter?			
6. Does the agile implementation team understand the meaning of Yes and No responses?			
7. For items in which the agile implementation team could not arrive at a consensus, was a No response given?			
8. Did the agile implementation team prepare the software testing process footprint and then discuss and draw conclusions about that footprint?			
9. Was each category item that had a No response evaluated as a potential improvement idea to compress the software testing delivery timeline?			

WORK PAPER 24-16   Stakeholder Analysis

Stakeholder (Name of Function)	Current Stake	Reason(s)	Desired Stake	How to Address

WORK PAPER 24-17   Barrier/Obstacles

Barrier/Obstacle	Source	Root Cause	How to Address

```
                                        Job results not known
                                       ┌─────────────────────────
                                         (why did it occur)
                                                                          Challanged boss
                                                                        ┌──────────────────────
                                                                          (why did it occur)
  Poor Performance Appraisal            Personal conflict       ┌────────┤
 ┌────────────────────────────┬────────┤
    (Barrier/Obstacle)                   (why did it occur)              Different work styles
                                                                        └──────────────────────
                                                                          (why did it occur)


                                        Lack of planning
                                       └─────────────────────────
                                         (why did it occur)
```

WORK PAPER 24-19   Quality Control Checklist for Step 4

	YES	NO	COMMENTS
1. Does the agile implementation team recognize the impact that a barrier/obstacle can have on implementing a time compression idea?			
2. Does the agile implementation team understand the various views a stakeholder can have on a proposed time compression idea?			
3. Has the agile implementation team identified all of the potential stakeholders in compressing the software testing delivery time?			
4. Has the agile implementation team determined which stakeholders have to be individually identified and which stakeholders can be identified by job position?			
5. Has the current stake for each stakeholder been identified?			
6. Has the agile implementation team defined what they believe is the reason the person holds that specific stake?			
7. Has the desired stake for each individual/job position been determined?			
8. Has the agile implementation team developed a solution on how to address moving an individual from a current stake to a desired stake?			
9. Have the barriers associated with staff competency been identified?			
10. Have the barriers associated with individual's red flags/hot buttons been identified?			
11. Does the agile implementation team understand that the individual looks at an idea from the viewpoint of "What's In It For Me?"			
12. Have the administrative/organizational barriers been identified?			
13. Does the agile implementation team understand how to determine the root cause of each administrative/ organizational barrier?			
14. Has a reasonable solution been developed for each root cause to address that root cause should it become necessary?			
15. Is the agile implementation team in agreement that the important people, administrative, and organizational barriers that can affect time compression projects have been identified?			

1

WORK PAPER 24-20   Cultural Barrier Work Paper

Current IT management culture

Barrier posed by culture

What can be done in current culture

Desired culture for time compression

How to address cultural barriers

WORK PAPER 24-21   Information and Communication Flow Barrier

Information Flow

Information Needed	Importance	Should Be Communicated		Barrier	How to Address Barrier
		By	To		

1

WORK PAPER 24-22 Quality Control Checklist for Step 5

	YES	NO	COMMENTS
1. Does the agile implementation team have a good understanding of how an IT management culture affects the operation of the IT organization?			
2. Does the agile implementation team understand the five different cultures that can exist in an IT organization?			
3. Did the agile implementation team reach consensus on the current IT organization's management culture?			
4. Given the discussion of why IT management would want to keep their current culture, can the agile implementation team identify barriers posed by the current IT culture?			
5. Can the agile implementation team convert those barriers into positive statements of how time compression solutions must be implemented?			
6. Has the agile implementation team determined whether or not a different culture would be more advantageous in implementing the proposed time compression solutions?			
7. For each of the barriers identified, has the agile implementation team determined whether those barriers can be adequately addressed in implementing time compression solutions?			
8. For those barriers that the agile implementation team believes can be adequately addressed in the time compression solutions, have they determined a potential solution for addressing those culture barriers?			
9. Does the agile implementation team recognize the importance of information and communication in building an agile software testing process?			
10. Does the agile implementation team understand the three components of effective communication?			
11. Has the team developed a lines of communication graph for software testing?			
12. Has the graph been analyzed to determine: a. Information missing from the graph b. Information not communicated to the right individual			

(continues)

WORK PAPER 24-22   *(continued)*

	YES	NO	COMMENTS
13. Has the team determined the importance of each communication and developed a communication score for each individual/function identified on the communication graph?			
14. Has the team studied and understood the guidelines for information and communication?			
15. Has the team identified the barriers for effective communication in the performance of software testing?			

WORK PAPER 24-23   Software Testing Time Compression Idea

Improvement Idea	User Acceptable	× Barrier Free	× Attainability	× Effectiveness	= Doable Score

WORK PAPER 24-24   Establishing the Priority of Doable Ideas for Jumpstarting an Agile Software Testing Process

Implementable Improvement Idea Ranked by Doable Score	Prioritization Considerations	Prioritization Rank		
		High	Medium	Low

1

WORK PAPER 24-25   Quality Control Checklist for Step 6

		YES	NO	COMMENTS
1.	Has the agile implementation team agreed upon a list of improvement ideas they will consider?			
2.	Does the agile implementation team believe that an algorithm to score each idea from best to worst would assist them in selecting the best ideas?			
3.	Does the agile implementation team understand the four criteria proposed for the selection for the best idea?			
4.	Does the agile implementation team understand and accept the 0 to 3 scoring method for each of the four criteria?			
5.	Has the agile implementation team scored each idea using the selection process criteria?			
6.	Has the agile implementation team then ranked all the ideas from highest score to lowest score?			
7.	Does the agile implementation team believe that the best idea is among the highest scoring ideas?			
8.	Has the agile implementation team reviewed the few highest scoring ideas to determine which of those they believe are the best regardless of the final score?			
9.	Has the agile implementation team reviewed the top six ideas for compressing software testing time to determine if the idea they selected is consistent with the top six?			
10.	Has the agile implementation team agreed upon one idea for implementation?			
11.	If the agile implementation team wants to do further prioritization to select doable ideas to implement, have team members determined how they will do that additional prioritization?			

WORK PAPER 24-26   Software Testing Time Compression Tactical Work Plan

Objective to Accomplish:

Improvement Idea:

Objective	Current Results	Expected Results	Actual Results	Method of Measurement

Work Plan

Tasks	Resources	Start Date	Target Completion Date

1

WORK PAPER 24-27   Quality Control Checklist for Step 7

		YES	NO	COMMENTS
1.	Has the agile implementation team gathered all the appropriate information related to a selected improvement idea from Steps 1 through 6?			
2.	Does the agile implementation team have a project planning process that it can use to implement the improvement idea?			
3.	Does the agile implementation team understand the "Plan-Do-Check-Act" cycle and its relationship to planning and implementing a time compression improvement idea?			
4.	Can the agile implementation team express the improvement objective in measurable terms?			
5.	Does the agile implementation team know the current results from the workbench that is designated to be improved?			
6.	Has the agile implementation team agreed upon a method for measuring the expected results from implementing the time compression idea?			
7.	Do the work tasks include both tasks to modify the workbench and tasks to address the obstacle/barrier that may impede implementing the improvement idea?			
8.	Has the agile implementation team been authorized the resources needed to implement the improvement idea?			
9.	After implementation, have the actual results from implementation been documented?			
10.	Was a reasonable process used to record the actual results?			
11.	If the actual results indicate a successful implementation of an improvement idea, has the agile implementation team taken the action necessary to make that improvement idea in part of the affected workbench?			