

# Smart Medicine Box

## B.E. Dissertation

Submitted in partial fulfillment of the requirement of

**University of Mumbai**

For the Degree of

**Bachelor of Engineering  
(Electronics and Telecommunication Engineering)**

by

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April 2018



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# Certificate

This is to certify that, the dissertation titled

**“Smart Medicine Box ”**

is a bonafide work done by

**Roman Shaikh (15DET127)**

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and is submitted in the partial fulfillment of the requirement for the degree of

**Bachelor of Engineering**

in

**Electronics and Telecommunication Engineering**

to the

**University of Mumbai.**

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Guide

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Project Coordinator

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Head of Department

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Principal

# Certificate of Approval by Examiners

This is to certify that the dissertation entitled ”**Smart Medicine Box**” is a bonafide work done by **Roman Shaikh, Wasim Ahmad Shaikh, Abu Talha Ansari, Farooqi Meraj** under the guidance of **Mr. Mujib Tamboli**. This dissertation has been approved for the award of **Bachelor’s Degree in Electronics and Telecommunication Engineering**, University of Mumbai.

Examiners:

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Name:

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# Declaration

I declare that this written submission represents my idea in my own words and where others ideas or words have been included. I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academy honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Place: Panvel

Date:

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Shaikh Roman

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Shaikh Wasim Ahmad

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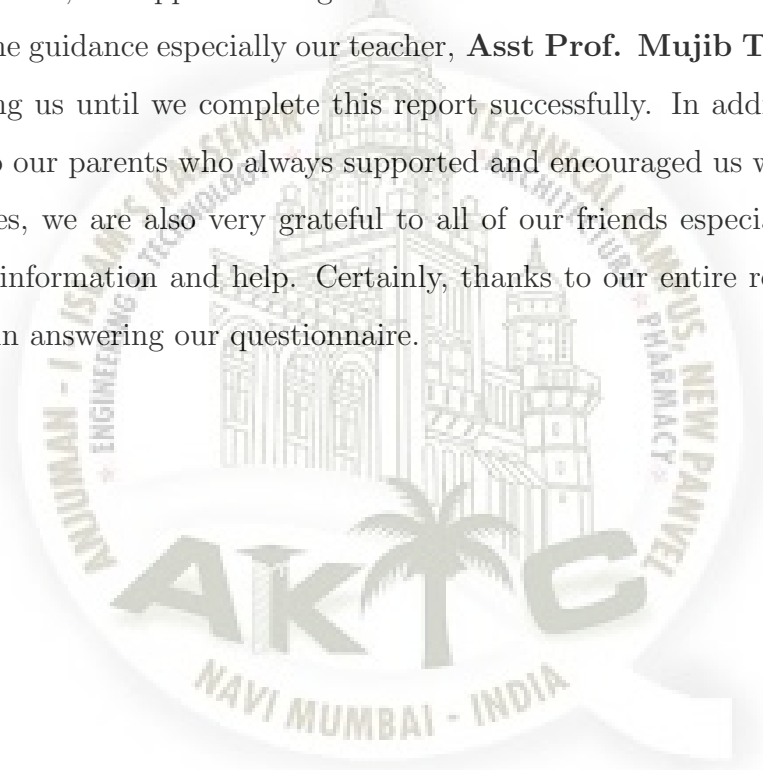
Ansari Abu Talha

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Farooqi Meraj

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# Abstract

Most of the people, from young age to the old age forget to take medicines on time. The elder people also forget which medicine to take at particular time. There should be a means to always remind such people to take medicines on time. This paper presents a Smart Medicine box to users who regularly take drugs or vitamin supplements, or nurses who take care of the older or patients. Our medicine box is programmable that reminds the nurses and users which specific pill to take at particular times of day and serves at those times each day. It contains three separate boxes. Therefore, nurses or users can set information for three different pills. When the pill quantity and time have been set by making use of the keys provided, the medicine box will remind users or patients to take pills using sound and light. The specific box from which the pill needs to be taken will be displayed by an led placed on the corresponding box.

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# Chapter 1

## Introduction

### 1.1 Introduction

The medications you have been prescribed are more likely to be effective if you follow your doctors exact instructions on when and how to take them. Your doctor has prescribed a particular medication because he or she feels it will treat your condition in a specific way. However, this medication is more likely to be effective if you follow your medication course as prescribed. Failure to do so could, in some circumstances, have life-threatening consequences. Common medication mistakes done by Elderly people that they need to take several tablets each day and if they are living on their own they may not always remember. It may be difficult for them to remember the prescribed schedule, particularly when taking multiple medications at different times of the day or having to take a medication on a different schedule, such as once a week. Many people are not sure what to do if they miss or skip a dose of the medication. The proportion of the worlds population aged 60 years or over increased from 8 per cent in 1950 to 12 per cent in 2013. It will increase more rapidly in the next four decades to reach 21 per cent in 2050. With this, independent living has become a commonplace for the elderly. Medication adherence describes the patient's medicine taking behaviour and it is vitally responsible to ensure patients consume the right medicine at the right time which contributes to the effectiveness of the treatment. There are a few problems which have been identified with regards to this issue which are memory loss and poor eyesight especially among the senior citizens. Hence, the objective of this research is to develop a Medicine box which track Number of dosage need to take at a particular time for senior citizen patients.

## Chapter 2

# Literature Survey

**A Survey on Smart Medicine Box:** This paper deals with the Smart Medicine Box. This Smart Medicine Box will track their medication and inform patient to take right dosage of right medicine at the right time.

**Review:** The above system only consist of only track and inform patient to take medicine at right time we are also adding GSM module to inform through the message and, If the pills is less than defined value it will automatically inform to his relatives.

**A Survey on Smart Medicine Reminder Box:** This paper deals with Smart Medicine Box using Arduino UNO In this system Present time will be saved in RTC module and notification time will be saved in EEPROM.

**Review:** In above system they are using Arduino UNO which is required RTC module to save present time but in our system we are using Raspberry Pi which is credit-card size computer it does not require any RTC module and gives the better output as compare to Arduino UNO.

**Objective:** Our objective is to make a Smart medicine box for those users who regularly take medicines as their names are very long. So it is hard to remember for patients and their care takers.

# Chapter 3

## Block Diagram and Description

### 3.1 Block Diagram

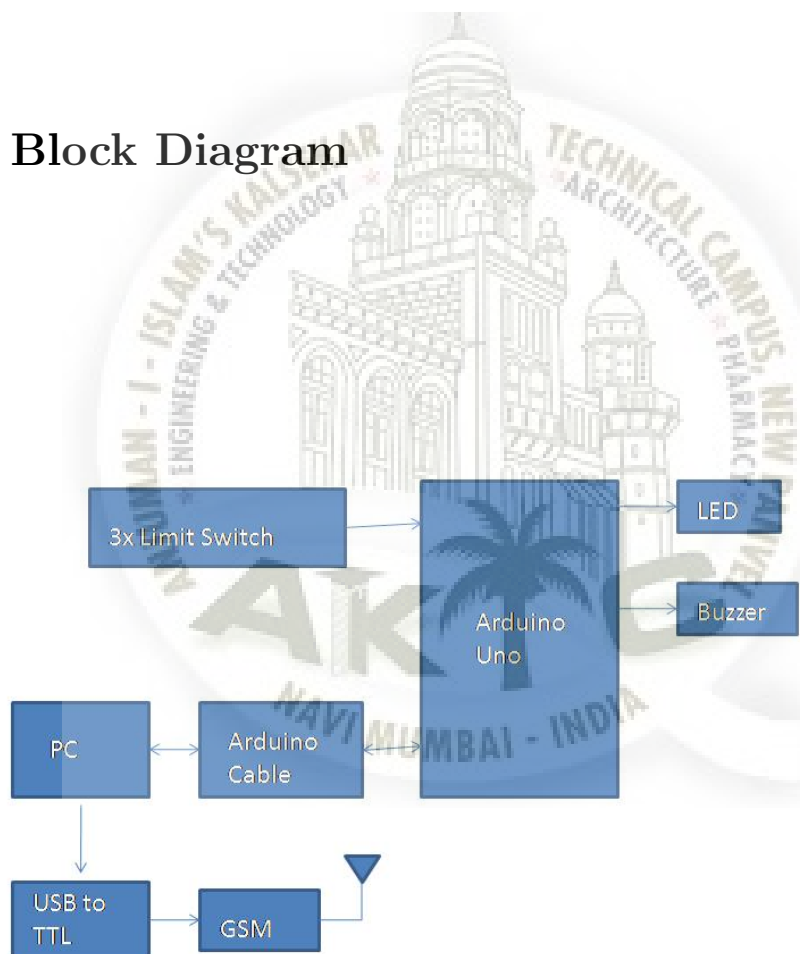


Figure 3.1: Block Diagram

## 3.2 Hardware/ software requirements

### 3.2.1 Hardware requirements

- 1 Arduino Uno
- 2 GSM Module
- 3 USB to TTL
- 4 Buzzer
- 5 LED
- 6 Limit Switch

### 3.2.2 Software Requirements

- 1 VB 6.0
- 2 Arduino IDE



## 3.3 Hardware Details

### 3.3.1 ARDUINO UNO



Figure 3.2: Arduino uno

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

## Arduino Specification

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328) of which 0.5 KB used by boot loader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock Speed	16 MHz

Figure 3.3: Arduino Specification





### 3.3.2 GSM MODULE



Figure 3.4: GSM Module

1. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system.
2. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate.
3. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network.

4. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network.
5. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:
  - i. Receive, send or delete SMS messages in a SIM.
  - ii. Read, add, search phonebook entries of the SIM.
  - iii. Make, Receive, or reject a voice call.
6. The MODEM needs AT commands, for interacting with processor or controller, which are communicated through serial communication.
7. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command.
9. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular network.

### **Features**

1. Dual band GSM/GPRS 900/1800MHz.
2. Configurable baud rate.
3. SIM card holder.
4. Built in network status LED.
5. Inbuilt powerful TCP/IP protocol stack for internet data transfer over GPRS.

## Specifications

Parameter	Value
Operating voltage	+12v DC
Weight	<140g

Figure 3.5: GSM Specifications

## Pin Specification

Pin	Name	Detail
1	GND	Power supply ground
2	tx	transmitter
3	rx	receiver
4	Line_r & Line_l	Line input
5	Spk_p & spk_n	Speaker positive & negative
6	Mic_p & mic_n	Mic positive & negative
7	DTR	Data terminal ready
8	CTS	Clear to send
9	RTS	Request to send

Figure 3.6: Pin Diagram

### 3.3.3 USB to TTL

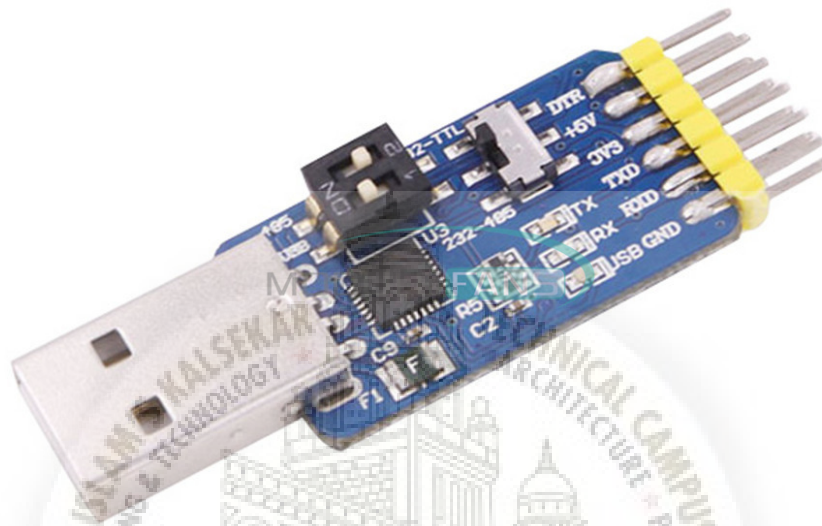


Figure 3.7: USB to TTL

The USB TTL Serial cables are a range of USB to serial converter cables which provide connectivity between USB and serial UART (Universal Asynchronous Receiver Transmitter) interfaces.

The TTL-232R-3V3 is a USB to TTL serial converter cable incorporating FTDI's FT232RQ USB- Serial UART interface IC device, the latest device to be added to FTDI's range of USB UART interface Integrated Circuit Devices. It is designed to allow for a fast, simple way to connect devices with a TTL level serial interface to USB.

The FT232RQ chip used by the TTL-232R-3V3 is housed within the USB 'A' connector. A 1.6 meter (6 foot) cable is terminated with a 6 way 0.1" pitch header socket which provides access to the transmit (Tx), receive (Rx), RTS, CTS, as well as VCC (5V out) and GND.

The FT232R is a USB to Serial UART interface with optional clock generator output, and the new FTDIChip ID security dongle feature. In addition, asynchronous and synchronous bit bang interface modes are available. USB to serial interface designs using the FT232R have been further simplified by fully integrating the external EEPROM, clock circuit and USB resistors onto the device.



### 3.3.4 Buzzer

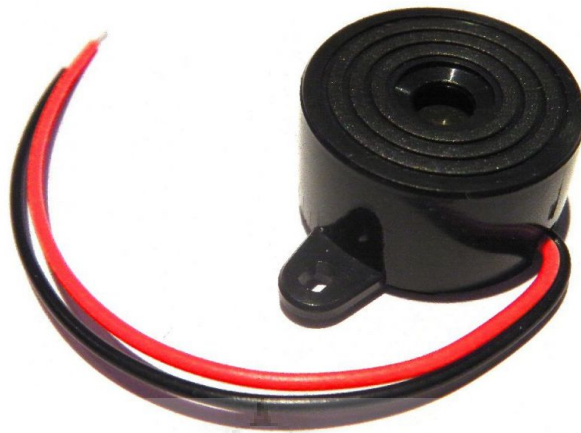


Figure 3.8: Buzzer

Piezo buzzer is an electronic device commonly used to produce sound. Light weight, simple construction and low price make it usable in various applications like car/truck reversing indicator, computers, call bells etc. Piezo buzzer is based on the inverse principle of piezo electricity discovered in 1880 by Jacques and Pierre Curie. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true. Such materials are called piezo electric materials. Piezo electric materials are either naturally available or manmade. Piezoceramic is class of manmade material, which poses piezo electric effect and is widely used to make disc, the heart of piezo buzzer. When subjected to an alternating electric field they stretch or compress, in accordance with the frequency of the signal thereby producing sound.

#### **Applications for Buzzers**

1. Alarm devices
2. Timers
3. Confirmation of user input (ex: mouse click or keystroke)
4. Electronic metronomes
5. Annunciator panels
6. Game shows
7. Sporting events
8. Household appliances

### 3.3.5 LED (Light-Emitting Diode)



Figure 3.9: LED

A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current passes through it. The light is not particularly bright, but in most LEDs it is monochromatic, occurring at a single wavelength. The output from an LED can range from red (at a wavelength of approximately 700 nanometers) to blue-violet (about 400 nanometers). Some LEDs emit infrared (IR) energy (830 nanometers or longer); such a device is known as an infrared-emitting diode (IRED).

We have 3 boxes having an LED in each box which blinks to show us the specific box from which the pills needs to be taken at given time.

### 3.3.6 Limit Switch



Figure 3.10: Limit Switch

Limit switches are often used to control mechanisms on robots. While limit switches are simple to use, they only can sense a single position of a moving part. This makes them ideal for ensuring that movement doesn't exceed some limit but not so good at controlling the speed of the movement as it approaches the limit. For example, a rotational shoulder joint on a robot arm would best be controlled using a potentiometer or an absolute encoder, the limit switch could make sure that if the potentiometer ever failed, the limit switch would stop the robot from going too far and causing damage.

Limit switches can have "normally opened" or "normally closed" outputs. The usual way of wiring the switch is between a digital input signal connection and ground. The digital input has pull-up resistors that will make the input be high (1 value) when the switch is open, but when the switch closes the value goes to 0 since the input is now connected to ground. The switch shown here has both normally open and normally closed outputs.



## 3.4 Softwares Details

### 3.4.1 Visual Basic

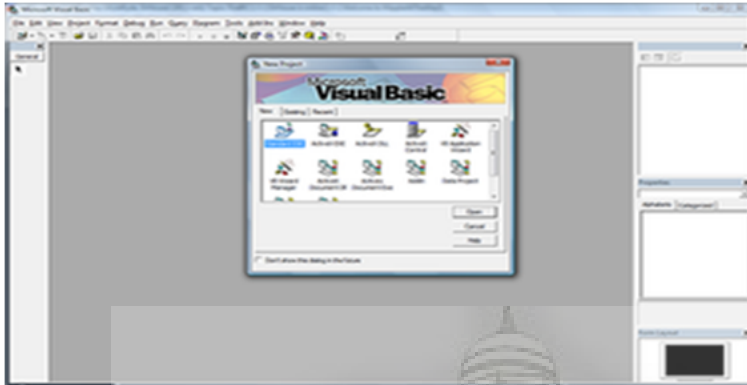


Figure 3.11: Visual Basic 6.0

Visual Basic (VB) is an event driven programming language and associated development environment from Microsoft for its COM programming model. VB has been replaced by Visual Basic .NET. The older version of VB was derived heavily from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using DAO, RDO, or ADO, and creation of ActiveX controls and objects. A programmer can put together an application using the components provided with Visual Basic itself. Programs written in Visual Basic can also use the Windows API, but doing so requires external function declarations.



### Step 3

Click Run program.

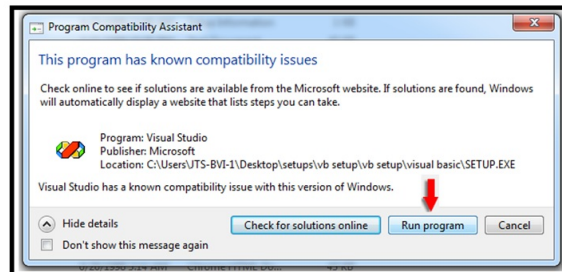


Figure 3.14: Program window

### Step 4

Click Next Button.

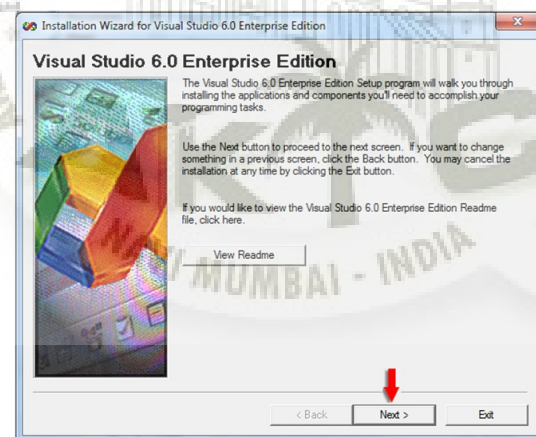


Figure 3.15: Visual Studio 6.0

### Step 5

Accept the agreement and select next button.

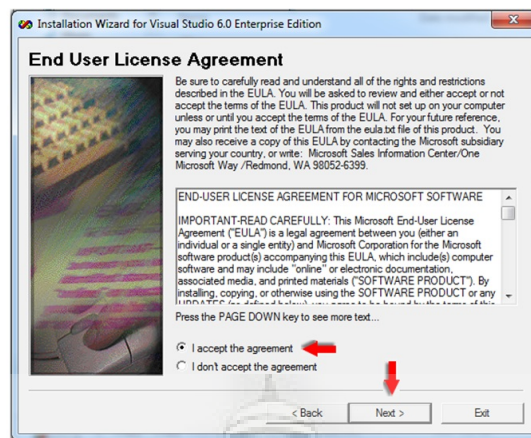


Figure 3.16: End User License Agreement

### Step 6

Select Next Button.

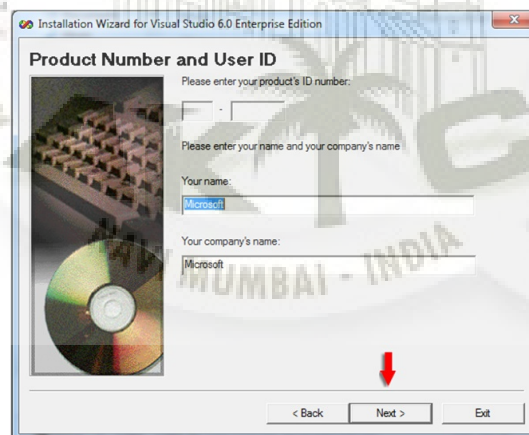


Figure 3.17: Product Number and User ID

## Step 7

Update Microsoft Virtual Machine and click Next Button.

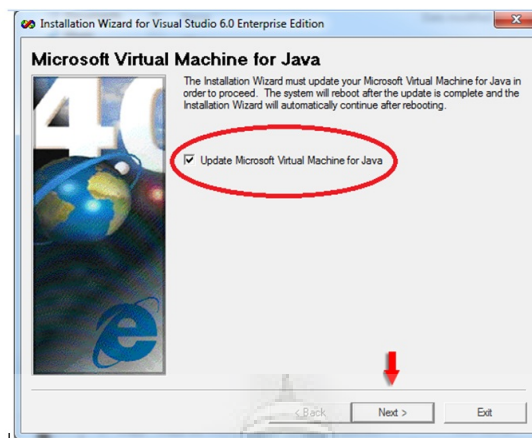


Figure 3.18: Microsoft Virtual Machine For Java

## Step 8

Click Run Program Button.

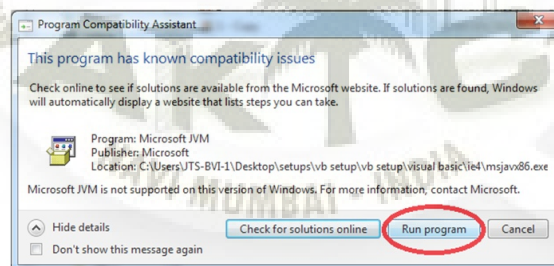


Figure 3.19: Program compatibility

### Step 9

Click Run Program Button.

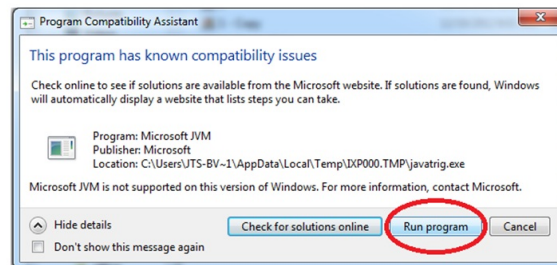


Figure 3.20: Program compatibility

### Step 10

Click OK Button to reboot the system.

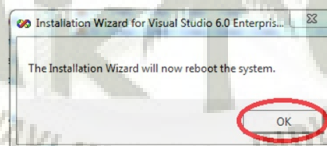


Figure 3.21: Program compatibility

### Step 11

Click Run Program Button.

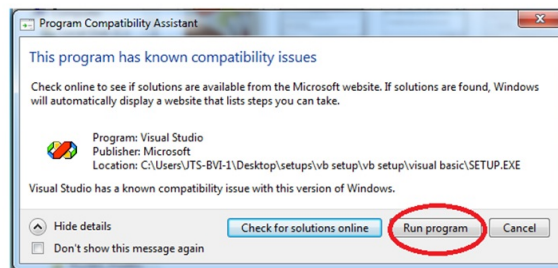


Figure 3.22: Program compatibility

### Step 12

Select Custom option, click Next Button.

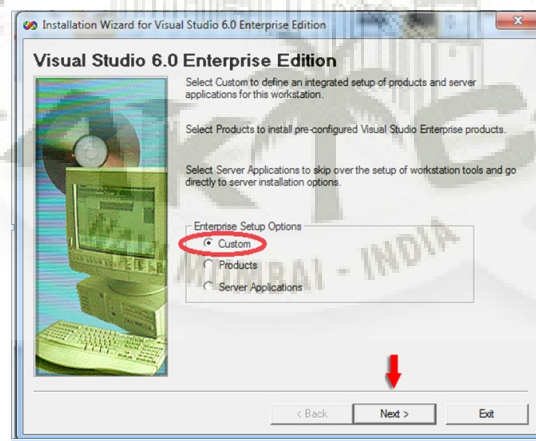


Figure 3.23: Visual Studio Enterprise Edition

### Step 13

Click Next Button.

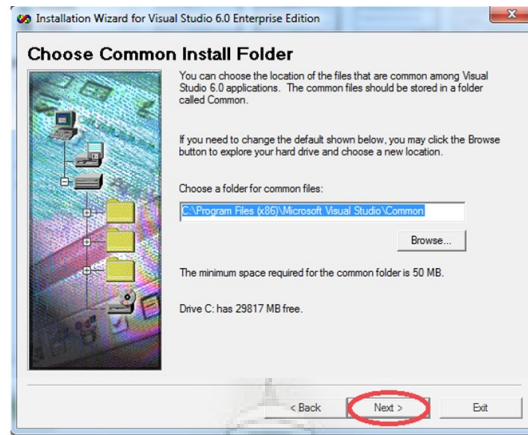


Figure 3.24: Choose Common Install Folder

### Step 14

Click Run Program Button.

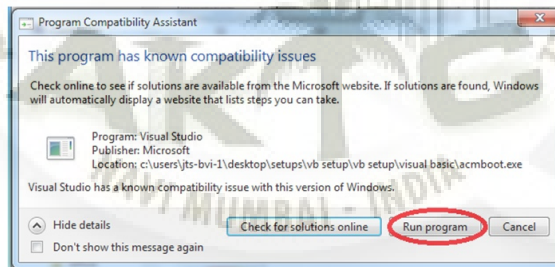


Figure 3.25: Program Compatibility



### Step 15

Click OK button.



Figure 3.26: Installation Wizard

### Step 16

Click OK Button.

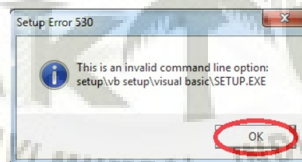


Figure 3.27: Setup Error 530

## Step 17

System will reboot and below screen will appear and select Setup option.

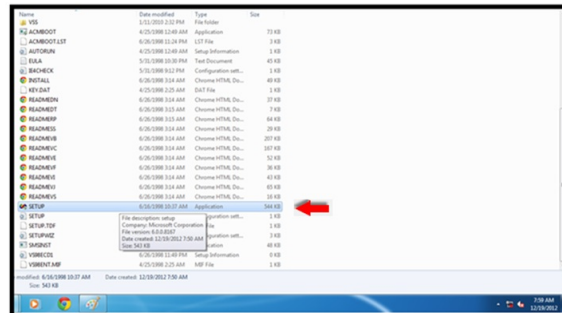


Figure 3.28: Setup option

## Step 18

Click Continue Button.

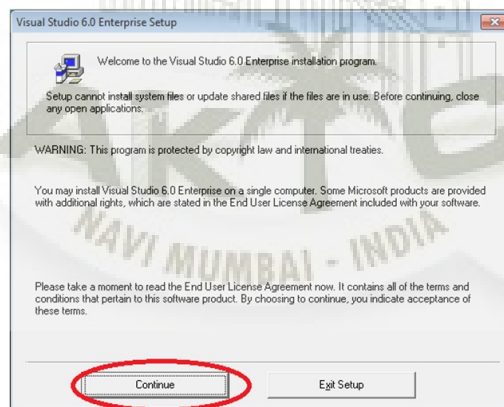


Figure 3.29: Enterprise Setup

**Step 19**

Click OK Button.

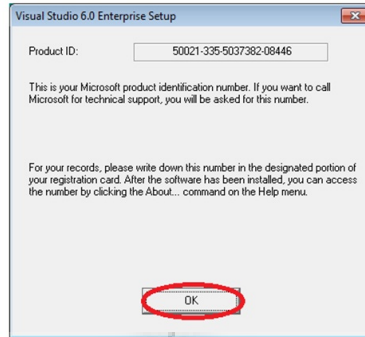


Figure 3.30: Enterprise Setup

**Step 20**

Click Continue Button.

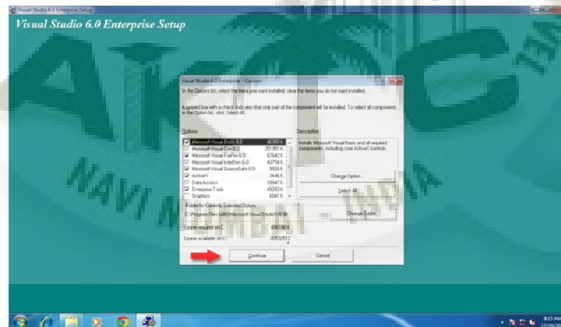


Figure 3.31: Enterprise Setup

**Step 21**

Click OK Button.

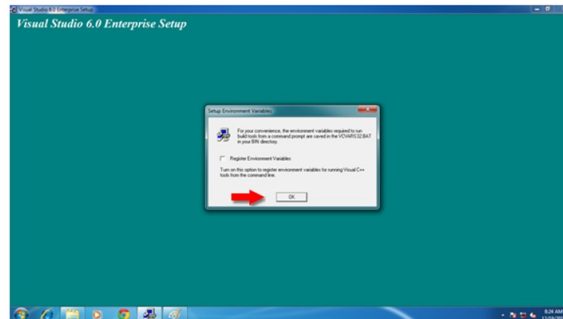


Figure 3.32: Enterprise Setup

**Step 22**

Click NO Option.

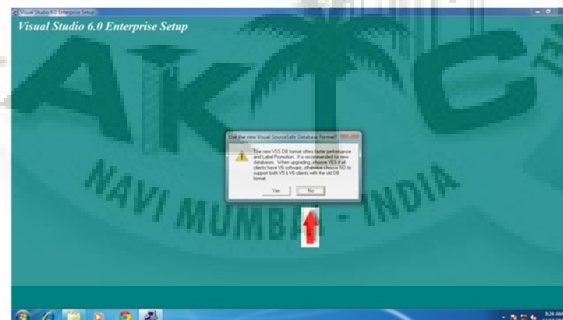


Figure 3.33: Enterprise Setup

**Step 23**  
Continue Process.

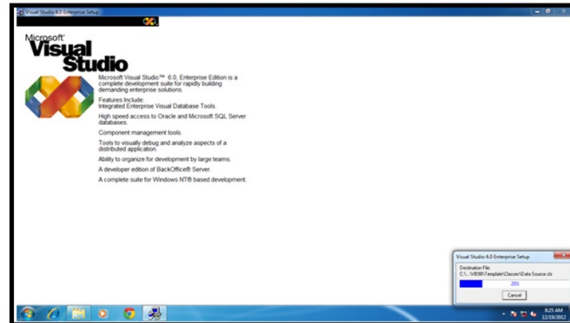


Figure 3.34: Enterprise Setup

**Step 24**  
Click Allow Access Button.

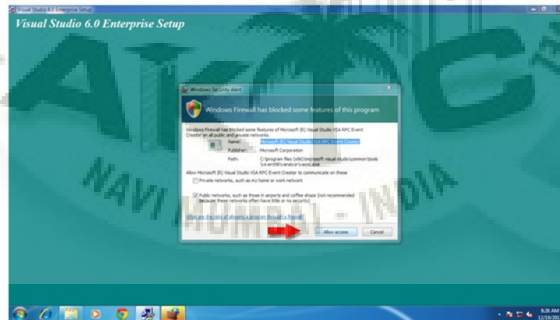


Figure 3.35: Enterprise Setup

**Step 25**

Click OK Button.

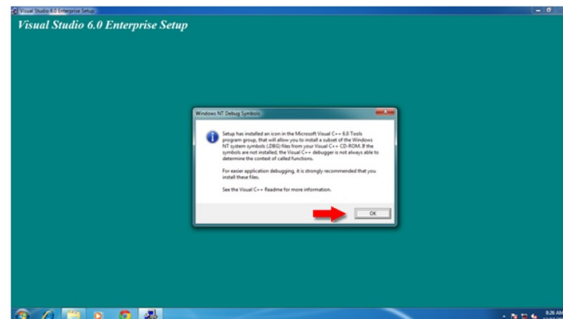


Figure 3.36: Enterprise Setup

**Step 26**

Click Restart Windows Button.

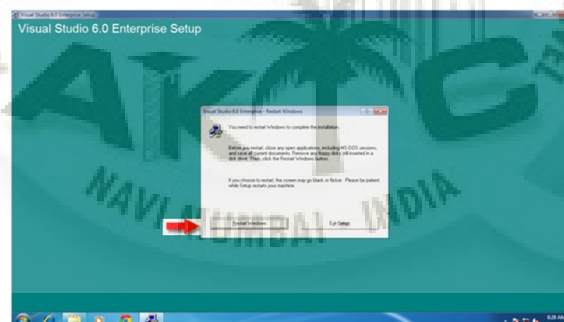


Figure 3.37: Enterprise Setup

## Step 27

Click Run Program Button.

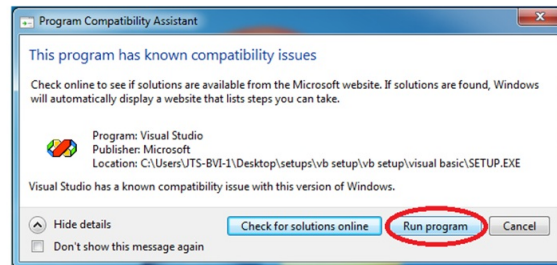


Figure 3.38: Program Compatibility

## Step 28

Do Not Select MSDN , Click Next Button.

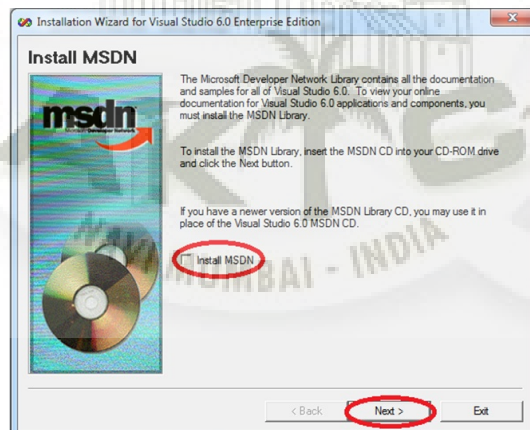


Figure 3.39: Installation Wizard

**Step 29**

Click Yes Button.

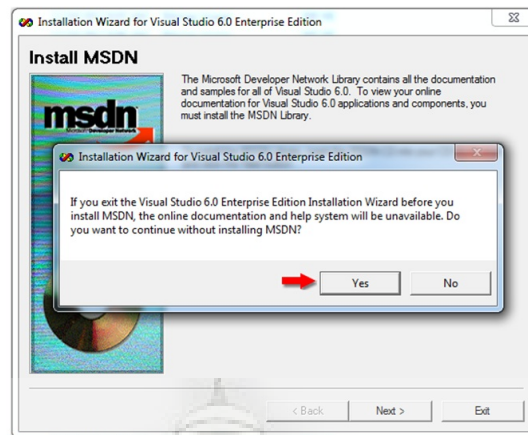


Figure 3.40: Installation Wizard

**Step 30**

Click Next Button.

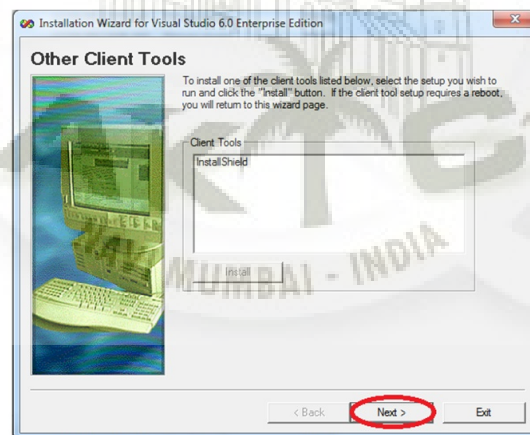


Figure 3.41: Other Client Tool



### Step 31

Click Next Button.

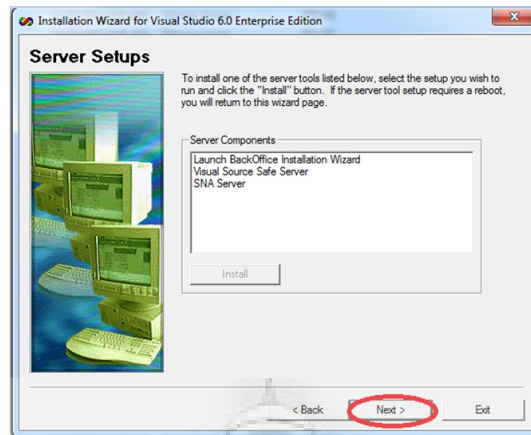


Figure 3.42: Server Setups

### Step 32

Click Finish Button.

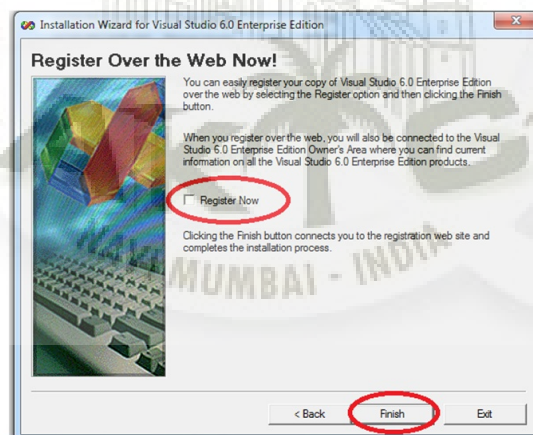


Figure 3.43: Register Over the Web Now

### 3.4.3 Arduino IDE



Figure 3.44: Arduino IDE

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

# Chapter 4

## Interfacing Diagram

### 4.1 Interfacing Diagram

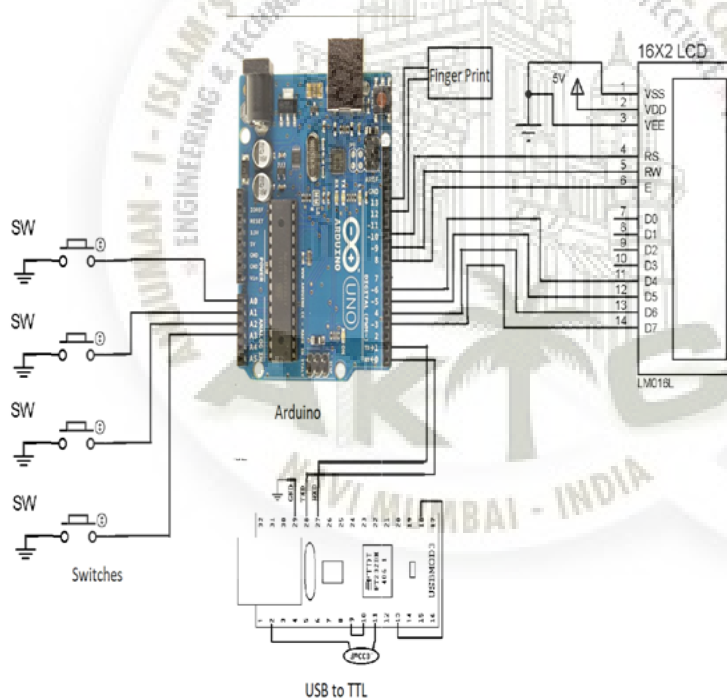


Figure 4.1: Interfacing Diagram

## 4.2 Flow of Working

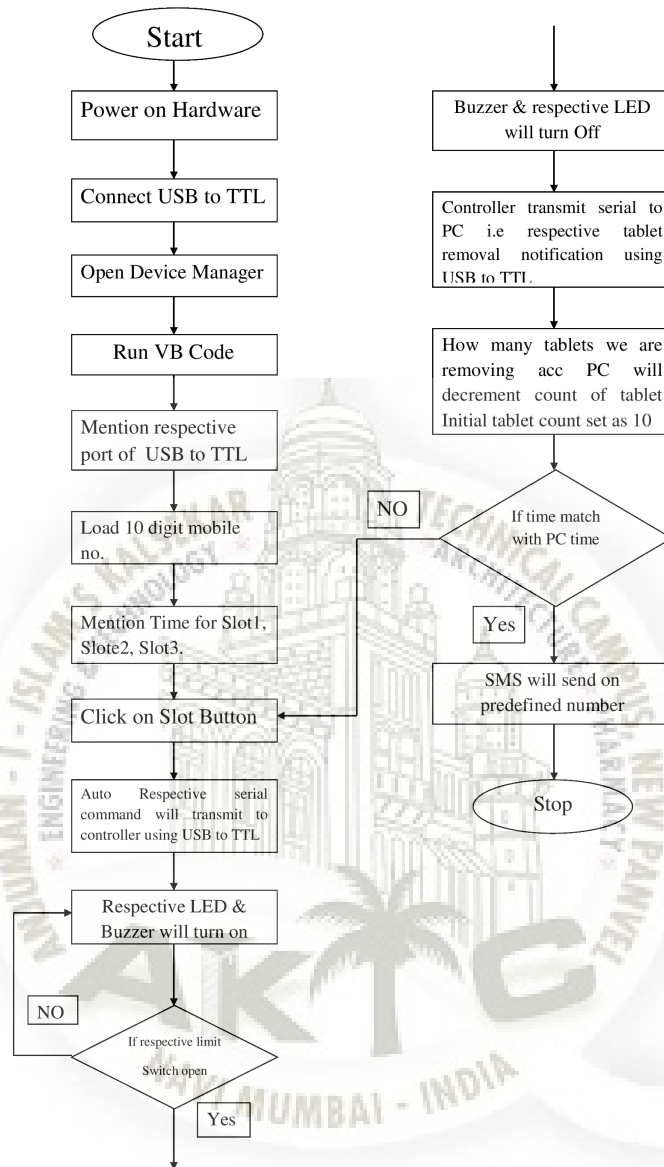


Figure 4.2: Flow of Working

# Chapter 5

## Software Design

### Installing Arduino Software On Windows XP,7,10

There are common Methods to get software is to download from [www.arduino.cc](http://www.arduino.cc)

Install arduino ide setup. After installation open the software.

Go to tools select board as arduino uno.

Connect the arduino cable to arduino uno and laptop/pc.

Connect GSM module module etc.

Type the code on main window save it. File will be saved by .ino extension

After programming is done in arduino software. First execute it to check error. If there is no error then upload the code. If there is error correct it and than upload.

# Chapter 6

## Advantages and Applications

### 6.1 Advantages

1. Our product cost is affordable compare to other product available in market.
2. User can set time table of medicine by himself.
3. Good in quality and performance able to be trusted for patients and old age people.
4. Comfortable for old age people and provide healthy life for patients who are regularly take medicines.
5. The product can be used for long time.

## 6.2 Applications

The project that has been introduced here can be used for variety of applications -

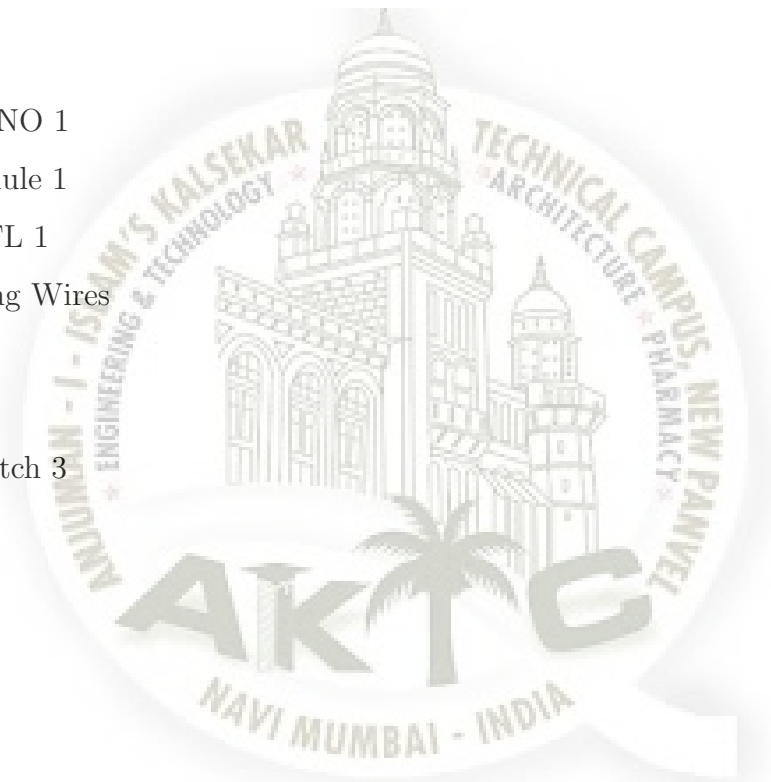
1. Elder patients
2. For care takers
3. For Hard working employees



# Chapter 7

## Component List

- i) Arduino UNO 1
- ii) GSM Module 1
- iii) Usb to TTL 1
- iv) Connecting Wires
- v) Buzzer 1
- vi) LED 4
- vii) Limit Switch 3

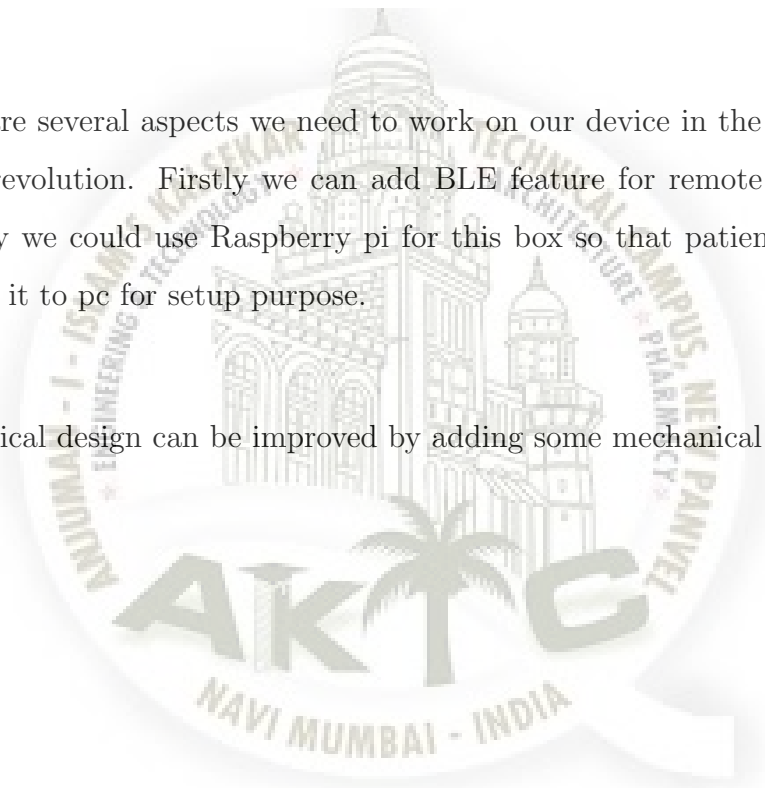




## Chapter 8

### Future Scope

- There are several aspects we need to work on our device in the future to meet the future revolution. Firstly we can add BLE feature for remote access to this box secondly we could use Raspberry pi for this box so that patient does not need to connect it to pc for setup purpose.
- Mechanical design can be improved by adding some mechanical structures to it.



## Chapter 9

### Conclusion

- This project has focused on the problems faced by senior citizens concerning adherence to their prescribed medication. It not only aids the elderly who live independently but also the caretakers of the elderly by reminding right amount of medicine at the right time.
- This ensures that the elderly patient consumes the right dosage of medication at the right time, provided he or she accepts this new, unusual method of medication.

## References

1. Viral Shah, Jigar Shah, Nilesh Singhal, Harsh Shah and Prof. Prashant Uapdhyay , Imperial Journal of Interdisciplinary Research (IJIR) Vol-2, Issue-5, 2016.
2. Naga Udayini Nyapathi<sup>1</sup>, Bhargavi Pendlimarri<sup>2</sup>, Karishma Sk<sup>3</sup> , Kavya Ch<sup>4</sup> , International Research Journal of Engineering and Technology (IRJET) , Volume: 03 Issue: 05 , May-2016.
3. Sanjay Bhati , Harshid Soni , Vijayrajsinh Zala , Parth Vyas , Mr. Yash Sharma , IJSTE - International Journal of Science Technology and Engineering , Volume 3 , Issue 10 , April 2017 .
4. [www.google.com](http://www.google.com)
5. [www.Arduino.IDE](http://www.Arduino.IDE)

# Photo Gallery

- Time of slot 2 is Set.

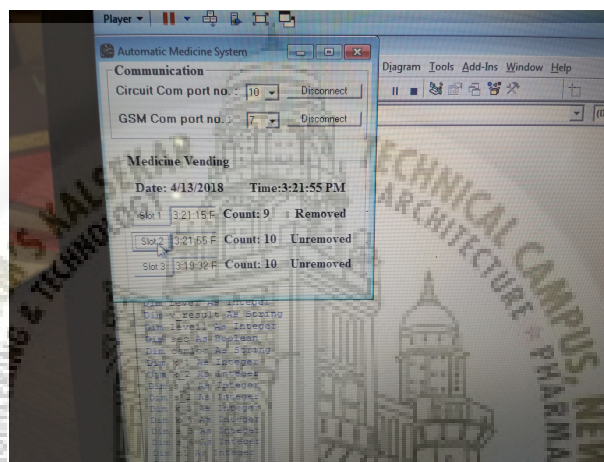


Figure 1: Step 1

- You can see Slot 2 LED is glowing.

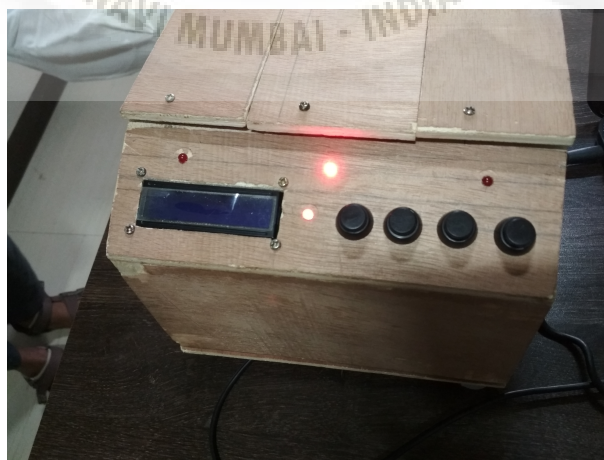


Figure 2: Step 2

- Message is also received on Mobile phone.

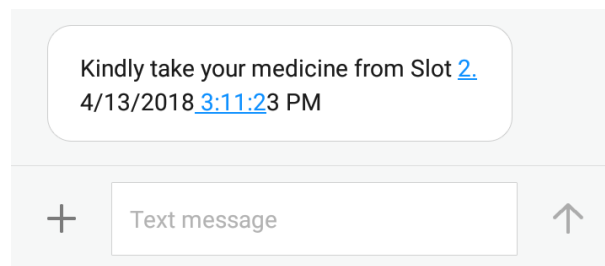


Figure 3: Step 3

- Counter is decremented by 1 from 10 to 9.



Figure 4: Step 4

# Certificates



Figure 5: Certificate 1



Figure 6: Certificate 2



Figure 7: Certificate 3





Figure 8: Certificate 4