

HOME AUTOMATION SYSTEM USING ANDROID

By

Mahabub Rabbani

ID: 151-15-5476

This Report Presented in Partial Fulfillment of the Requirements for the Degree of
Bachelor of Science in Computer Science and Engineering.

Supervised By

Ms. Tasnim Ahmed

Lecturer

Department of Computer Science and Engineering
Daffodil International University



DAFFODIAL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

06 MAY 2018

APPROVAL

This Project titled “**HOME AUTOMATION SYSTEM USING ANDROID**”, Submitted by **Mahabub Rabbni** ID No:151-15-5476 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.SC. in Computer Science and Engineering and approved as to its style and contents. This presentation will be held on 6 May 2018.

BOARD OF EXAMINERS



Dr. Syed Akhter Hossain

Professor and Head

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University.

Chairman



Dr. Sheak Rashed Haider Noori

Associate Professor

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University.

Internal Examiner



Md. Zahid Hasann

Assistant Professor

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University.

Internal Examiner



Dr. Mohammad Shorif Uddin

Professor

Department of Computer Science and Engineering
Jahangirnagar University

External Examiner

DECLARATION

I hereby declare that, this Project report is prepared by me, **Mahbub Rabbani, ID No: 151-15-5476** to the Department of Computer Science and Engineering, Daffodil International University, under the Supervision of **Ms. Tasnim Ahmed, Lecturer, Department of CSE**, Daffodil International University.

I also declare that neither this project report nor any part of this project report has been submitted elsewhere for award of any Degree or Diploma.

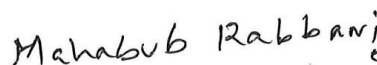
Supervised by:


16/05/18

Ms. Tasnim Ahmed

Lecturer

Department of Computer Science and Engineering
Daffodil International University.


06.05-18

Mahbub Rabbani

ID: 151-15-5476

Department of Computer Science and Engineering
Daffodil International University.

ACKNOWLEDGEMENT

First I express my heartiest thanks and gratefulness to "**Almighty**" for his special blessing to let me makes possible to complete this project successfully.

To make a report and deal with a practical world is not so easy work if not get support by others.

I fell grateful to and wish my profound my indebtedness to **Ms.Tasnim Ahmed** Lecturer, Department of CSE, Daffodil International University, Dhaka. She guided me to finish this task successfully. Her endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting them at all stage have made it possible to complete this project.

I would like to express my heartiest gratitude to **Dr. Syed Akhter Hossain**, Professor and Head of the Department of CSE, for his kind help to finish my internship and also to other faculty member and the staff of CSE department of Daffodil International University.

I would like to thank my entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

And finally but immensely express my utmost gratitude to my parents for their love and support, affection and inspiration.

ABSTRACT

This task exhibits the general plan of Home Automation System (HAS) with minimal effort and Bluetooth framework. This framework is intended to help and offer help so as to satisfy the requirements of elderly and debilitated in the home. Likewise, the keen home idea in the framework enhances the standard living at home. The change mode used to control the home apparatuses. The input is taken in the Android. The fundamental control framework executes Bluetooth innovation to give remote access from the cell phone. The outline remains the current electrical switches and gives more security control on the switches with low voltage initiating strategy. The switches status is synchronized in all the control framework whereby each UI demonstrates the constant existing switches status. The framework expected to control electrical machines and gadgets in-house with generally minimal effort outline, easy to use interface, and simplicity of establishment.

TABLE OF CONTENTS

CONTENTS	PAGE NO
Approval	i
Declaration	ii
Acknowledgement	iii
Abstract	iv
 CHAPTER	
CHAPTER 1: INTRODUCTION	(1-5)
1.1 Introduction	1
1.2 Project Objectives	2
1.3 Scope	3
1.4 Innovation Exposures that project provides	3
1.5 Project Management	4
1.5.1. Experimentation	4
1.5.2 Design	4
1.5.3 Improvement Testing	5
1.5.4 Real world testing	5
CHAPTER 2: BACKGROUND	(6-8)
2.1 What is Home automation system in workflow	6
2.2 History of automation system and its workflow	6
2.3 Why automation is used	7
2.4 Home automation system architecture	8
 CHAPTER 3: REQUIREMET SPECIFICATION	(9-15)
3.1 Design specification	9
3. 2 Design diagrams	10
3.2.1 Data flow diagram	10

3.2.2 Sequence diagrams	11
3.2.3 Use case diagram	13
3.2.4 Component diagram	15
CHAPTER 4: IMPLEMENTATION AND TESTING	(16-25)
4.1 Overview	16
4.2 Needed Hardware and software	16
4.3.2 Bluetooth	18
4.3.3 Relay module	18
4.3.4 Bread Board	19
4.3.5 Jumper wire	20
4.4 Description of component	21
4.4.1 App inventor	21
4.4.2 Arduino	22
4.4.3 Ardudroid (android app)	24
4.5 Component cost	25
CHAPTER 5: CONCLUSION AND FUTURE CAREER	26
5.1 conclusion details	26
5.2 Application	26
5.3 Future Enhancements	26
REFERENCES:	28
APPENDICES:	(29-35)
Appendix-A	(29-31)
Appendix-B	(32-35)

LIST OF FIGURES

FIGURES	PAGE
1.1. Waterfall Model	4
1.2. Gantt Chart	5
2.1 Home automation system Architecture	8
3.1 Data flow Diagram	10
3.2 Bluetooth client in control	11
3.3 Time based profile	12
3.4 Arduino or server module	13
3.5 Client use case	14
3.6 Microcontroller use case	14
3.7 Component Design	15
4.1 Arduino UNO	17
4.2 Bluetooth module	18
4.3 Relay module	19
4.4 Bread board.	20
4.5 Jumper Wire	21
4.6 App inventor	22
4.7 Arduino CC software	23
4.8 Ardudroid (Android App)	24

LIST OF TABLE

1 Part List with Cost Estimation	25
----------------------------------	----

CHAPTER 1

INTRODUCTION

1.1 Introduction

The "Home Automation" idea has existed for a long time. The expressions "Brilliant Home", "Savvy Home" took after and has been utilized to present the idea of organizing machines and gadgets in the house. Home mechanization Systems (HASs) speaks to an incredible research opportunity in making new fields in designing, and Processing. HASs incorporates unified control of lighting, apparatuses, security locks of entryways and entryways and different frameworks, to give enhanced solace, vitality proficiency, and security framework. HASs getting to be noticeably well known these days and enter rapidly into this developing business sector. Nonetheless, end clients, particularly the crippled and elderly due to their Unpredictability and cost, don't generally acknowledge these frameworks.

Because of the headway of Bluetooth innovation, there are a few distinctive of associations are presented, for example, GSM, WIFI, and Bluetooth. Each of the association has their own particular extraordinary details and applications. Among the four prevalent Bluetooth associations that frequently executed in HAS venture, Bluetooth is being picked with its reasonable capacity. The abilities of Bluetooth are all that anyone could need to be actualized in the plan. Likewise, a large portion of the present tablet/scratch pad or Cell phone accompanies the implicit Bluetooth connector. It will in a roundabout way diminish the cost of this Framework.

1.2 Project Objectives

The primary target of this venture is to build up a with Android application controlled Bluetooth. As innovation is propelling so houses are additionally getting more brilliant. Present day houses are slowly moving from regular changes to bring together control framework, including Bluetooth controlled switches. By and by, customary divider switches situated in various parts of the house makes it troublesome for the client to go close them to work. Significantly more, it turns out to be more troublesome for the elderly or physically impeded individuals to do as such. Bluetooth controlled home automation System furnishes a less difficult arrangement with Android application Technology.

Bluetooth operation is accomplished by any PDA/Tablet and so forth. With Android OS, upon a GUI (Graphical User Interface) based touch Screen operation. Keeping in mind the end goal to accomplish this, Android application goes about as the transmitter, which sends ON/OFF orders to the collector where loads are associated.

Controlling Home Appliances by means of Application (Switch Mode)

To build up an application that incorporates the highlights of switches mode Application. Switch Mode or Voice Mode can be utilized to control the switches of home Appliances.

Secure Connection Channels amongst Application and Raspberry pi

Utilization of secure conventions over Bluetooth with the goal that different gadgets can't control the Appliances. Alternatives for secure association is SSL over TCP, SSH

Controlled by any gadget fit for Bluetooth (Android, iOS, PC) to make the home machines adaptable to charge, any gadget fit for Wi-Fi Connectivity will ready to control the home apparatuses from the remote area.

Extensible stage for future improvement

The application is to be very extensible, with the plausibility of including highlights in the Future as required.

1.3 Scopes

The task goes for outlining a model for controlling the home machines that can be controlled Bluetooth through an application that gives the highlights of switch mode. An application is keeps running on android Device. The framework can be utilized as a part of an extensive variety of territories.

The framework incorporated with various highlights can be connected in the accompanying fields.

- **The framework can be utilized as a part of home, little workplaces to the enormous shopping centers**

The framework can be utilized from home to workplaces to control the electrical Appliances.

- **For remote access to apparatuses in Bluetooth or warless.**

The home/office machines can be controlled in intra-arrange or can be gotten to by means of Bluetooth.

- **For the advancement of innovation neighborly condition**

The framework fuses the utilization of innovation and making savvy home computerization. By the utilization of everyday devices, we can use them for an alternate point of view.

1.4. Innovation Exposures That Project Provides

1. Google's Android open source innovation.
2. Bluetooth technology.
3. Interfacing Wireless Adapter to Raspberry pi.
4. Interfacing transfers with air conditioning and dc control sources.
5. Utilizing Transistor as a Switch.
6. Embedded programming.

1.5. Project Management

This venture constituted the improvement of use as its significant part and in addition the equipment to control home machines. Administration of any venture has a few stages or forms in it. Thus, our undertakings can be portrayed under the accompanying advances:

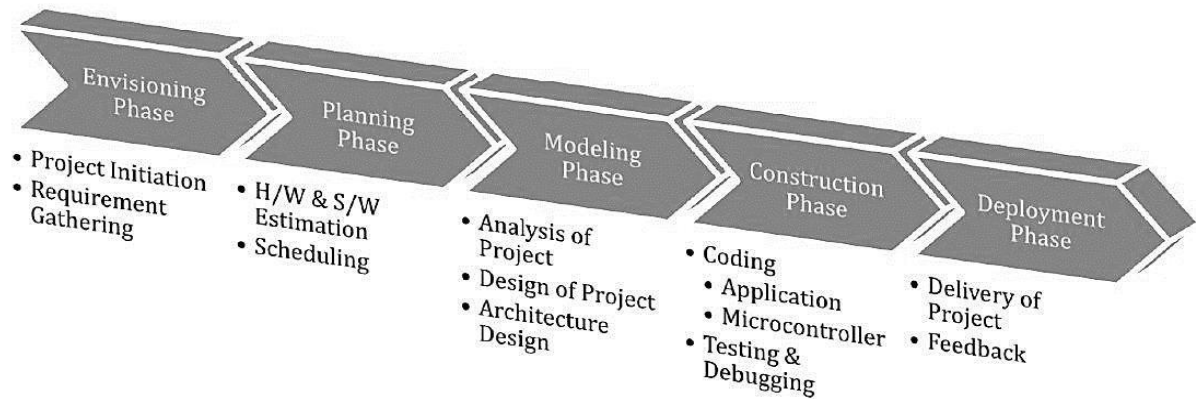


Figure 1.1: Waterfall Model

1.5.1. Experimentation

In this progression, we were talking about the essential sorts of hardware and materials. We were learning about the comparative activities, assembling the data of programming dialect to be utilized. We were creating straightforward calculations and flowcharts.

1.5.2. Design

In this stage, we were planning the format of the application. The essential highlights to be incorporated. We were planning the electrical extension to interface the home apparatuses that can be controlled by means of GPIO pins.

1.5.3. Improvement and Testing

In this stage, the improvement of utilization was performed. The bugs were distinguished and evacuated. We counseled numerous product specialists for the assessment of our application. Equipment configuration incorporates the outline of electrical extension.

1.5.4. Real-World Testing

At last, our framework was prepared to be tried in the genuine electrical apparatuses

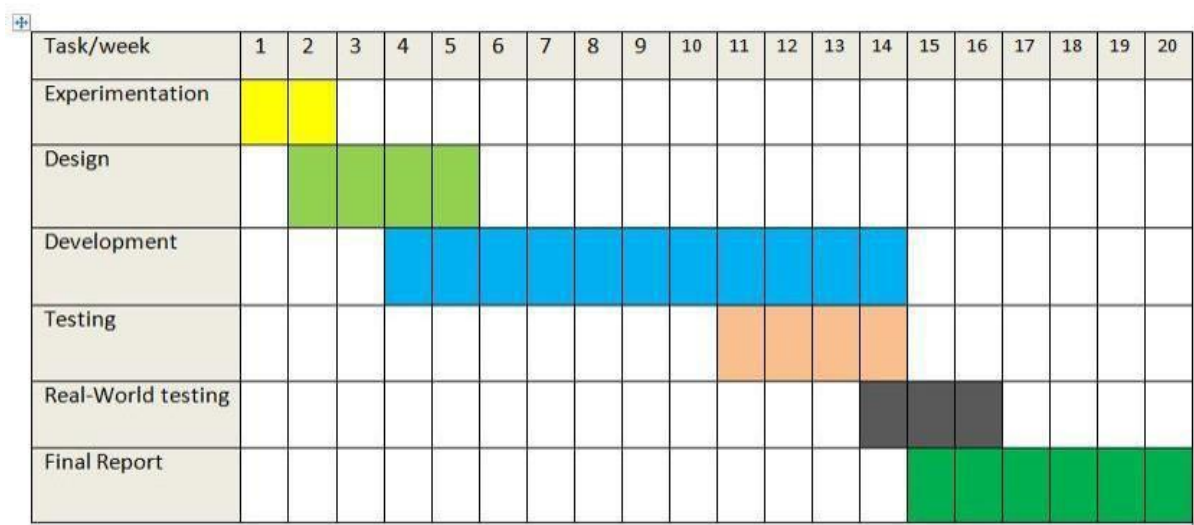


Figure1.2: Gantt chart

CHAPTER 2

BACKGROUND

2.1 What is home automation system in workflow

A work process computerization framework is a PC is a PC framework the administration and characterizes as arrangement of assignments inside an association to deliver a ultimate result or results. Work processes for various sorts of employments or procedures. Along these lines, for instance. in an assembling setting, an outline record may be naturally steered shape architect to a specialized chief to the generation build, At each phase in the work process, one individual or gathering is in charge of a particular errand, Once the assignment is finished, the work process programming guarantees that the people in charge of the following undertaking are informed and get the information they have to execute their phase of the procedure. Work process Automation frameworks may control forms notwithstanding supplanting paper work arrange exchanges. A home Workflow Automation framework mirrors the conditions required for the culmination of each errand.

2.2 History of automation system and its workflow

In 1980,s with database technologies maturing, workflow automation was built upon the database management system. The business processes to be automated involves transaction-based tasks coordinated in concurrent collaboration while preserving information integrity in the database and observing business rules. Workflow automation primarily deals with the coordination of transaction-based tasks performed by knowledge workers around the database system. The approach is known as the transactional model of workflow automation (Marinescu, 2002).in early 1990,s with network-based systems becoming commonplace. Workflow dealt with the management of collaborative work for business processes in the network. Research effort began to extend the transactional model; there might be long-lasting transactions in a workflow (Dayal,1990,)relatively few addressed the issue of customization protocol changes (Gangopadhyay, 1993), Instead of coordinating tasks around the database system,

2.3 Why automation is used

Initially, work process computerization frameworks were totally paper-based. You needed to take the paper trail keeping in mind the end goal to discover what precisely what going ahead with an assignment. Presently we can do the whole work process computerization framework process on the web, with the goal that everybody can get to it from anyplace. Work process robotization frameworks in a perfect world will likewise incorporate with other programming application so we can have the whole framework cooperate keeping in mind the end goal to effectively explore and exhibit data and undertaking booking. Work process computerization frameworks enable us to increment and track the proficiency of your errand finish execution. Presently there are increasingly work process rebooted frameworks that work with human connection administration frameworks keeping in mind the end goal to incorporate how your PCs are finishing errands and your representatives are working. This is the place the logbook booking comes in, the web-based meeting coordination. The capacity to share report altering and creation obligations, and things thusly.

2.4 Home automation system architecture

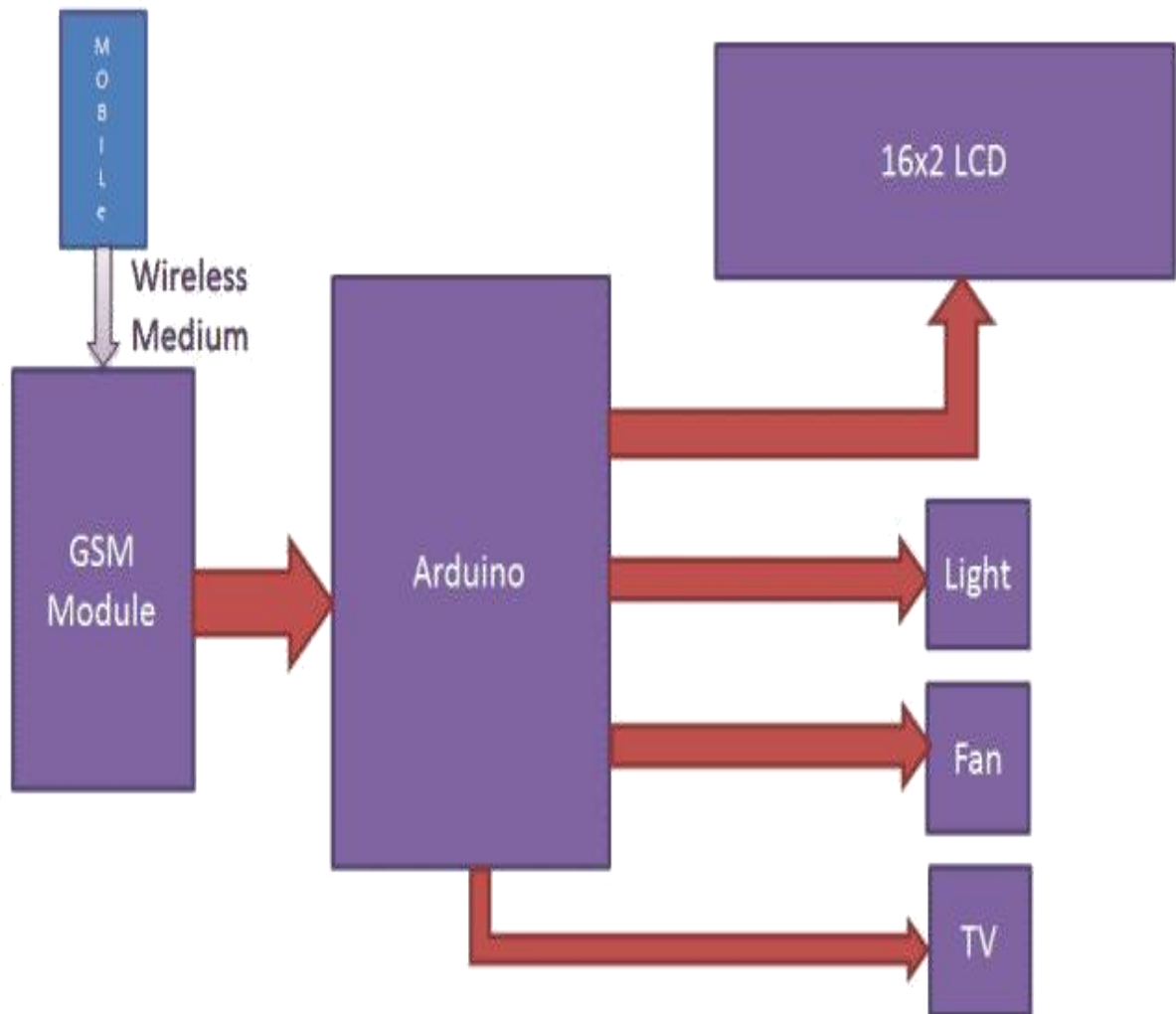


Figure 2.1: Home automation system architecture

CHAPTER 3

REQUIRMENT SPECIFICATION

3.1 DESIGN SPECIFICATION

The framework is composed remembering the accompanying key prerequisites:

- ☐ Clients ought to have the capacity to rapidly and consistently associate with and disengage

From the framework.

- ☐ Connections from a wide range of customers must be dealt with all the while; i.e. Bluetooth, Wi-Fi, and the Internet.

- ☐ Change in the status of an apparatus ought to be spread to all customers progressively.

- ☐ Customizable time-based profiles to consequently enact and deactivate apparatuses in light of the season of day.

- ☐ Hardware ought to be generally good with various PC setups.

- ☐ Server should keep running out of sight without irritating standard exercises on the desktop PC.

- ☐ Provide a straightforward and easy to use interface on the customer side.

3.2.1 DATA FLOW DIAGRAM

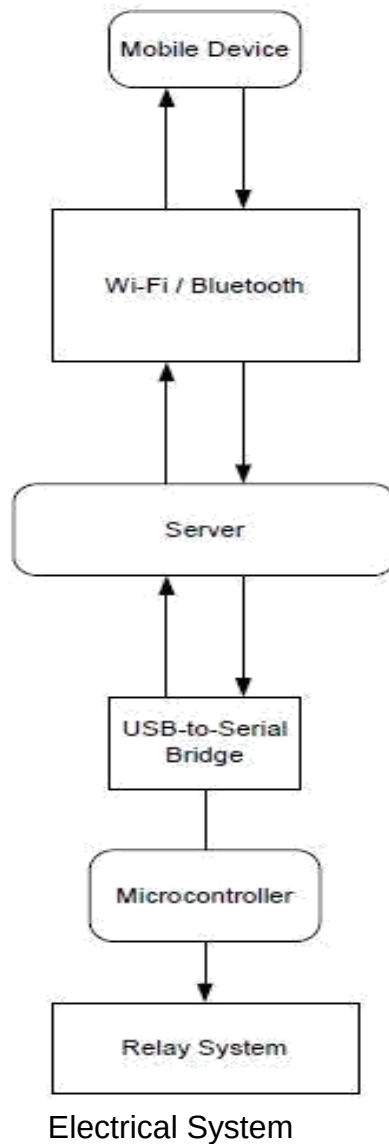


Figure 3.1 Data Flow Diagram

The cell phone associated with the server PC through Bluetooth or Wi-Fi or, on the other hand through the web. The client sends summons to the Arduino from the portable gadget. The microcontroller is associated with the server through USB. On accepting charges from the cell

3.2.2 SEQUENCE DIAGRAMS

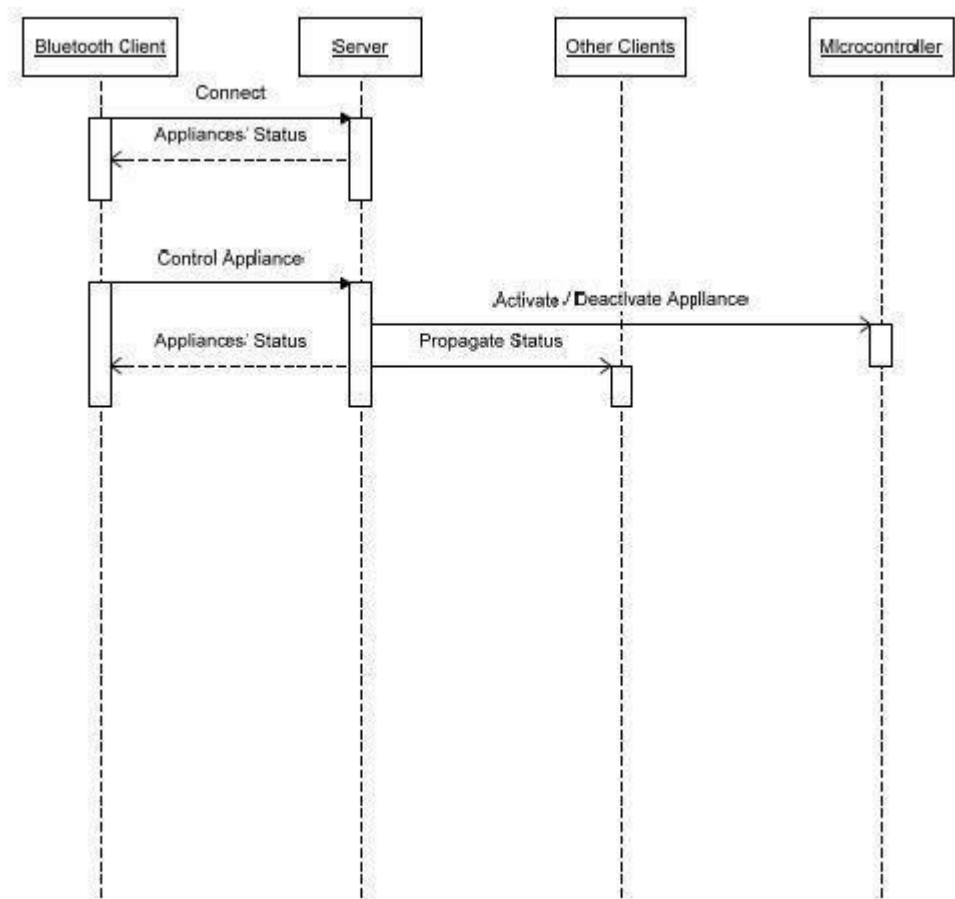


Figure 3.2 Bluetooth Client in Control

At the point when Bluetooth interfaces with the Arduino, the Arduino sends it the present status of the machines so it can be shown on the versatile gadget. At the point when the client sends a summon from the cell phone, the server gets it and advances it to the microcontroller, and Afterward sends refreshed status of the considerable number of machines to every one of the customers associated with the Arduino. Also, the Bluetooth customer consistently screens the flagging quality, also, distinguishes when the client leaves or goes into the room as per its arrangement and it can send charges to enact or deactivate machines.

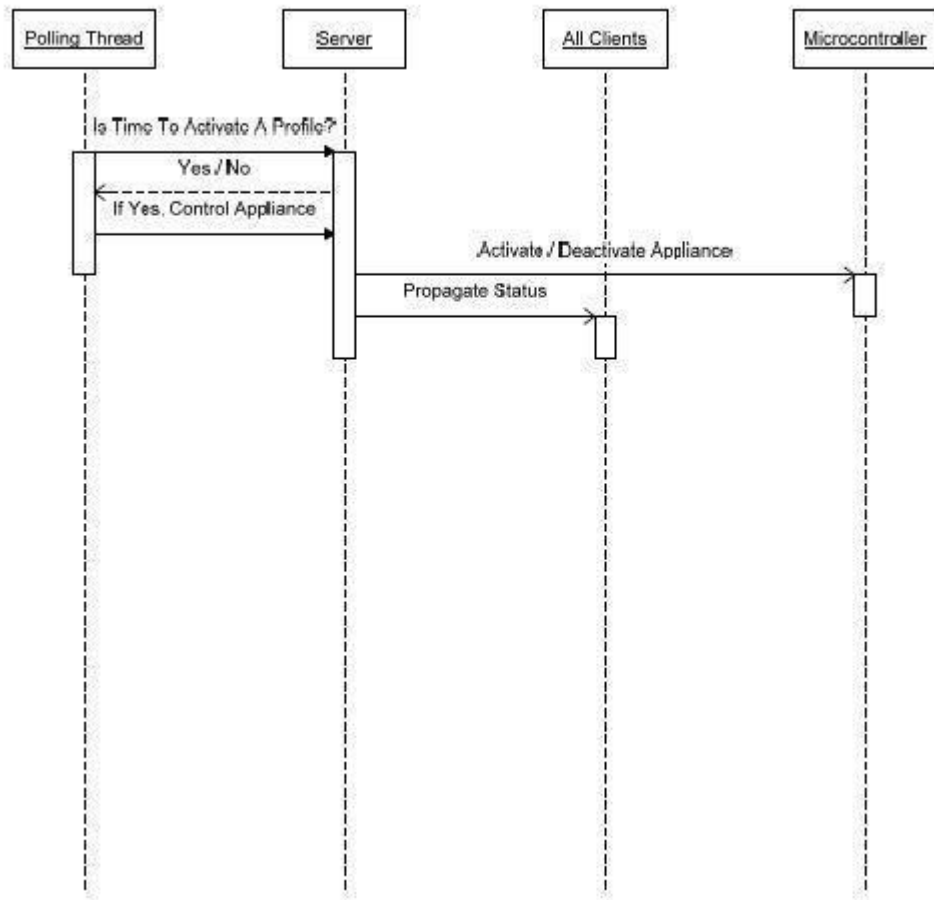


Figure 3.3 Time-Based Profile

The time-construct profiles are designed in light of the server interface. The Arduino checks whether it's an ideal opportunity to actuate a specific profile and sends them relating summons to the microcontroller to initiate or deactivate the relating apparatuses.

3.2.3 USE CASE DIAGRAMS

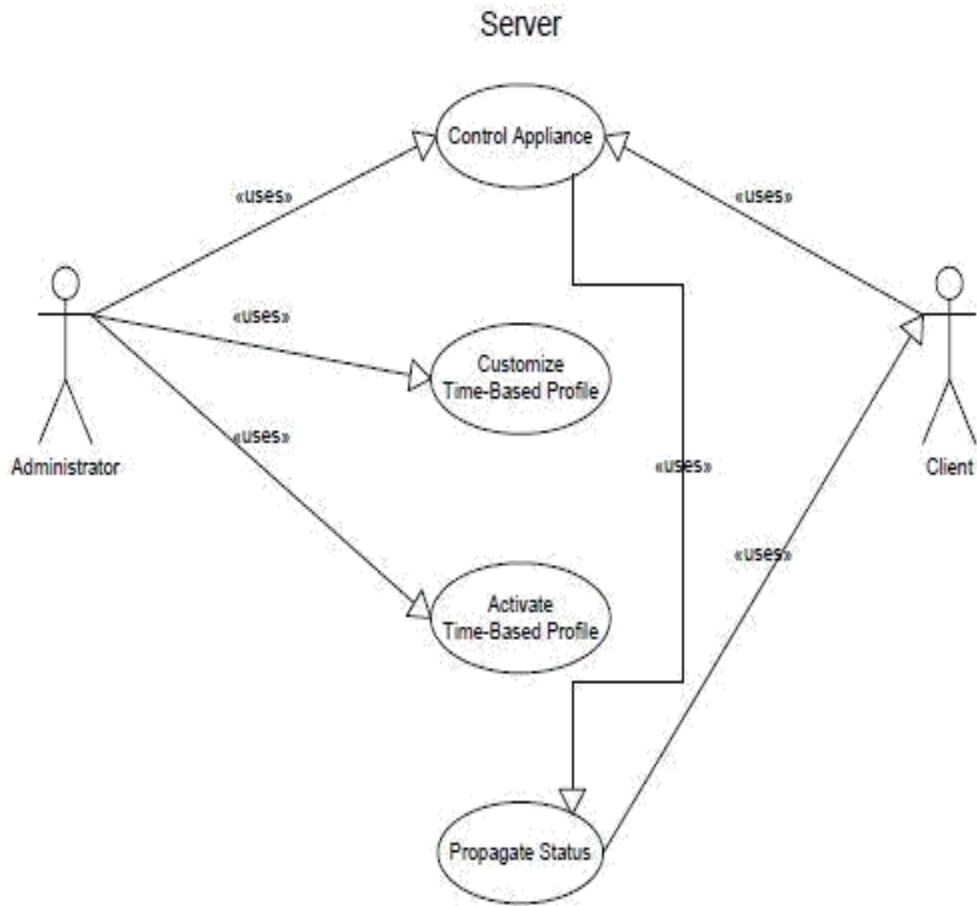


Figure 3.4 Arduino or server Module

The Arduino or server module gets control summons either from client or straightforwardly from its own interface. The time-construct profiles are arranged in light of the server interface. It inside checks whether it's an ideal opportunity to actuate a period based profile. It proliferates the status of the apparatuses to every single associated customer.

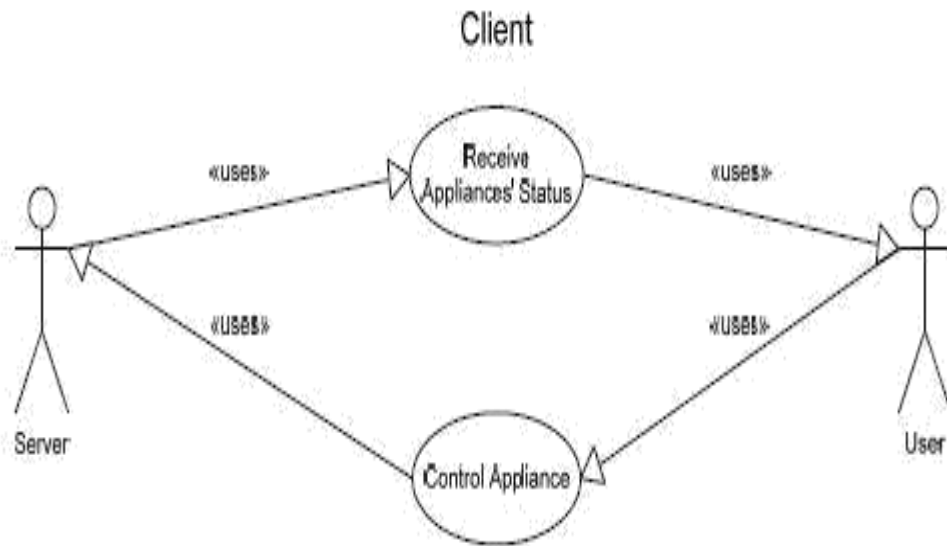


Figure 3.5 Client Use Case

The client interface enables the client to control the apparatuses. It gets announcements from the Arduino.

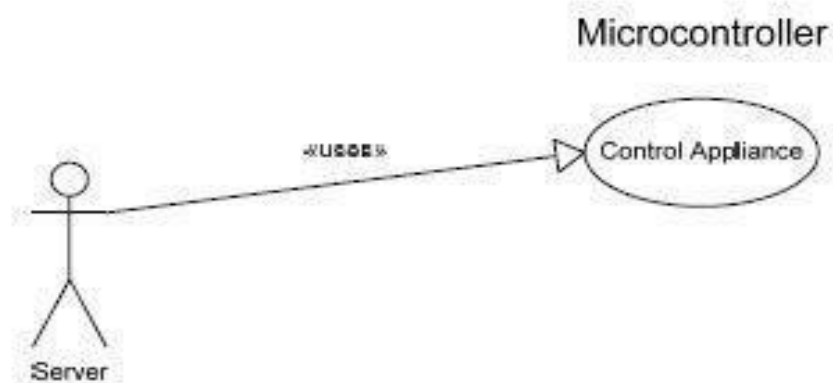


Figure 3.6 Microcontroller Use Case

The microcontroller only receives commands from the server via USB

3.2.4 COMPONENT DIAGRAM

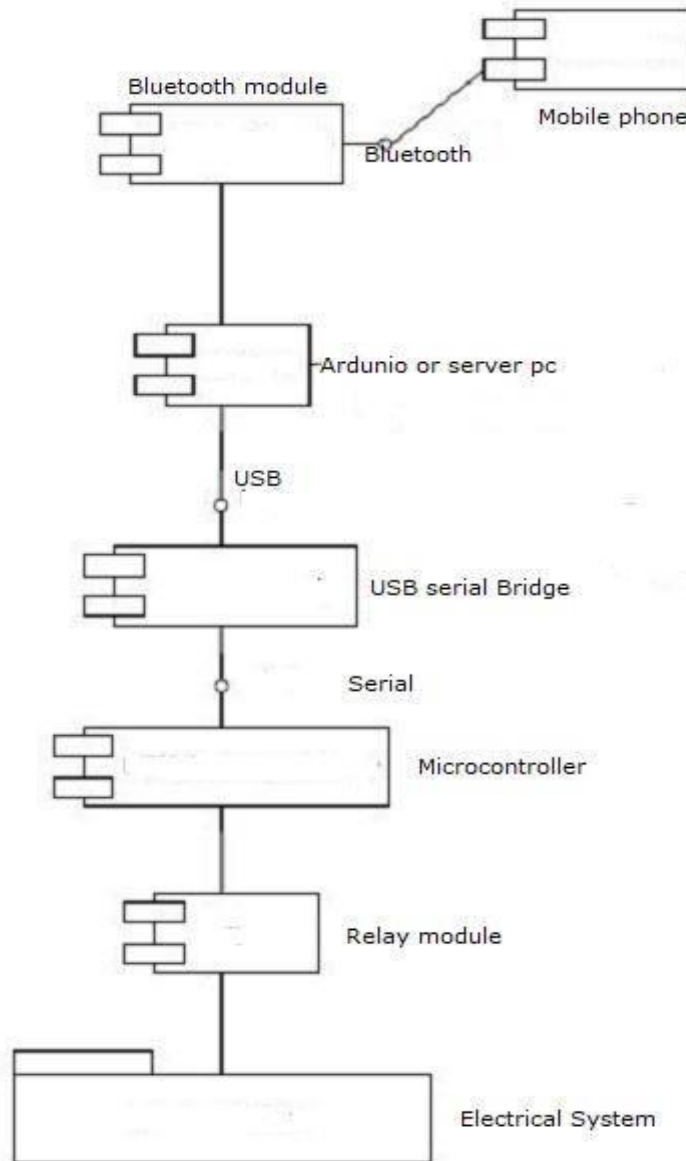


Figure 3.7 Component Diagram

The component diagram shows all the physical components of the entire System and how they are interfaced with each other.

CHAPTER 4

IMPLEMENTATION AND TESTING

4.1 Overview

In this chapter, we will discuss in details the process of implementing the home workflow automation system in android. Here will be discuss about the hardware and software requirements of sitting up a functional information system website, as well as the step-by step process of installing, configuring, coding and integrating all the various system components.

4.2 For this project we have need some hardware and software component. They are listed given blew

Hardware

- Arduino
-
- Relay Module

- Bluetooth Module

- Bread Board

- Jumper Wire

Software

- Appinventor
- Arduino CC
- ArduDroid (Android App)

4.3 Description of Component (Hardware)

4.3.1 Arduino

Arduino is an open-source stage utilized for building hardware ventures. Arduino comprises of both a physical programmable circuit board (regularly alluded to as a microcontroller and a bit of programming, or IDE (Integrated Development Environment) that keeps running on your PC, used to compose and transfer PC code to the physical board.[I]

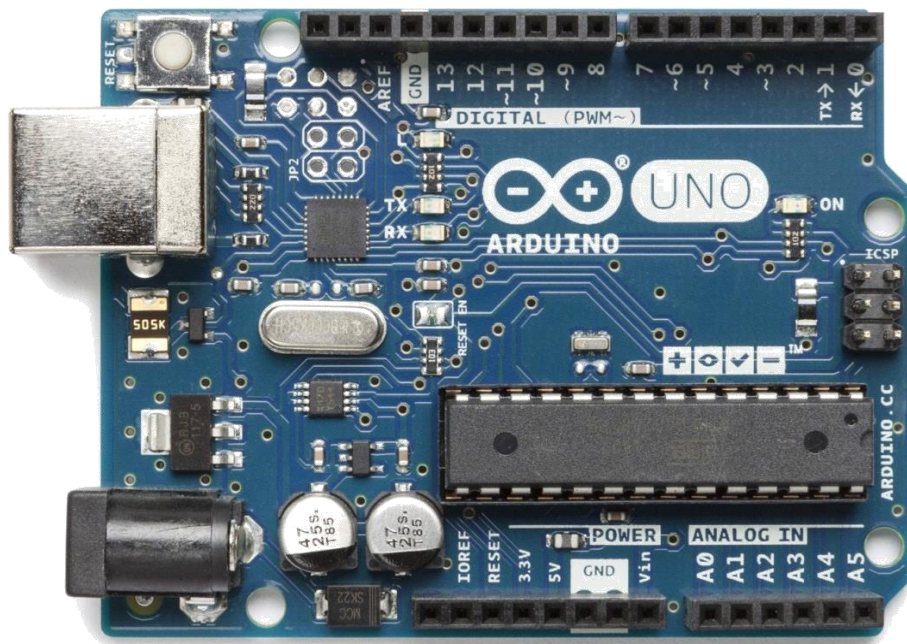


Figure 4.1: Arduino UNO

The Arduino stage has turned out to be very well known with individuals simply beginning with gadgets, and all things considered. Not at all like most past programmable circuit sheets, the Arduino does not require a different bit of equipment (called a software engineer) keeping in mind the end goal to stack new code onto the board – you can essentially utilize a USB link. Furthermore, the Arduino IDE utilizes a rearranged adaptation of C++, making it less demanding to figure out how to program.[I] At long last, Arduino gives a standard frame factor that breaks out the elements of the smaller scale controller into a more available bundle.[I]

4.3.2 Bluetooth module



Figure 4.2: Bluetooth module

- BLE112 is a Bluetooth Smart module focused on low-control sensors and adornments.
- It incorporates all highlights required for a Bluetooth Smart application.
- It is fueled straightforwardly by a standard 3V coin cell battery or a couple of AAA batteries.
- In the least power rest mode, it just devours 500 nA and will wake up inside a couple of hundred microseconds.

4.3.3 Relay Module

- A hand-off is an electrically worked switch.
- Relays are utilized where it is important to control a circuit by a low-control flag.
- Relays shield electrical circuits from over-burden or blame.



Figure 4.3 : Relay Module

4.3.4 Bread Board

A breadboard is a development base for prototyping of hardware. Initially, it was truly a breadboard, a finished bit of wood utilized for cutting bread.

The solder less breadboard does not require welding, it is reusable.[I] This makes it simple to use for making impermanent models and trying different things with circuit outline. Consequently, solder less breadboards are additionally greatly prominent with understudies and in mechanical instruction.[I] More seasoned breadboard sorts did not have this property. A strip board (Vero board) and comparative prototyping printed circuit sheets, which are utilized to fabricate semi-changeless fastened models or unique cases, can't undoubtedly be reused.

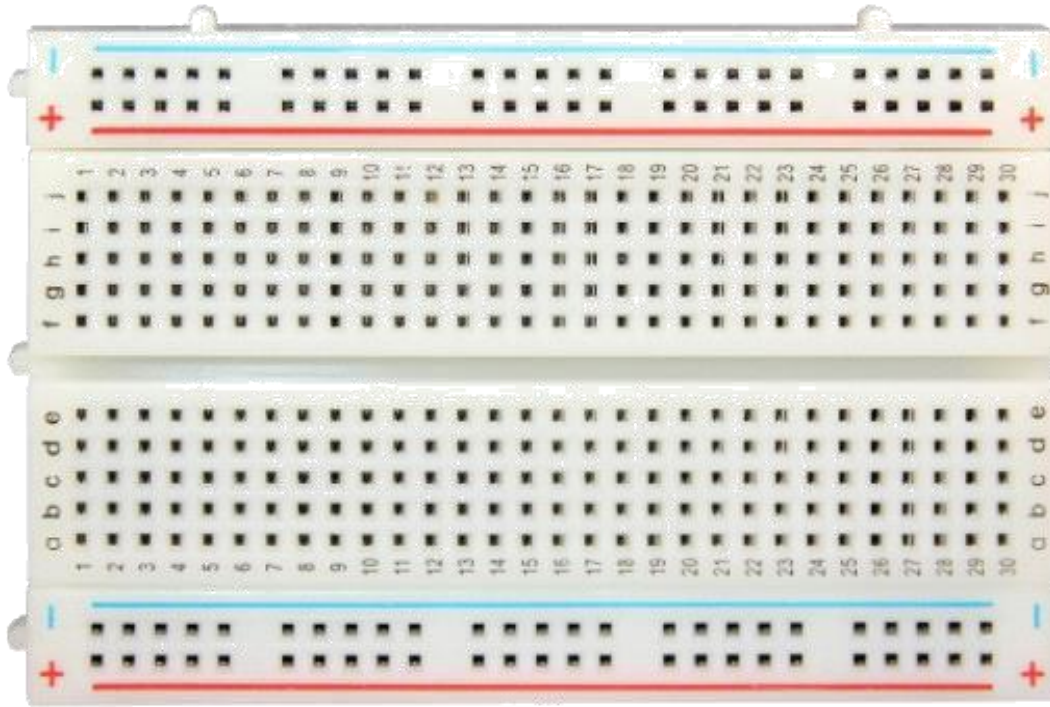


Figure 4.4: breadboard

An assortment of electronic frameworks might be prototyped by utilizing breadboards, from little simple and advanced circuits to finish focal preparing units (CPUs)

4.3.5 Jumper Wire

A hop wire (otherwise called jumper, jumper wire, jumper link, DuPont wire, or DuPont link – named for one maker of them) is an electrical wire or gathering of them in a link with a connector or stick at each end (or once in a while without them – essentially "tinned"), which is ordinarily used to interconnect the parts of a breadboard or other model or test circuit, inside or with other hardware or segments, without fastening.

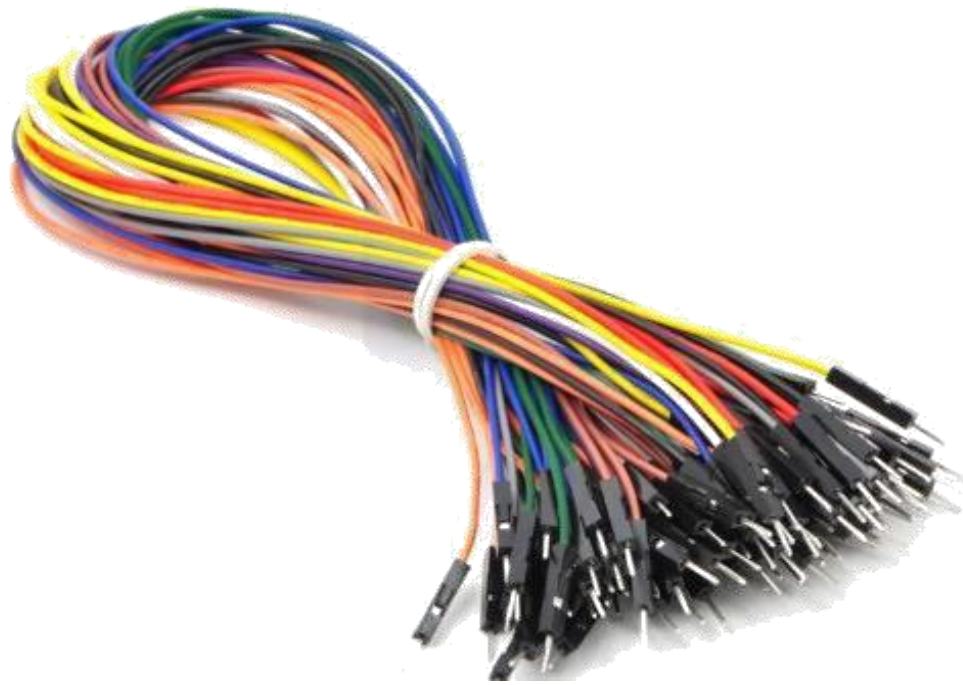


Figure 4.5: Jumper Wire

Singular bounce wires are fitted by embeddings their "end connectors" into the openings gave in a breadboard, the header connector of a circuit board, or a bit of test gear.

4.4 Description of Component (software)

4.4.1 App inventor

MIT App Inventor is an instinctive, visual programming condition that permits everybody – even kids – to assemble completely practical applications for cell phones and tablets. Those new to MIT App Inventor can have a straightforward first application up and running in under 30 minutes. Furthermore, also, our pieces based instrument encourages the production of perplexing, high-affect applications in fundamentally less time than customary programming situations. The MIT App Inventor venture tries to democratize programming

improvement by enabling all individuals, particularly youngsters, to move from innovation utilization to innovation creation.

A little group of CSAIL staff and understudies, drove by Professor Hal Abelson, shapes the core of a global development of designers. Notwithstanding driving instructive effort around MIT App Inventor and leading examination on its effects, this center group keeps up the free online application advancement condition that serves more than 6 million enlisted clients.



Figure 4.6 App inventor

Pieces based coding programs motivate scholarly and innovative strengthening. MIT App Inventor goes past this to give genuine strengthening to children to have any kind of effect - an approach to accomplish the social effect of boundless incentive to their groups. Truth be told, App Inventors in school and outside of customary instructive settings have met up and done only.

4.4.2 Arduino CC

The open-source Arduino Software (IDE) makes it simple to compose code and transfer it to the board. It keeps running on Windows, Mac OS X, and Linux. The earth is composed in Java and in view of Processing and another open-source programming. This product can be utilized by any Arduino board.

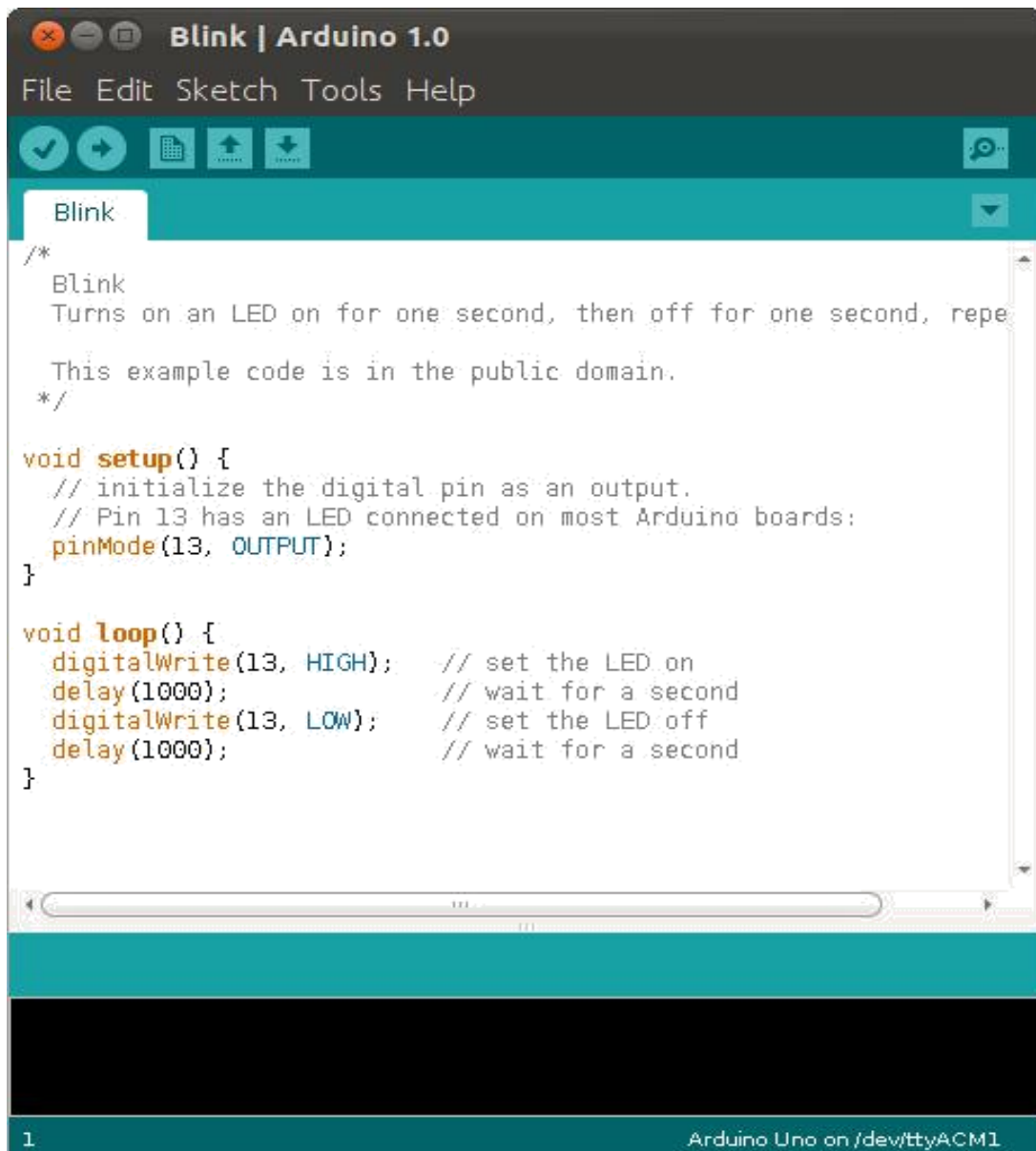


Figure 4.7: Arduino CC software

4.4.3 ArduDroid (Android App)

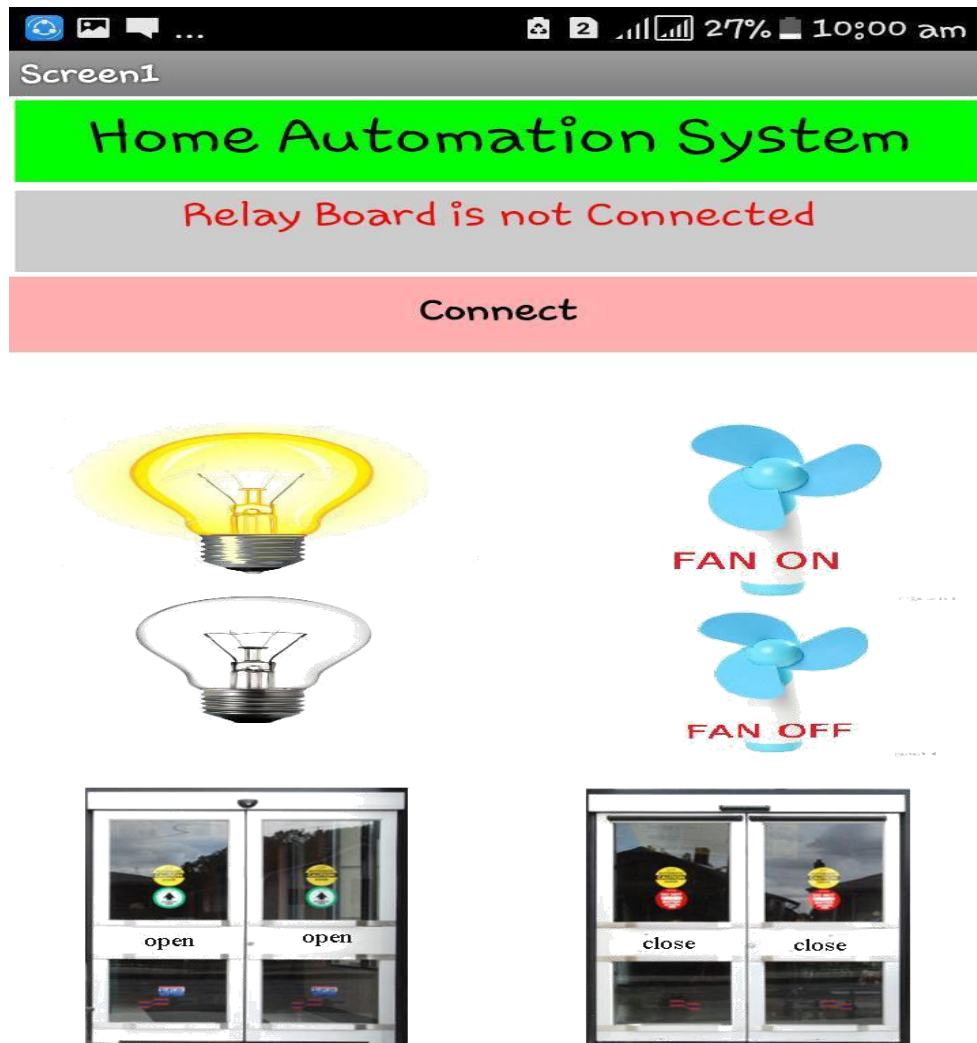


Figure 4.8: ArduDroid (Android App)

Here given our project maintenance apps. This app is created in embedded programming in c. here uses two light button. There is an on the button and off button. And uses in two fan button. There is an on the button and another off button. And another two button is door designing. On and off. After connecting electricity line than when we press in on the button in any switch then start any device such as light, fan, or door. It is only useable in Bluetooth device. If any programming code is failed then apps do not work.

4.5 Component Cost

Table 1: Cost Estimation

Name	Number	Cost	Availability
Arduino:	1	750	Available
Bluetooth Adapter	1	390	Available
Relay module	1	450	Available
Jumper wire	2 pkt.	150	Available
Motor	2	120	Available
Led	4 pics	20	Available
Breadboard	1	150	Available

CHAPTER 5

CONCLUSION

5.1. Introduction

The home automation system has been tentatively demonstrated to work attractively by interfacing test machines with it and the apparatuses were effectively controlled by a remote cell phone. The Bluetooth customer was effectively tried on a large number of various cell phones from various producers, along these lines demonstrating its versatility and wide similarity.

In this manner a minimal effort home mechanization framework was effectively planned, actualized and tried.

5.2APPLICATION

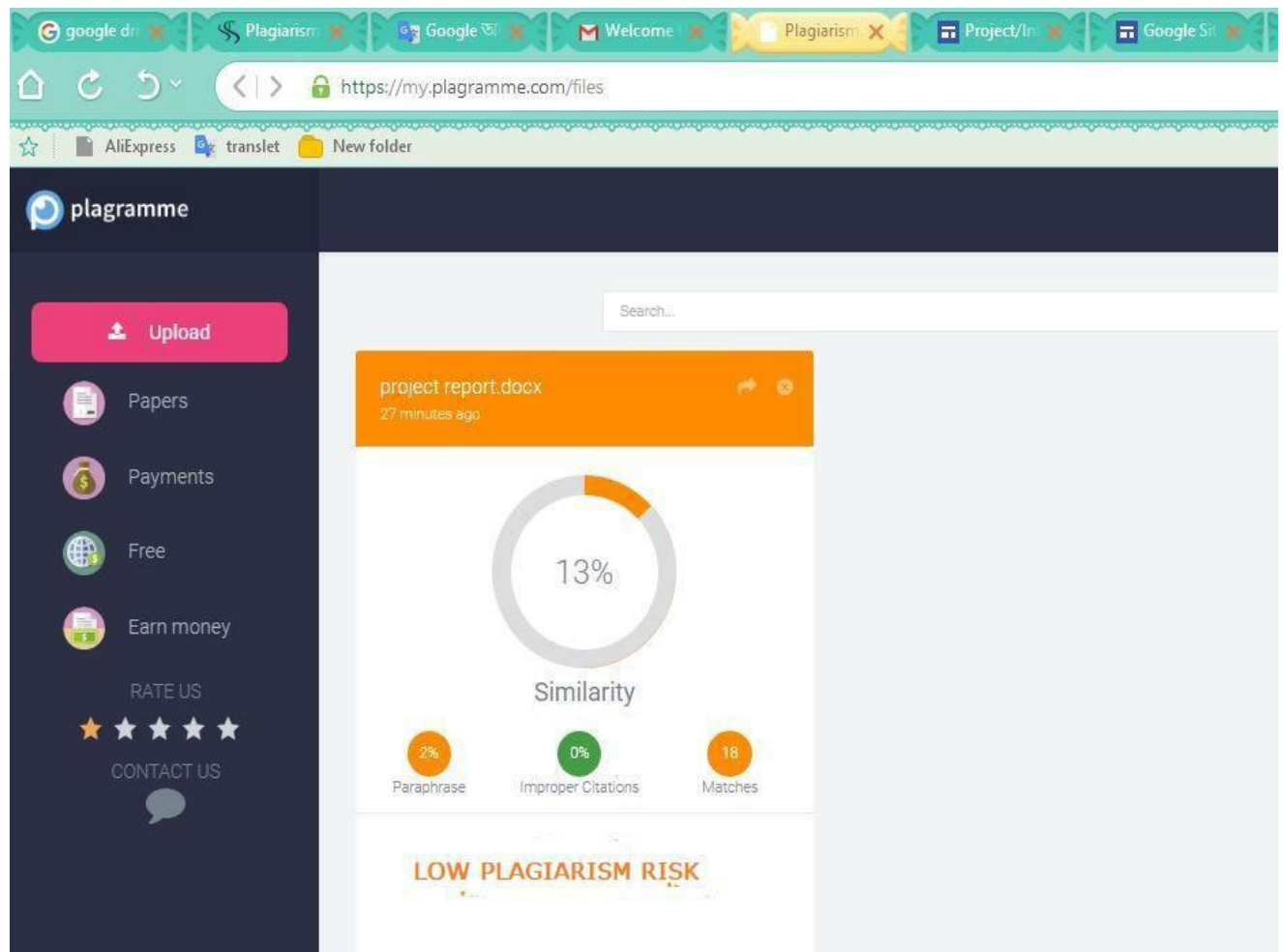
The undertaking planned is exceptionally viable in nature in light of the fact that everything can be controlled with the assistance of only a cell phone which is generally accessible these days and furthermore turns out to be helpful. Likewise, the venture is plausible in light of the fact that the cost of the undertaking is less when contrasted with the costly Wi-Fi-based home control frameworks directly accessible in the market which require an extra cost of web administrations.

5.3 FUTURE ENHANCEMENTS

A valuable element is included bolster for remotely controlling an infrared transmitter. This transmitter can be set within the scope of an infrared-empowered apparatus, for example, an aeration and cooling system. The client would then have the capacity to control further developed highlights of the apparatus, for example, temperature control, fan speed, and so on.

Plagiarism check

Plagiarism check in <https://my.plagramme.com>



References

1. <https://www.electronicshub.org/home-automation-projects> (10.1.2018)
2. http://www.ebookbou.edu.bd/Books/Text/SST/DCSA/DCSA_1302_full.pdf (25.1.2018)
3. <http://gsdl.easternuni.edu.bd/greenstone/collect/5thesis/index/assoc/HASH456d.dir/doc.pdf> (05.2.2018)
4. <https://create.arduino.cc/projecthub/projects/tags/automation> (14.2.2018)
5. <https://www.codeproject.com/script/Articles/BlogArticleList.aspx> (25.02.2018)
6. <https://create.arduino.cc/projecthub/kksjunior/simple-home-automation-using-bluetooth-android-and-arduino-2157b3> (5.3.2018)
7. https://en.wikipedia.org/wiki/Home_automation (1.04.2018)
8. <http://ai2.appinventor.mit.edu/?locale=en#6212643630874624> (4.04.2018)

References book

1. Home Automation Made Easy: Do It Yourself Know How Using UPB, INSTEON, ARDIUNO AND BLUETOOTH (2.3.2018)
Written by Dennis C Brewer
2. Home Automation and Wiring (27.3.2018)
Written by James Gerhart

APPENDIX-A

Code for the Arduino :

Relay IN1 connected to PinOut 2 Arduino

Relay IN2 connected to PinOut 3 Arduino

Relay IN3 connected to PinOut 4 Arduino

Relay IN4 connected to PinOut 5 Arduino

--->you can connected to relay modul 4 channel

Serial data sending from Arduino Bluetooth Relay

4CH.apk data '1'-'4' to on is Ralay CH 1-4 data 'A'-'D' to
off is Ralay CH 1-4

data '9' to on ALL CH 1-4

data 'T' to off ALL CH 1-4

*

```
#include <SoftwareSerial.h>
```

```
SoftwareSerialmySerial(10, 11); //Pin10 RX , Pin 11 TX connected to--> Bluetooth TX,RX
```

```
#define relay1 2
```

```
#define relay2 3
```

```
#define relay3 4
```

```
#define relay4 5
```

```
charval;
```

```
void setup() {
```

```
pinMode(relay1,OUTPUT);
```

```
pinMode(relay2,OUTPUT);
```

```
pinMode(relay3,OUTPUT);
```

```
pinMode(relay4,OUTPUT);
```

```
digitalWrite(relay1,HIGH);
```

```
digitalWrite(relay2,HIGH);
```

```

digitalWrite(relay3,HIGH);

digitalWrite(relay4,HIGH);
mySerial.begin(9600);
Serial.begin(9600);
}

void loop() {
//cek data serial from bluetooth android App
if(mySerial.available() >0 ) {
val = mySerial.read();

Serial.println(val);
}

//Relay is on
if(val == '1' ) {
digitalWrite(relay1,LOW); }
else if( val == '2' ) {
digitalWrite(relay2,LOW); }
else if( val == '3' ) {
digitalWrite(relay3,LOW); }
else if( val == '4' ) {
digitalWrite(relay4,LOW); }

//relay all on
else if( val == '9' ) {
digitalWrite(relay1,LOW);
digitalWrite(relay2,LOW);
digitalWrite(relay3,LOW);
digitalWrite(relay4,LOW);
}
}

```

```
}  
  
//relay is off  
  
else if( val == 'A' ) {  
    digitalWrite(relay1,HIGH); }  
  
else if( val == 'B' ) {  
    digitalWrite(relay2,HIGH); }  
  
else if( val == 'C' ) {  
    digitalWrite(relay3,HIGH); }  
  
else if( val == 'D' ) {  
  
    digitalWrite(relay4,HIGH); }  
  
//relay all off  
  
else if( val == 'T' ) {  
    digitalWrite(relay1,HIGH);  
    digitalWrite(relay2,HIGH);  
    digitalWrite(relay3,HIGH);  
    digitalWrite(relay4,HIGH);  
}  
  
}
```

APPENDIX-B

Command for the switch ON/ OFF

```
#DEFINE START_CMD_CHAR '*'

#DEFINE END_CMD_CHAR '#'

#DEFINE DIV_CMD_CHAR 'I'

#DEFINE CMD_DIGITALWRITE 10

#DEFINE CMD_ANALOGWRITE 11

#DEFINE CMD_TEXT 12

#DEFINE CMD_READ_ARDUROID 13

#DEFINE MAX_COMMAND 20 // MAX COMMAND NUMBER CODE.USED FOR ERROR CHECKING.

#DEFINE MIN_COMMAND 10 // MINIMUM COMMAND CODE.USED FOR ERROR CHECKING.

#DEFINE IN_STRING_LENGTH 40

#DEFINE MAX_ANALOGWRITE 255

#DEFINE PIN_HIGH 3

#DEFINE PIN_LOW 2

STRING IN TEXT;

VOID SETUP() {

SERIAL.BEGIN(9600);

SERIAL.PRINTLN("ARDUROID 0.12 ALPHA BY TECHBITAR

(2013)"); SERIAL.FLUSH();

}

VOID LOOP()

{

SERIAL.FLUSH();

INT ARD_COMMAND=0;

INT PIN_NUM=0;
```

```

INT PIN_VALUE=0;

CHAR GET_CHAR=' '; READ SERIAL

// WAIT FOR INCOMING DATA

IF (SERIAL.AVAILABLE <1) RETURN:    //IF SERIALEEMPTY, RETURN TO LOOP0.

//PARSE INCOMING COMMEND START FLAG

GET_CHAR=SERIALREAD():

IF(GET_CHAR!=START_CMD_CHAR) RETURN:    //IF NO COMMAND START FLAG, RETURN TO
LOOP().

//PARSE INCIMING COMMAND TYPE

ARD_COMMAND=SERIAL.PARSEINT0; //READ THE COMMAND

//PARSE INCOMING PIN# AND VALUE

PIN_NUM=SERIAL.PARSEINT();    // READ THE PIN

PIN_VALUE=SERIAL.PARSEINT();    // READ T

```

GET TEXT COMMAND FROM ARDUDROID

```

IF(ARD_COMMAND==CMD_TEXT)[
  INTEXT=""; //CLEARS VARIABLE FOR NEW INPUT
  WHILE(SERIAL.AVAILABLE()){
    CHAR C= SERIAL.READ();    // GET ONE BYTE FROM SERIAL BUFFER
    IF (C==END_CMD_CHAR) {    // IF WE THE COMPLETE STRING HAS BEEN HEAD
      BREAK
    }
    ELSE{
      IF(C!=DIV_CMD_CHAR){
        INTEXT +=C;
        DELAY(5);
      }
    }
  }
}

```

```
}  
}
```

GET DIGITAL WRITE DATA FROM ARDUDROID

```
IF(ARD_COMMAND==CMD_DIGITALWRITE) {  
  IF(PIN_VALUE==PIN_LOW) PIN_VALUE=LOW;  
  ELSE IF (PIN_VALUE==PIN_HIGH) PIN_VALUE=HIGH;  
  ELSE RETURN; //ERROR IN PIN VALUE. RETURN.  
  SET_DEGITALWRITE(PIN_NUM, PIN_VALUE); //UNCOMMENT THIS FUNCTION IF YOU WISH TO USE  
  RETURN; // RETURN FROM START OF LOOP()  
}
```

SEND DATA TO ARDUDROID

```
IF(ARD_COMMAND==CMD_READ_ARDUDROID){  
  //CHARSEND_TO_ANDROID[]="PLACE YOUR TEXT HEAR."  
  //SERIAL.PRINTLN(SEND_TO_ANDROID); //EXAMPLE : SENDING  
  TEXT SERIAL.PRINT("ANALOG 0=");  
  
  SERIAL.PRINTLN(ANALOGREAD(AO)); //EXAMPLE: READ AND SEND ANALOG PIN VALUE TO  
  ARDUINO  
  
  RETURN; //DONE. RETURN TO LOOP();  
}  
  
}  
  
VOID SET_DIGITALWRITE(INT PIN_NUM, INT PIN_VALUE)  
{  
  SWITCH(PIN_NUM) {  
    DIGITALWRITE(7,PIN_VALUE);  
  
    CASE 3:  
      PINMODE(3,OUTPUT);  
      DIGITALWRITE(3,PIN_VALUE);  
  
      BREAK;
```

CASE 2:

```
PINMODE(2,OUTPUT);
```

```
DIGITALWRITE(2,PIN_VALUE);
```

```
BREAK;
```

```
}
```

```
}
```