1. INTRODUCTION

1.1 INTRODUCTION

Automation is term used to define things are doing work by electronically and mechanically by pressing just one button on a remote or any other mobile device. Now a day we can automate hardware devices through Android software. We can operate equipment's such as large machinery, home appliances and even detect temperature through sensors. Communication is required as a host for these systems such as Wi-Fi, and is configured by different controling devices. We live in an exciting time where more and more everyday things are becoming smart. Appliances have sensors and can communicate to other things and can provide control to more things. The Internet of Things, IoT, is in a huge way and people are rapidly inventing new gadgets that enhances lives. The price of microcontrollers with the ability to talk over a network keeps dropping and developers can now tinker and build things inexpensively. IoT based home automation project is done using low cost ESP8266 Espino ESP-12 WiFi Module, It uses relays and few simple components, four electrical devices can be controlled and temperature can be monitored . ESP-12 is low cost module is used here. Homes of the 21st century will become more and more self - controlled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that allow users to control electric appliances of varying kind. In contrast, Wireless systems can be of great help for automation systems.

1.2 PROBLEM DEFINITION

There is a great energy crisis in current situation of our country. Moreover, people have become negligent in proper utilization of the available energy. People often forget to turn off the light sources and other home appliance while staying out from home. Even in those situations, application of home automation makes it possible to control them from a distant place in easy way with our smart phone. People are constantly running from place to place, working to accomplish everything on our never- system, we never have to worry about opening the door, switching off the appliances and so on. In short, we can save precious time and experience more daily productivity.Home automation is incredible. It can make almost all aspects of your home simpler, more comfortable and more enjoyable. Home automation, though, is much less exceptional when it goes wrong. And, unfortunately, due to things like poorly inadequate functionality, and installation delays, home automation problems can arise.

1.2.1 EXISTING SYSTEM

Home automation plays a very important role in the modern era because of its flexibility in using it at different places so it will save money and time by decreasing human hard work. The focus of this technology is to control the household equipment's like light, fan, door, AC etc. remotely.

DISADVANTAGES OF EXISTING SYSTEM

- Security Problems because there is no authentication required for remoye controls.
- For remote there is also a Limit Range which can be used only a specific limit range only.

1.2.2 PROPOSED SYSTEM

The proposed system is a distributed home automation system, consists of server, hardware interface modules. Server controls hardware one interface module, and can be easily configured to handle more hardware interface module. A server is a computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.

ADVANTAGES OF PROPOSED SYSTEM

- Managing all of your home devices from one place.
- Remote control of home functions.
- Increased energy efficiency.
- Improved appliance functionality.
- Home management insights.

1.3 OBJECTIVES

- Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet.

- When it comes to our house, this concept can be aptly incorporated to make it smarter, safer.

- This IoT project focuses on building a smart wireless home.

2. LITERATURE REVIEW

The focus of this technology is to control the household equipment's like light, fan, door, AC etc. remotely.Home Automation systems are highly increasing to Comfort in life and also improving quality of life.We are creating this application instead of any remote for because every person have their personal android phone and they can easily control their home appliances and security system for their home, and sometimes remote device is misplaced or destroyed.. Another reason is that remote device is hard to carry when you are outside from home but your personal phone is always with you. So users can easily control home automation appliances and security-based system through one application through their android mobile phone. So technology is in your one hand in your one app.

3. SOFTWARE REQUIREMENTS ANALYSIS

3.1 SOFTWARE REQUIREMENTS ANALYSIS

- At the beginning of the application, the system authorization is required for the users.
- When the Apllication is opened, the user will face with the screen. Previously authenticated users will login the system with their exact Authentication code.
- Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet.
- When it comes to our house, this concept can be aptly incorporated to make it smarter, safer.
- This IoT project focuses on building a smart wireless home.

3.2. REQUIREMENTS

3.2.1 SOFTWARE REQUIREMENTS

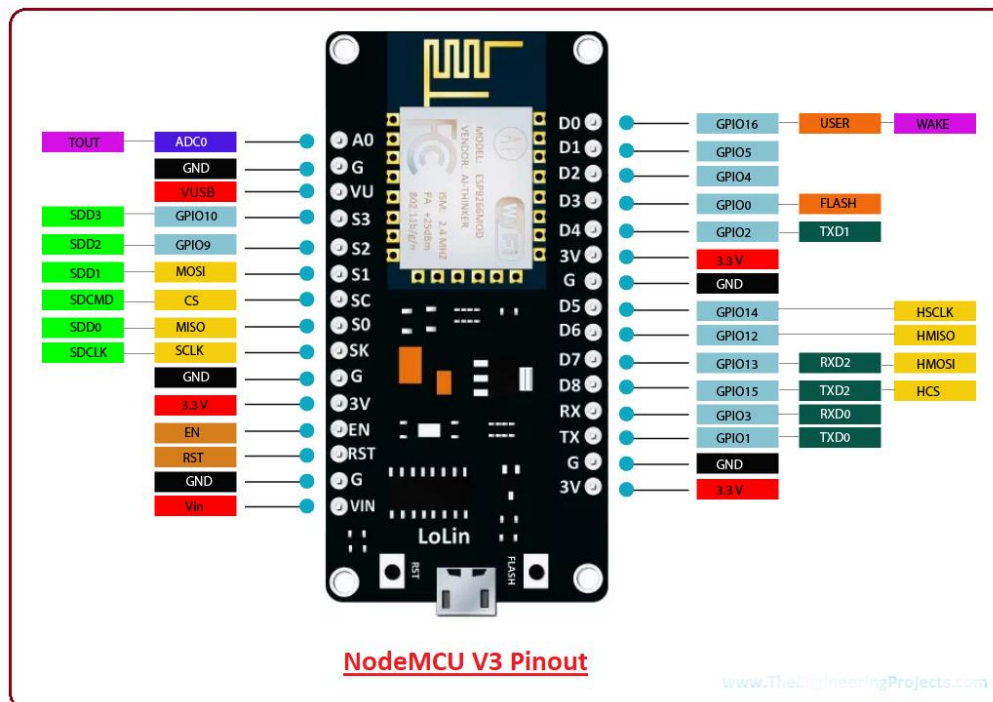- OPERATING SYSTEM (Windows, MacOs, Linux)

- ARDUINO

- ESP8266 IDE

3.2.2 HARDWARE REQUIREMENTS

- NODEMCU 12E

- 2-CHANNEL 5V RELAY MODULE

- IC 7805

- CONNECTOR

- HEAT SINK

- POWER SUPPLY

- PCB BOARD

- Ohm 330

- PN Junction Dioade IN4007

3.3 COMPONENTS REQUIRED

NODEMCU 12E

NodeMCU V3 Pinout

NodeMCU is an open source IoT platform.It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.The term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson.

CONNECTOR

A male connector is a connector attached to a wire, cable, or piece of hardware, having one or more exposed, unshielded electrical terminal s, and constructed in such a way that it can be inserted snugly into a receptacle (female connector) to ensure a reliable physical and electrical connection . This type of connector is also known as a plug. A male connector can be recognized by the fact that, when it is disconnected or removed, the unshielded electrical prongs are plainly visible.

POWER CONNECTOR
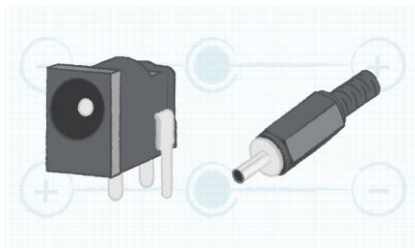
A 2 pole connector available in several sizes for DC power input applications. The plug consists of a 'barrel' with a hole in the middle, the 'pin' actually being on the socket part. The connectors push together. Chassis sockets normally include a switch which is operated when the plug is inserted, to disconnect batteries when a mains adapter is connected. They are only suitable for use at low voltages. The connectors are available in 1.3mm, 2.1mm and 2.5mm sizes, the measurement referring to the diameter of the pin on the socket.
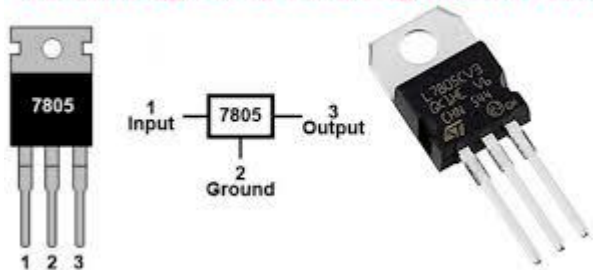
REGISTOR 330 OHM

Resistors are electronic components which have a specific, never-changing electrical resistance. The resistor's resistance **limits the flow of electrons** through a circuit.

IC 7805

IC 7805 is a 5V Voltage Regulator that **restricts the output voltage to** 5V output **for** various ranges of input voltage. It acts as an excellent component against input voltage fluctuations for circuits, and adds an additional safety to your circuitry. It is inexpensive, easily available and very much commonly used. With few capacitors and this IC you can build pretty solid and reliable voltage regulator in no time. A Circuit diagram with pinout is given. It also comes with provision to add heatsink.The maximum value for input to the voltage regulator is 35V. It can provide a constant steady voltage flow of 5V for higher voltage input till the threshold limit of 35V. If the input voltage is near to 7.2V to 12V then it does not produce any heat and hence no need of heatsink. Higher the input volts - the more it gets heated up, and excess electricity is liberated as heat from 7805.

HEAT SINK

A heat sink is a piece of metal engineered to dissipate the maximum thermal energy into the ambient surroundings. It assists a component to remain below its maximum operating junction temperature by drawing this energy away, thereby preventing damage through excessive temperatures. All electronic components dissipate heat, and usually their package (body) is sufficient to dissipate it into the surroundings, however voltage regulators such as a 7805.

BC547
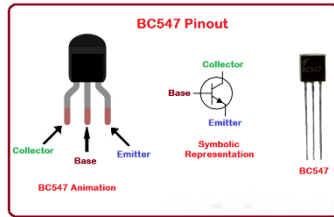
BC547 is an NPN Bipolar Junction Transistor. Mostly it is used for the switching purpose as well as for amplification purposes. Similar to the other transistors BC547 is also used for the amplification of current. The smaller amount of current at the base is used to control the larger amount of currents at collector and emitter as well. Its basic applications are switching and amplification. When the input voltage is applied at its terminal, some amount of current starts to flow from base to the emitter and controls the current at collector.

PN JUNCTION DIODE IN4007

It is a PN junction diode. Diodes can be made by combining two different types of semiconductor e.g. P and N. PN junction is a junction formed between P and N types of semiconductors. 1N4007 is a PN junction rectifier diode. These types of diodes allow only the flow of electrical current in one direction only. So, it can be used for the conversion of AC power to DC. 1N 4007 is electrically compatible with other rectifier diodes and can be used instead of any of the diode belonging to 1N400X series. 1N-4007 has different real life applications e.g. free wheeling diodes applications, general purpose rectification of power supplies, inverters, converters etc.

RELAY 5V

2-CHANNEL 5V RELAY MODULE IS A RELAY INTERFACE BOARD, IT CAN BE CONTROLLED DIRECTLY BY A WIDE RANGE OF MICROCONTROLLERS SUCH AS ARDUINO, AVR, PIC, ARM AND SO ON. IT USES A LOW LEVEL TRIGGERED CONTROL SIGNAL (3.3-5VDC) TO CONTROL THE RELAY. TRIGGERING THE RELAY OPERATES THE NORMALLY OPEN OR NORMALLY CLOSED CONTACTS. IT IS FREQUENTLY USED IN AN AUTOMATIC CONTROL CIRCUIT. TO PUT IT SIMPLY, IT IS AN AUTOMATIC SWITCH TO CONTROL A HIGH-CURRENT CIRCUIT WITH A LOW-CURRENT SIGNAL.5V RELAY SIGNAL INPUT VOLTAGE RANGE, 0-5V. VCC POWER TO THE SYSTEM. JD-VCC RELAY IN THE POWER SUPPLY. JD-VCC AND VCC CAN BE A SHORTED.

THE FEATURES OF 2-CHANNEL RELAY MODULE:

- GOOD FOR SAFE CONTROL OF HIGHER AMPERAGE CIRCUITS. IN POWER SYSTEMS, THE LOWER CURRENT CAN CONTROL THE HIGHER ONE.
- 2-CHANNEL HIGH VOLTAGE SYSTEM OUTPUT, MEETING THE NEEDS OF DUAL CHANNEL CONTROL.
- BRAND NEW AND HIGH QUALITY.
- STANDARD INTERFACE THAT CAN BE CONTROLLED DIRECTLY BY MICROCONTROLLER (ARDUINO , 8051, AVR, PIC, DSP, ARM)]
- WIDE RANGE OF CONTROLLABLE VOLTAGES.

4. MODELLING

4.1 ARCHITECTURE
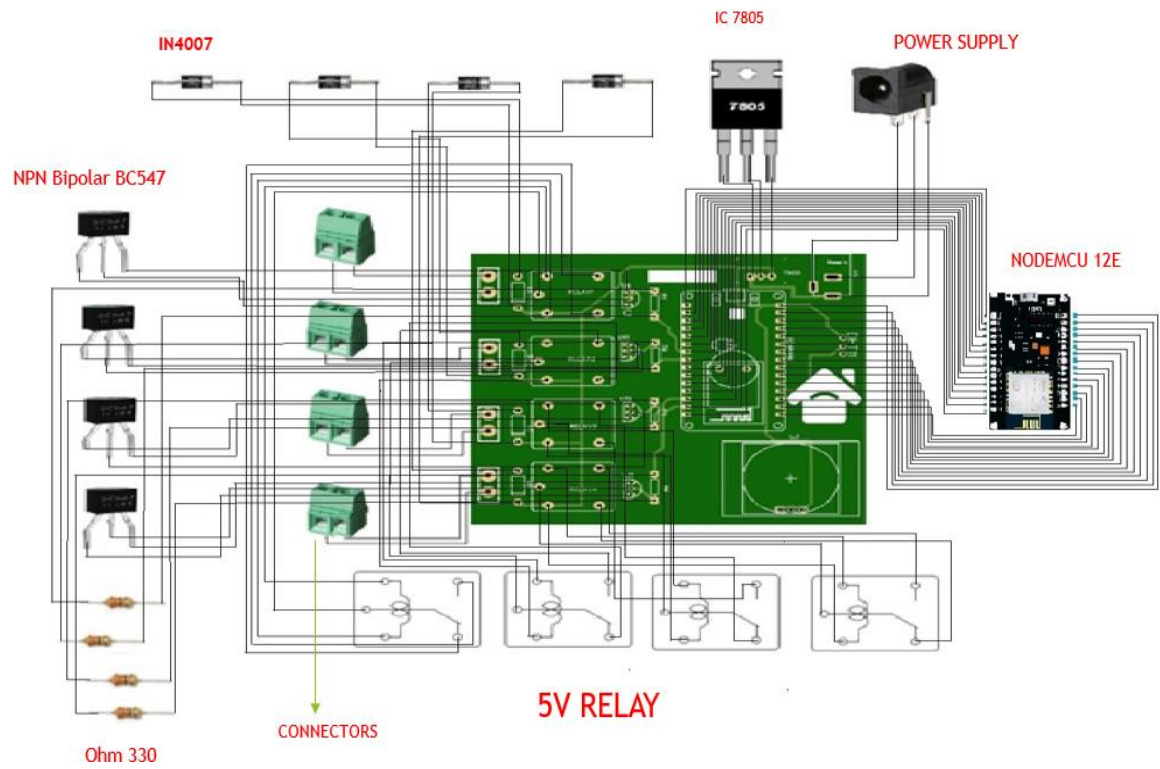
4.2.1 CLASS DIAGRAM

Identification of analysis classes: A class is a set of objects that share a common structure and common behavior (the same attributes, operations, relationships and semantics). A class is an abstraction of real-world items.

There are 4 approaches for identifying classes: Noun phrase approach:

a. Common class pattern approach.

b. Use case Driven Sequence or Collaboration approach.

c. Classes, Responsibilities and collaborators Approach.
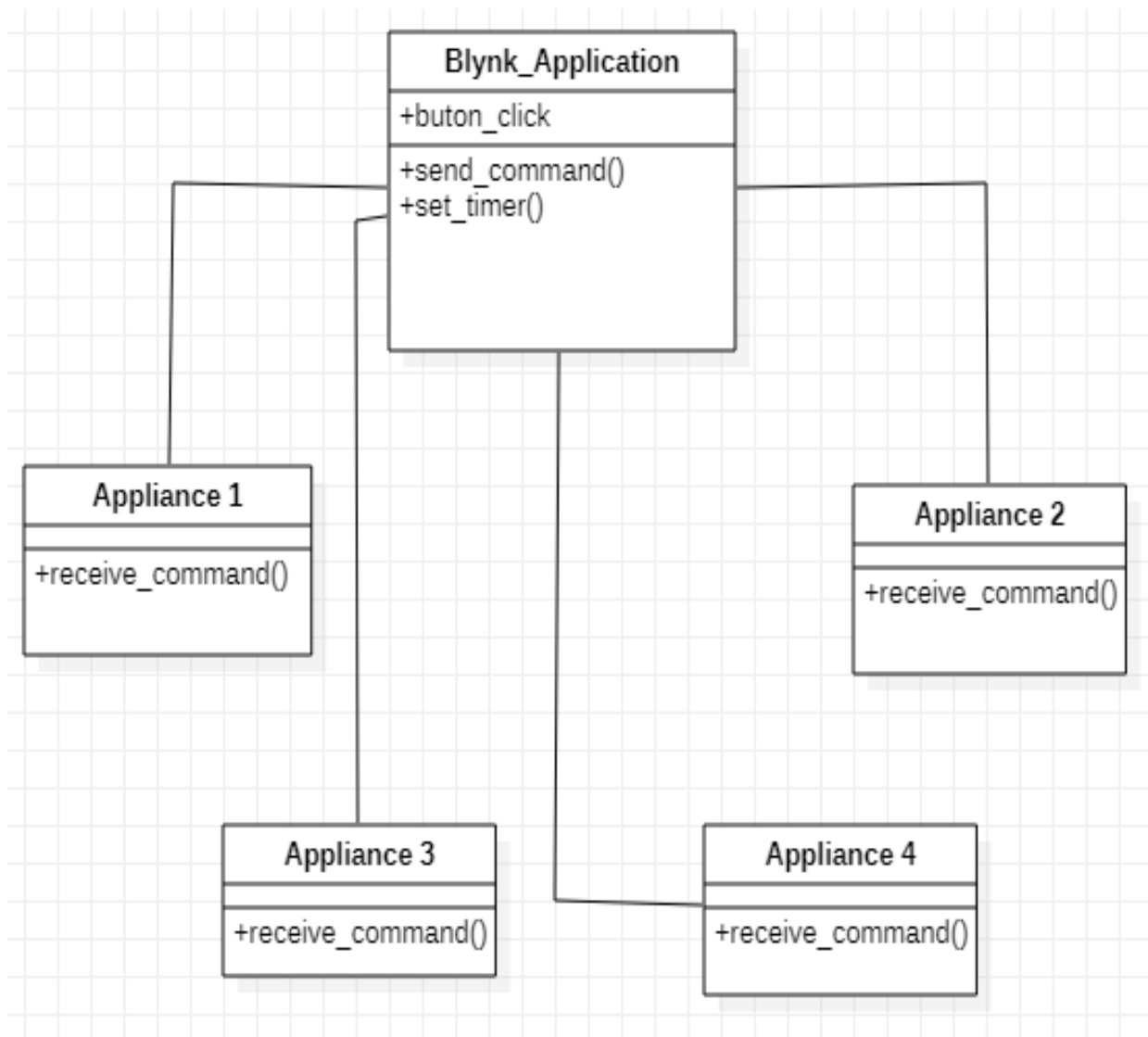
4.2.2 ACTIVITY DIAGRAM

Activity diagram is defined as a UML diagram that focuses on the execution and flow of the behavior of a system instead of implementation. It is also called object-oriented flowchart. Activity diagrams consist of activities that are made up of actions which apply to behavioral modeling technology.
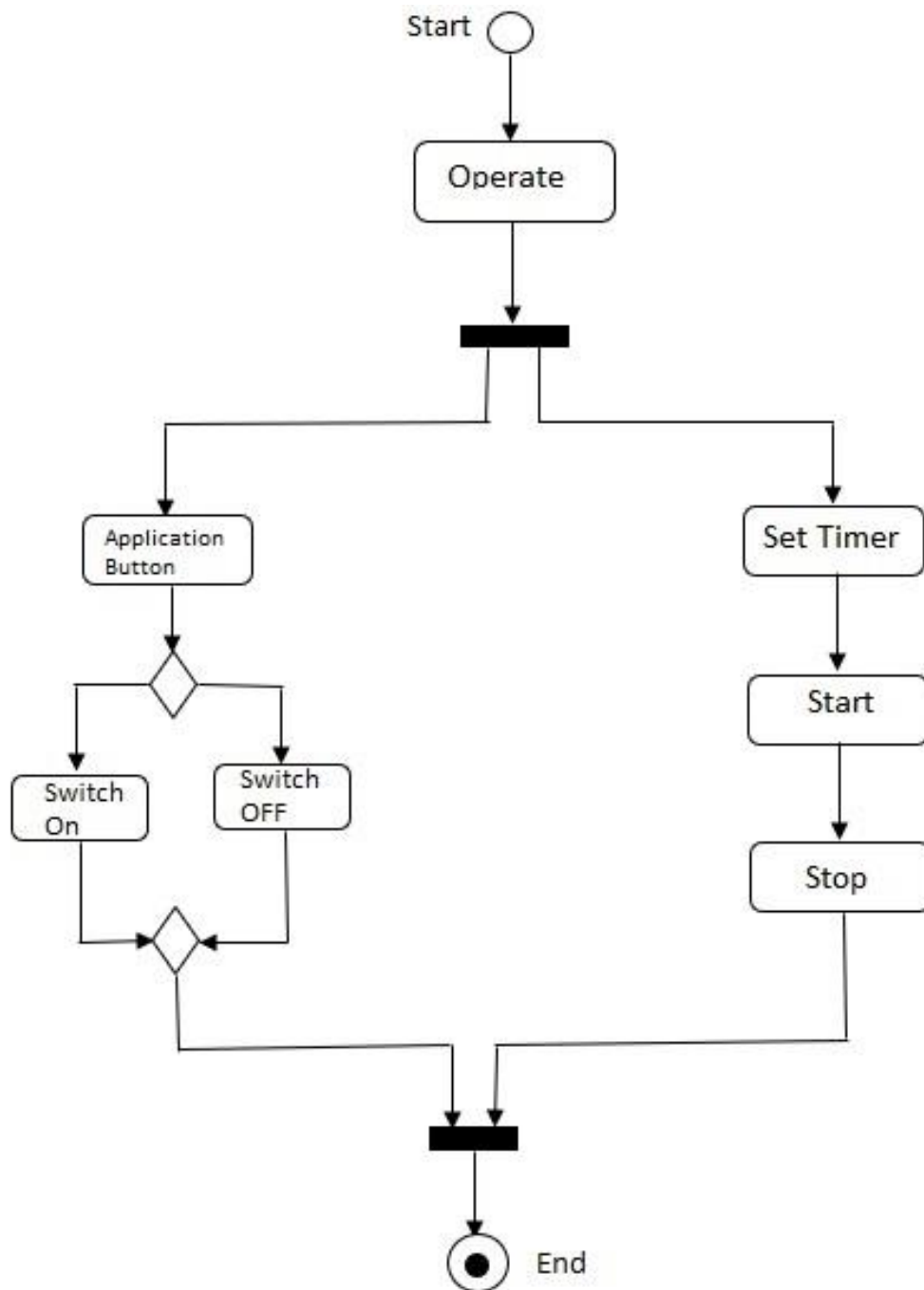
4.2.3 SEQUENCE DIAGRAM

A sequence diagram is a graphical view of a scenario that shows object interaction in a time-based sequence what happens first, what happens next. Sequence diagrams establish the roles of objects and help provide essential information to determine class responsibilities and interfaces. There are two main differences between sequence and collaboration diagrams: sequence diagrams show time-based object interaction while collaboration diagrams show how objects associate with each other. A sequence diagram has two dimensions: typically, vertical placement represents time and horizontal placement represents different objects.
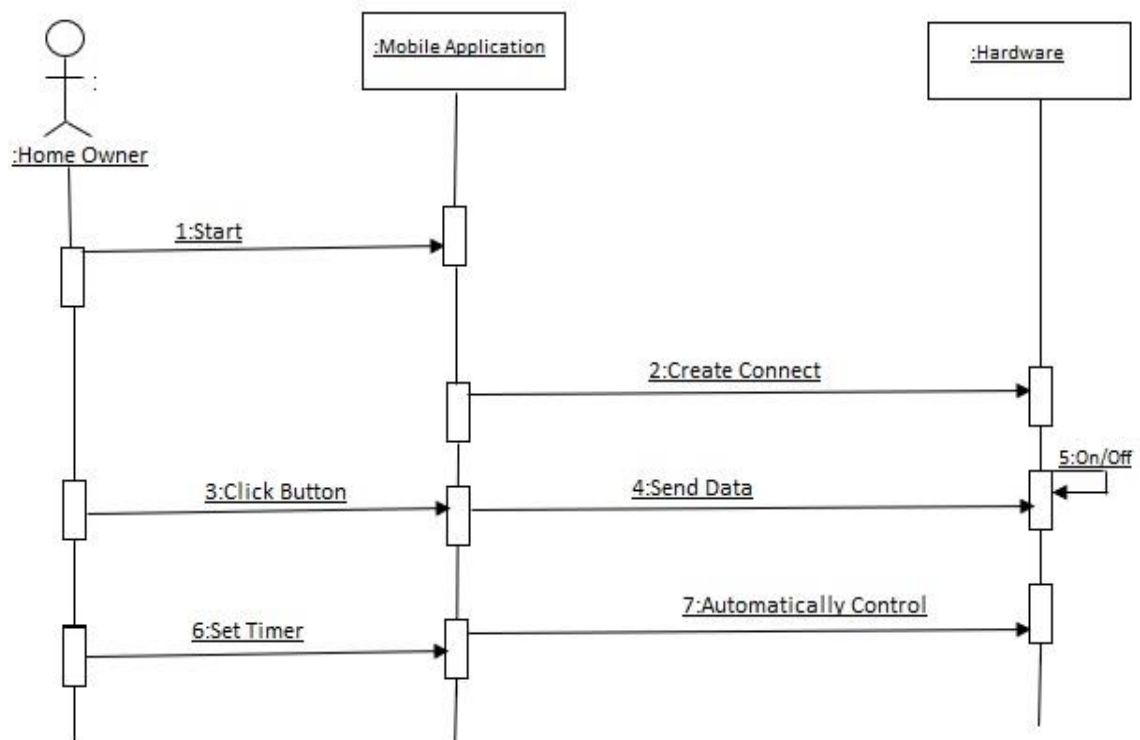
4.2.4 USECASE DIAGRAM

A use case diagram is a dynamic or behavior diagram in UML. Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform.
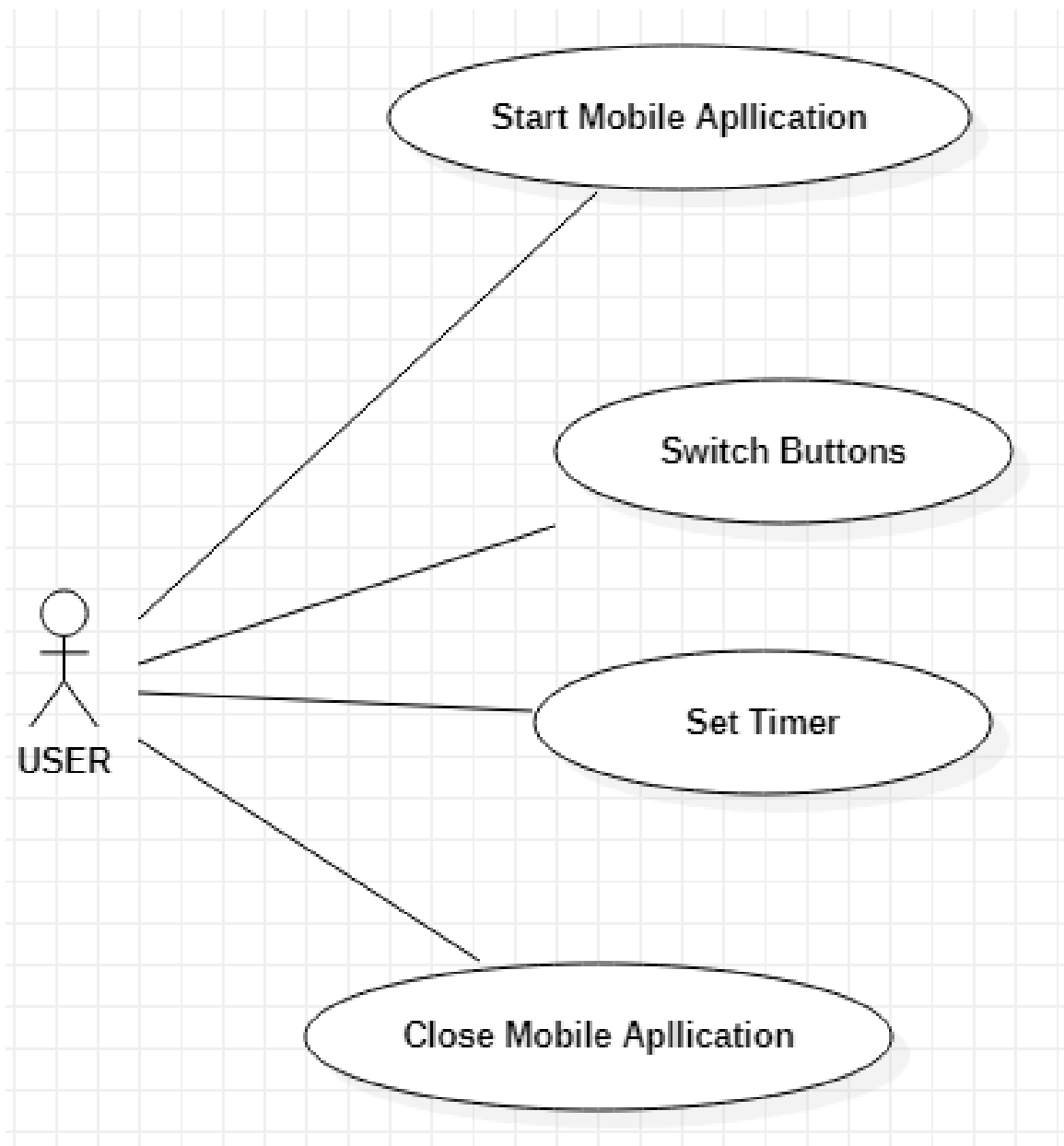
5. MODULES

5.1 USERS

In this module, Users simplley need to open the mobile application who have authentication to use the mobile application.

- User can Simply Access their Home Electronic Appliances like Switch On or Off by using the Mobile Application.
- They can also keep the Timer For their Electronic Appliances in which the Electronic Appliances will Automatically Turn it On or Off.

5.2 NODEMCU 12E

They provide wireless communications and Wi-Fi chips which are widely used in mobile devices and the Internet of Things applications.

Microcontroller	ESP8266
Frequency	80MHz
Flash	4MB
RAM	80KB
Vendor	NodeMCU

NodeMCU Dev Board is based on widely explored esp8266 System on Chip from Expressif. It combined features of WIFI accesspoint and station + microcontroller and uses simple LUA based programming language.

6. IMPLEMENTATION

6.1 SAMPLE CODE

```
#define BLYNK_PRINT Serial

#include <ESP8266WiFi.h>

#include <BlynkSimpleEsp8266_SSL.h>

char auth[] = "YourAuthToken";           // You should get Auth Token in the Blynk
App.

char ssid[] = "YourNetworkName";         // Your WiFi credentials.

char pass[] = "YourPassword";            // Set password to "" for open networks.

void setup()

{

      Serial.begin(9600);

      Blynk.begin(auth, ssid, pass)

      //Blynk.begin(auth, ssid, pass, "blynk-cloud.com", 80);
      //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);

}

void loop()

{

      Blynk.run();

}
```
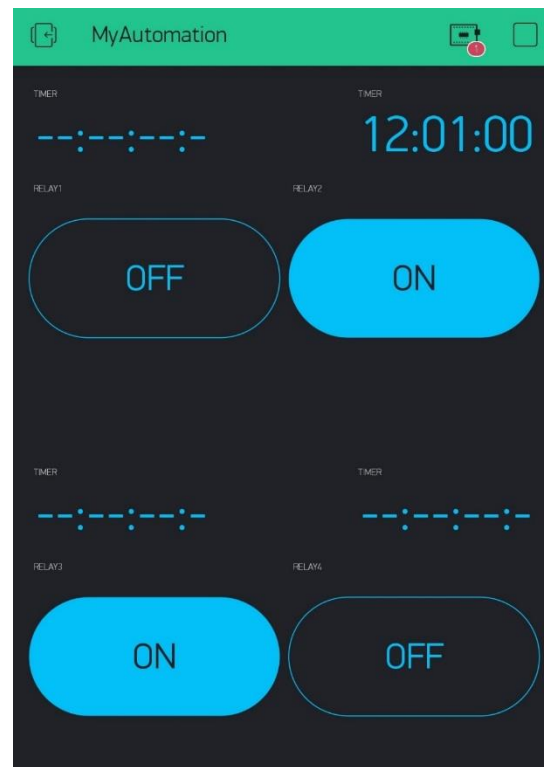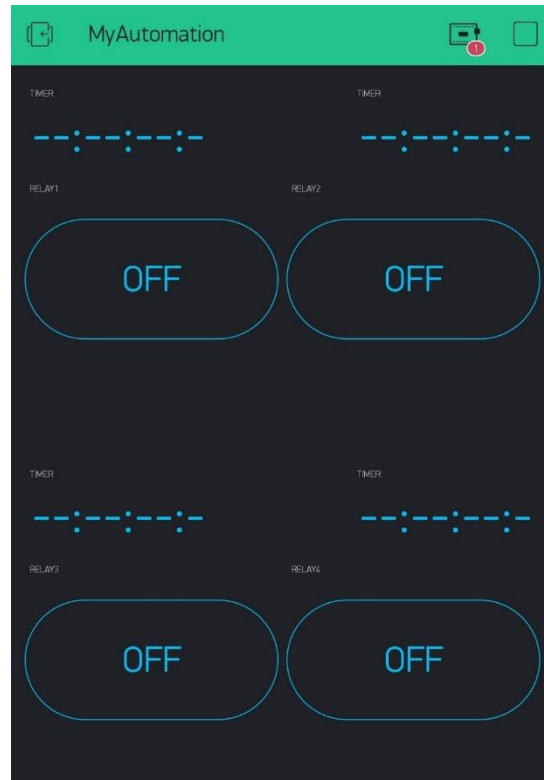
7. OUTPUT SCREENS

7.1 MOBILEAPPLICATIONSCREENS

7.2   APPLAINCES OUTPUT

7.3 PRODUCT FUNCTIONS

FOR HOME AUTOMATION:

- Home Appliances such as Lights and Fans on/off.

APPLICATION:

- Cell phone android application:

  Our application for home automation.

8. FUTURE WORK AND CONCLUSION

8.1 FUTURE WORK

Home of the future is a space for the digital natives. With the invention of lots of automation technologies featuring IOT and AI, home automation has become a reality. One can implement several of their tasks with just a single command of verbal instructions. These technologies can used to build fully functional home automation system and control smart home devices including smart lights, connected thermostats, and appliances.

In this project i.e Home Automation System Based on Internet of Things. I'll implement Voice Command System for this project in Future. There are a variety of enhancements that could be made to this system to achieve greater accuracy in sensing and detection. There are a lot of other sensors that can be used to increase the security and control of the home like pressure sensor that can be put outside the home to detect that someone will enter the home.

8.2 CONCLUSION

The main objective of the Project is to develop a home automation system using an NodeMcu 12E Board with WIFI module being remotely controlled by any operating system such as Android OS, etc . As Technology is advancing so the houses are also getting Smarter . Modern Houses are gradually shifting from conventional switches to centralized control System involving remote controlled Switches . The project has proposed the idea of smart homes that can support a lot of home automation systems. A smart home contains a connection between wireless communication

.

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BLYNK APPLICATION

https://blynk.io/