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Bluetooth control Home Automation system

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Abstract- The aim the topic is to design and construct a home automation system that Will remotely switch On or Off any household appliances connected to it, using a microcontroller, voice dial on phone, or Bluetooth based android application.

Keywords :- Remote control, Bluetooth module, Hardware, Adaptor, Relay module, Switch.

Objective:-

The objective of this project is to implement a low cost, reliable and scalable home automation system that can be used to remotely switch on or off any household appliance, using a microcontroller to achieve hardware simplicity, low-cost short messaging service for feedback voice dial from phone to toggle.

Introduction:-

Nowadays,wehaveremotecontrolsforourtelevisionsetsandotherselectronicSystems, which have made our livesrealeasy. Have you ever wondered about homeautomationwhich Would give the facility of controlling tube lights, fan and other electrical appliances at home using a remote control? Off-course, yes but, are the available options cost-effective? If the answer is no, we have found a solution to it. We have come up with a new system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control.

This project helps the user to control all the electronic devices using his/her smartphone. Time is very valuable thing. Everybody wants to save time as much as they can new technologies are being introduced to save our time.

To save people's time we are introducing Home Automation system using Bluetooth with your mobile phone. You can turn on/off your home appliances the range of Bluetooth.

Home Automation System Components:-

Certain mobile applications link directly to a router, which connects directly to an IoT device, although some home automation systems require hubs. Of course, it's better if there's no hub, as that's merely an additional fee on top of the IoT device's price.

Remote-control: Remote control, which can be done via a mobile application or a voice assistant, is the trademark of home automation.

Mobile Application:

Users can control their gadgets in real-time with the smartphone app, whether it's turning offtheoutdoorlightsoropeningthesmartgaragedoorforaneighbour.Usersmayalsousethe app to make schedules, create scenes, groupings of IoT devices, and change device settings, such as changing the colour of living room lighting. The bulk of the IoT devices include Android and iOS apps, making them compatible with the vast majority of smartphones and tablets.

Voice Assistants:

Think of voice assistants as the icing on top of the sundae of home home automation.Usersmay use voice to operate devices with voice assistants, whether it's disarming a security system as the yenterin the front door, viewing video door bell foot agronomic Show device or setting a timer on as mart speaker while their handsarefull of kitchentools.Alexa,GoogleAssistant, and Siri are the three voice assistants that most IoT devices interact with

Circuit Diagram:-

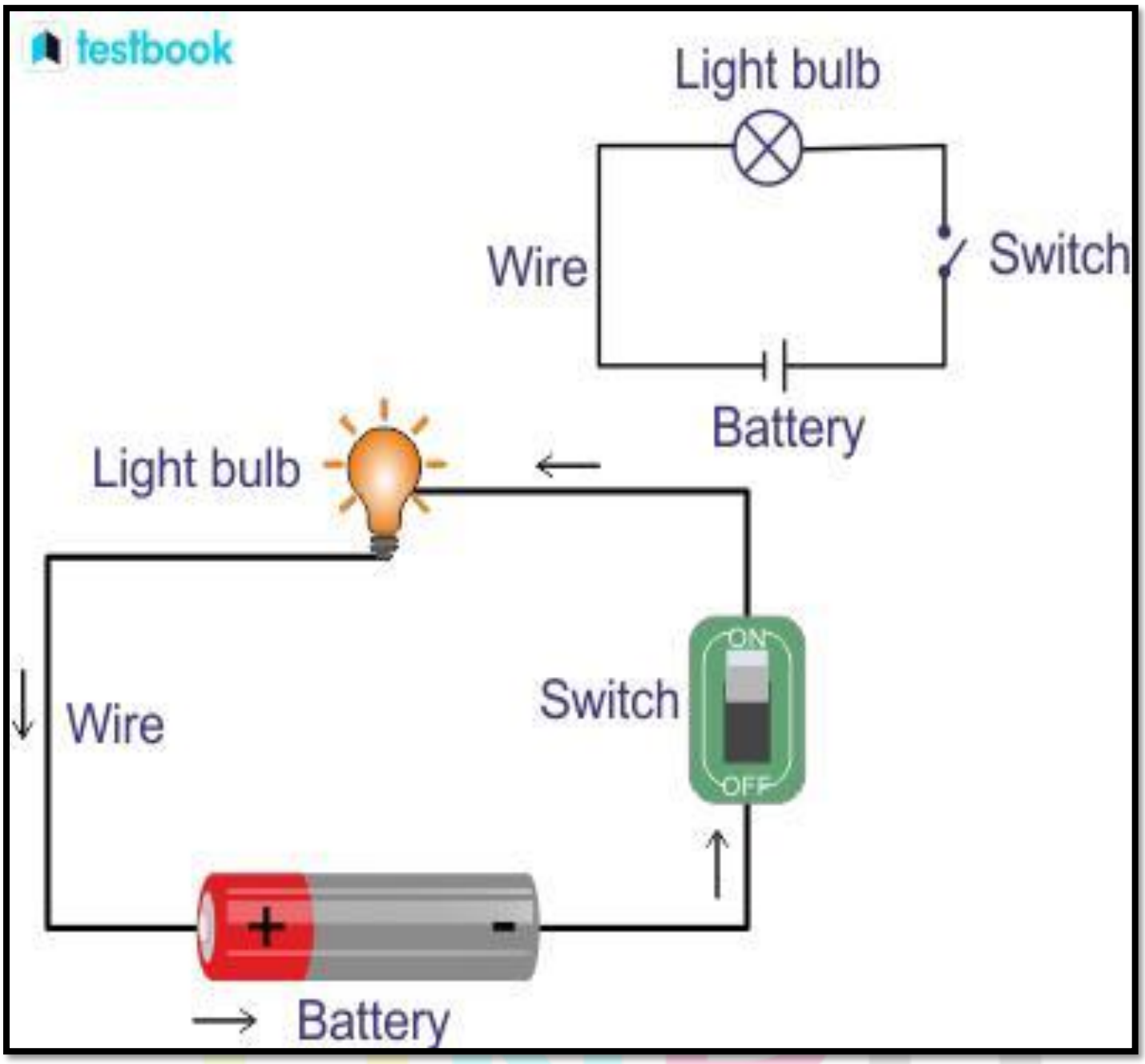

Fig:- Circuit Diagram

Working

In this project we have used 8051 microcontrollers for controlling the whole process of this project. And a Bluetooth module is used for controlling the home appliances wirelessly. Home appliances will turn ON and OFF when user will touch button in the Bluetooth mobile app in Android mobile phone. To run this project, first we need to download Bluetooth app form Google play store. We can use any Bluetooth app that can send data using Bluetooth. Here are some apps names that can be used:[1]

1. **Arduino Bluetooth control app:-**

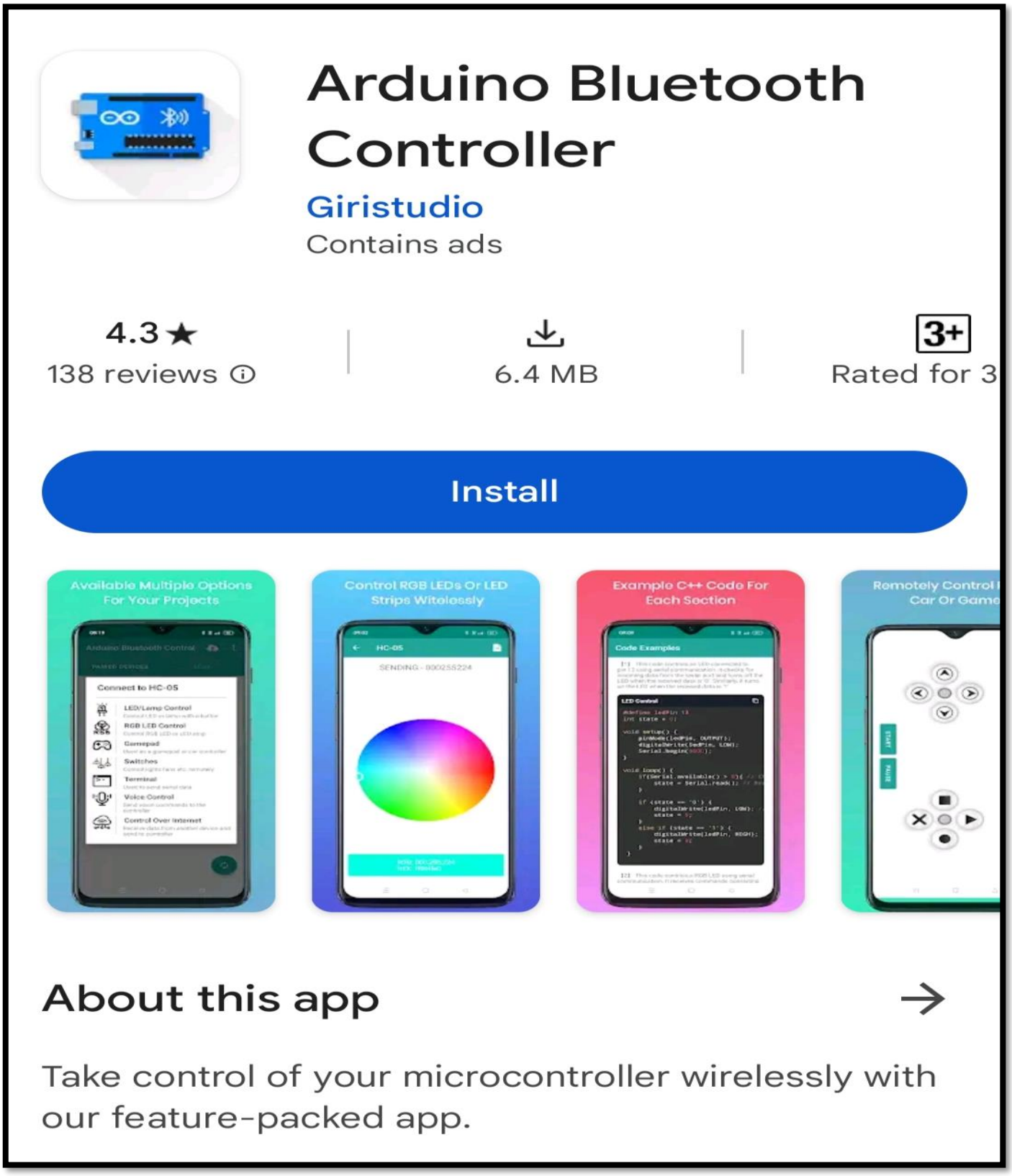

Fig:- Arduino Bluetooth control app:-

After installing the App, you need to open it and thensearchBluetoothdevice and select HC-05 Bluetooth device. And then configure keys.

Herein this project, we have used Arduino Bluetoothcontrolapp.

1.Download and install Arduino Bluetooth Controller.

2.Turned ON mobile Bluetooth.

3.Now open Bluetooth controller app

4.Press scan

5.Select desired Bluetooth device(BluetoothModuleHC-05).

6.Now set keys by pressing set button sunscreen

To set key sweneed to press‘ set button and dothesettings for each each load for its operation i.e. on and off.

Now, when we touch any button in Bluetooth controller app then Android phone sends a value to Bluetooth module, after receiving this value, Bluetooth module sends the received value to the microcontroller and then microcontroller reads it and compare it with predefined value. If any match is occurred then microcontroller performs relative operation. Same operation will perform each time when button pressed.

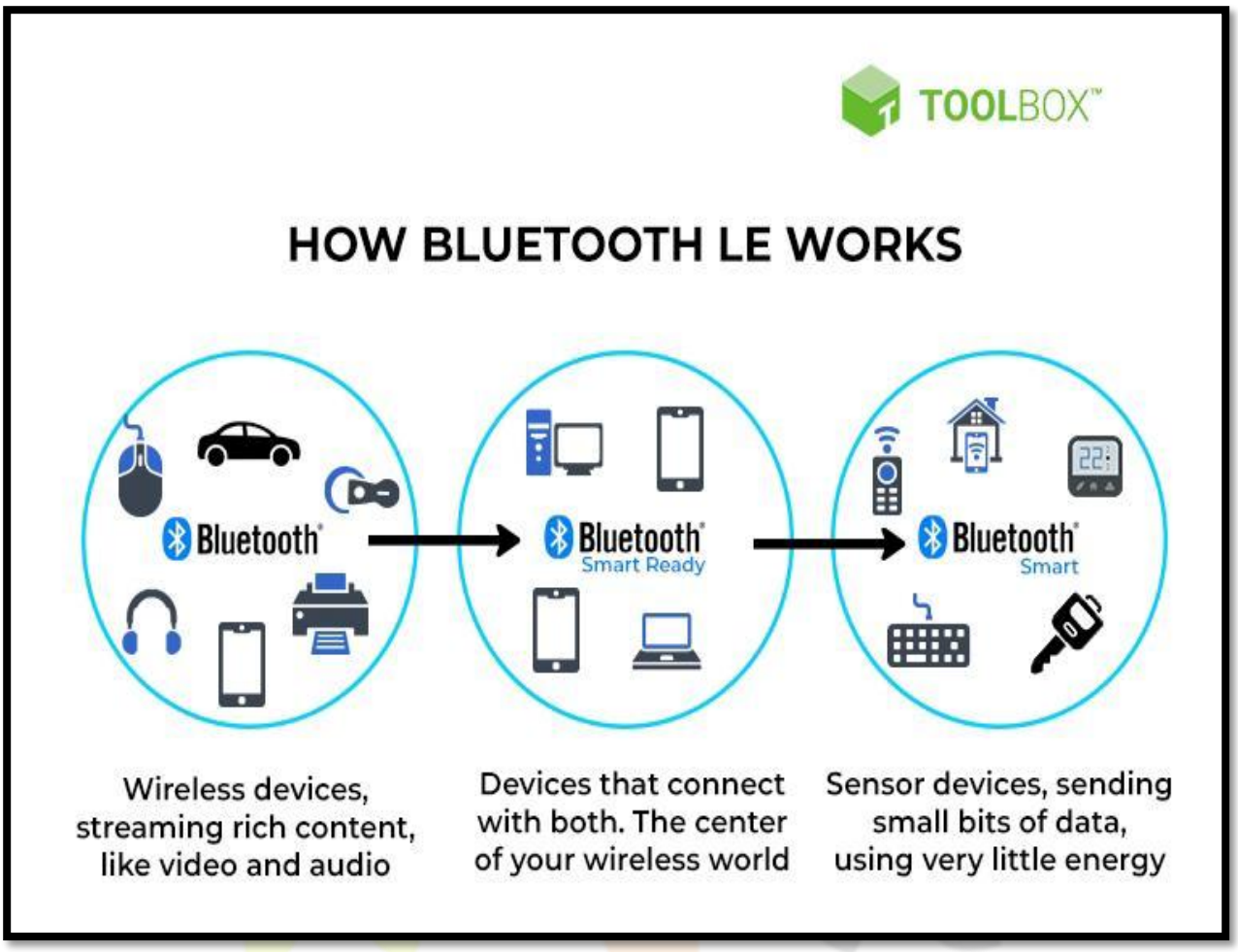

Fig:- Bluetooth Module

Now, when user touch 'light On' button in Arduino Bluetooth controller app then micro controller receives'1'viaBluetoothmoduleandthencontrollerSwitch'On'the light by using relay driver and relay. And when user touch 'light Off' button in Bluetooth controller app then microcontroller receives '2' via Bluetooth module and then controller Switch 'Off' the light by using relay driver and relay.

Hardware

1.Arduinouno

2.Adapter

3.HC 05BluetoothModule

4.Relay Module

1. The ArduinoUno isanopen-

sourcemicrocontrollerboardbasedontheMicrochipATmega328Pmicrocontroller(MCU)anddeve lopedby Arduino.ccand initially released in 2010. The microcontroller boardis equipped with sets of digital and analog input/output(I/O) pins that may be interfacedtovariousexpansionboards(shields)and other circuits. The board has 14 digital I/O pins (six capable of PW output), 6 analog I/O pins, and is programmable with the Arduino IDE(Integrated Development Environment), via a type BUSB cable. It can be powered by a USB cable or a barrel connector that accepts voltages between 7 and 20 volts, such as a rectangular 9-volt battery. It has the same microcontroller as the Arduino Nano board, and the same headers as the Leonardo board. The hardware reference designis distribute dundera Creative Commons Attribution Share-Alike license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. The word "Uno" means "one" inItalian and was chosen to mark a major redesign of the Arduino hardware and software. The Uno board was the success or of the Duemila nove release and was the 9th version inaseries of USB-based Arduino boards. Version1.0of the Arduino IDE for the Arduino Uno board has now evolved to newer releases. While the Uno communicates using the original STK500 protocol, it differs from all preceding boards in that it doe snot use a FTDIUSB-to-UART serial chip. Instead, it uses the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

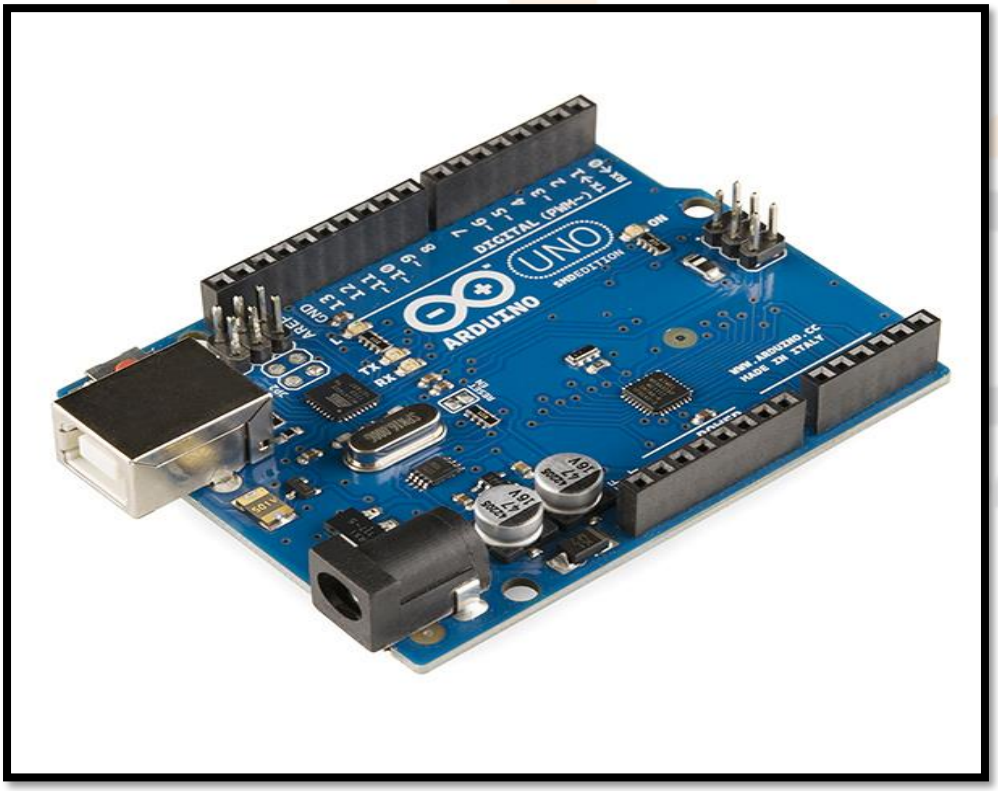

Fig:- ArduinoUno

2. Adapter

AC/DC Adapter–

The other type of external power supply, other than cells/batteries,that we willu sethe most for our circuits is the AC/.Itistypicalfunctionistoconnect to a socket of the general electrical network to transform the elevated alternating voltage offered by it (in Pakistan it is 220 V + 5% and 50Hz + 0.3%; if you want to know-nothing other countries, you can consultina continuous, constantan much lower voltage,to then offer this to the devices that are connected to it and thus put the minto operation instable and safe. AC/ DC adapters are basically made up of acircuit transformer, which converts the input AC voltage into another AC voltage much lower, and a rectifier circuit, which converts that already transformed AC voltage into a ADC voltage, which will be the final output voltage. Alladapters incorporate aprinted label that reports both the range of values in the AC voltage of the input with which they are able to work (in addition to the frequency of the AC signal allowed) as well as the value of the DC voltage and the maximum current offered as Exit. For example, the following image is for an AC/DC adapter that supports input AC voltages between100V and 240V at afrequencyof50or60Hzand provides an output DCvoltageof9V(and a maximum intensity of 1A).[2]

Fig:- Adapter

3.HC05Bluetooth Module

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

HC-05moduleInformation:-

1. HC-05 has red LED which indicates connection status, whether the Bluetooth is connectedornot.BeforeconnectingtoHC-05modulethisredLEDblinkscontinuously inaperiodicmanner.Whenitgetsconnectedtoanyother Bluetoothdevice,itsblinking slows down to two seconds.
2. This module works on 3.3V. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator.
3. AsHC05-Bluetoothmodulehas3.3VlevelforRX/TXandmicrocontrollercandetect
4. V level, so, no need to shift transmit levelofHC-05 module. But we need to shift the transmit voltage level from microcontroller to RX of HC-05 module.
5. The data transfer rate of HC-05 module can vary up to 1Mbps is in the range of 10 meters.[3]

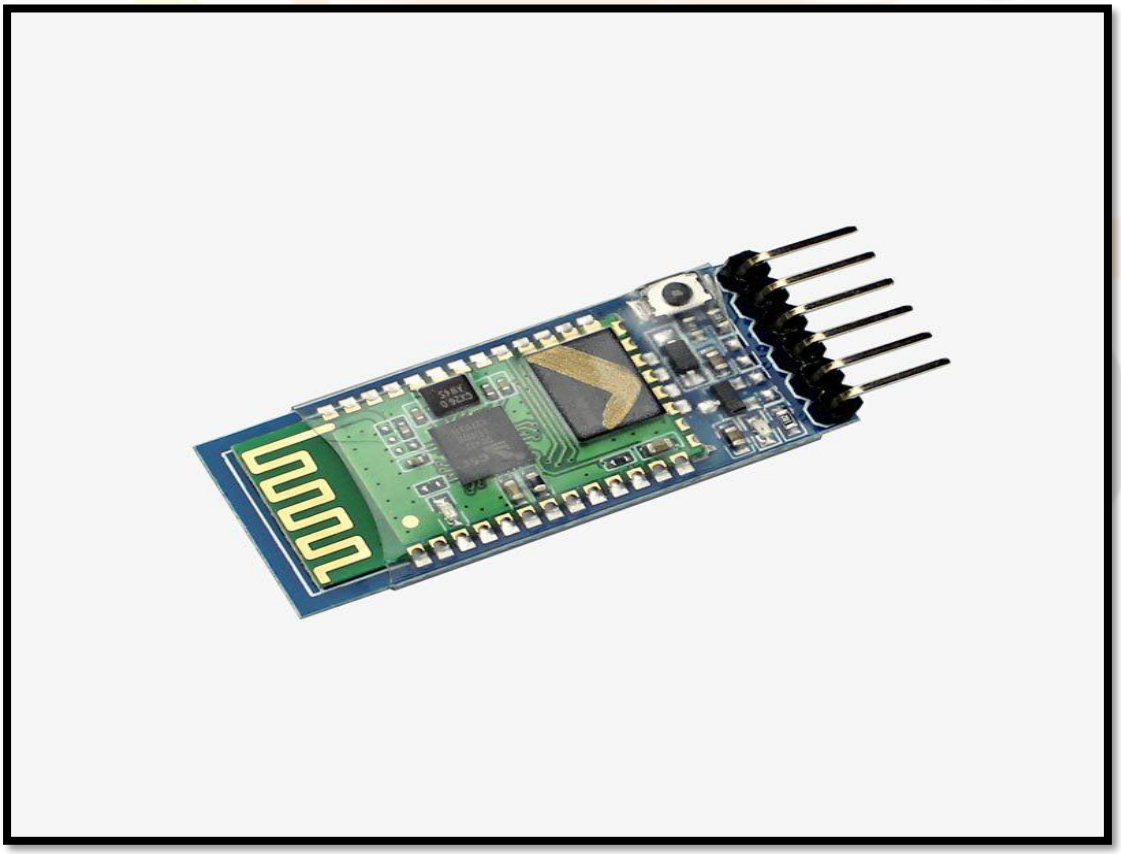

Fig:- HC05Bluetooth Module

Advantages and Application:-

 # Advantages:-

1. Managing all of your home devices fromone
2. Flexibility for new devices and Appliances
3. Maximizing Home Security
4. Increased Energy Efficiency
5. Improved Appliance Functionality
6. Home Management Insights

 # Applications:-

Using this project, we can turn on or off appliances remotely, using Phone ortablet.

1. The project can be further expanded to as mar home automation System by including some sensors like lights sensors, temperature sensor,Safety sensors etc. And automatically (room temperature), door etc, and Transmit the information to our phone.
2. Additionally, we can connect to internet and control the home from Remote location over internet and also monitor the safety.[4]

 # Conclusion And Applications

The home automation system was successfully operated from wireless mobile device after it was experimentally shown to work by attaching sample appliances to it.

We learnt numerous skills during this project, including soldering, wiring the circuit, and using othertools, and we were able to work together as team. The Bluetooth client has been successfully tested on a variety of mobile phones from various manufacturers, demonstrating its mobility and compatibility.

As a result, a low-cost home automation system was built, implemented, and tested successfully. We can turn-on or off appliances remotely with this project, utilising a phone or tablet.

Byaddingsomesensorssuchaslightsensors,temperaturesensors,andsafetysensors,the project can be expanded to a smart home automation system that can automatically adjust different parameters such as room lighting, air conditioning (room temperature), door locks, and transmit the information to our phone.

Furthermore, we may link to the internet and control the property from a remote location while simultaneous lymonitoring security. It is primarily designed for handicapped people and can be used in an emergency.[5]

 # References:-

[1].Md.AbdullahAlMamun,Md.AbdullahAlMamun,Md.AtiqurRahmanandMd.Ibrahim Abdullah,"SmartHomeAutomationSystemusingArduinoandAndroidApplication,"Journal of Computer Science Engineering and Software Testing, Vol 6, No. 2 (2020), pp. 08-12.

[2]. Md. WasifIslam, Bichat Roy, Nazia Homaira Preetyand Farhan BinMahtab, "Design Of Arduino Based Home Automation Systems Incorporating Identity Detection," BRAC University, Institutional Repository, 2017

[3]. M. Muthukumaran, M. Kannusamy, M. Kanagaraj and A. Guruveswaran, "Bluetooth based Home Automation using Arduino," International Journal of Engineering Research & Technology (IJERT), Vol. 7, No. 2 (2019), pp. 01-03.

[4].VaibhavMalav,RaushanKumarBhagat,RahulSainiandMamodiya,"Researchpaperon BluetoothbasedHomeAutomationusingArduino,"https://www.researchgate.net/profile/ VaibhavMalav/publication/332835074_Research_Paper_On_Home_Automation_Using_Ard uino/links/5ccc2576299bf14d9573a641/Research-Paper-OnHome-Automation-Using Arduino? Origin=publication _detail

[5].Anirban Bhowmik,Sandip Kumar Das, Souvik Acharyaand Tusharkanti Murmu, "Home Automation Using Arduino," https://rcciit.org/s tudents_projects/projects/ece /2018/GR30. Pdf, May 2018.