

THE MODERN ART OF ELECTRONICS



COMMUNICATION TECHNOLOGIES



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EDITORIAL TEAM

FACULTY EDITORS

MR. ARUN FRANCIS G, AP/ECE
MR. MUKUNTHARAJ C, AP/ECE
DR.SELVAKUMAR R, AP/ECE

STUDENT EDITORS

18L232	RANJITHKUMAR K
19L601	PRAVIN SUNDHAR K
19L219	KARTHIKEYAN S
19L241	SINDHUJA B
20L141	RAHUL SANJAY R
20L241	RAJAGURU S



About Karpagam College of Engineering

The Karpagam College of Engineering, established in the Year 2000, is an Autonomous institution, Approved by AICTE, NewDelhi and Affiliated to Anna University, Chennai. The college offers various Under Graduate and Post Graduate Engineering programmes. The College is accredited by NAAC with 'A' Grade, TCS and Wipro with 4500 students and 426 teaching and non-teaching staff members, Karpagam College of Engineering strives to impart quality education and an excellent career start to all its students.

The Placement and Training facilities add a feather to its cap ensuring the students get placed on campus. The 10 Centers of Excellence strive to impart practical and experimental exposure to the students and serve as a window to the corporate world.

The College is situated at Myleripalayam, 15kms from Coimbatore Central Railway station. The serene location surrounded by green fields and rich clusters of coconut groves creates a calm atmosphere conducive to learning and growth. Infrastructure with well-equipped laboratories and libraries, well maintained Play grounds, Hostels, Food Court, Gymnasium and an Indoor Stadium.

Vision

To become one of the best institutions at the National and International level by incorporating innovative teaching -learning methods to enable the students to secure a high-value career, motivate to pursue higher education and research to serve the society.

Mission

To bring out knowledgeable engineers and professionals in their field of specialization by having qualified and trained faculty members and staff besides necessary infrastructure and to create highly conducive teaching and learning environment .

To work in close association with stakeholders by way of enhanced industry – institute interaction, to take up need based research and industry specific programmes.

To organize co-curricular and extracurricular activities for character and personality development to produce highly competent and motivated engineers and professionals to serve and lead the society.

About Department of Electronics and Communication Engineering

The embryonic formation of the Department of Electronics and Communication Engineering was in the year 2000 with the introduction of an undergraduate course. The Department has been accredited by the National Board of Accreditation (NBA) and affiliated to Anna University, Chennai. The Department over the time has grown in several dimensions and provides a magnetic ambience in teaching and learning. Apart from four years B.E course, the Department also offers two full time M.E courses (VLSI Design and Communication Systems) and Anna University approved Ph.D Research Centre to expand the scope of research focus of the department

Students pursuing B.E in ECE have a full and flexible undergraduate curriculum. Numerous streams can be tailored to fit every individual's interests, skills and career goals. ECE has gained a reputation for producing top-notch engineers for industry and academia.

Postgraduate study in ECE prepares students for leadership roles in research, development and design positions that require skill and imaginative engineering solutions.

The major areas of faculty expertise of the department include Biomedical Signal Processing, Communication Systems, Computer networks, Control Systems, Digital Signal Processing, Image Processing, Instrumentation, RF and Microwaves, Microstrip Antennas, Optoelectronic and Optical Communication, VLSI Design, Wireless Communication, Embedded Systems and MEMS.

The Department has Centers of Excellence in the field of VLSI Design, Embedded Systems, Communication and Networks and Signal Processing. The Department has signed MoUs with leading industries and organizations for establishing collaborative research, conducting Workshops, Seminars and for organizing International Conferences. Professional associations such as ECE association and IEEE student chapter are developed for professional interaction.

Vision

To provide innovative teaching and learning methodologies for excelling in a high-value career, higher education and research to the students in the field of Electronics and Communication Engineering to meet the needs of the industry and to be a part of the advancing technological revolution.

Mission

To create engineers of high quality on par with international standards by providing excellent infrastructure and well qualified faculty.

To enhance the collaborative and multidisciplinary activities to develop human and intellectual qualities.

To provide technical expertise to carry out research and development.

Bluetooth Low Energy Technology

Internet of Things (IoT) systems involve small devices and sensors. Of the various protocols used by IoT for communication, Bluetooth is one of the most widely used protocol for short distance communications. It falls under the category of Wireless Personal Area Networks (WPAN).



There are two types of Bluetooth devices: one is referred to as Bluetooth Classic (BR/EDR), and the other is Bluetooth Low Energy (BLE). These two types of Bluetooth devices are incompatible with each other even though they share the same brand and even specification document. A Bluetooth Classic device cannot communicate (directly) with a BLE device. Devices like smartphones implement both types allowing them to communicate with both types of devices.



BLE is introduced in Bluetooth V4.0. BLE stands for Bluetooth Low Energy (Bluetooth LE, and marketed as Bluetooth Smart). In December 2016, the Bluetooth Special Interest Group (SIG), the governing body behind the Bluetooth standard, released Bluetooth version 5.0. Most of the enhancements and features introduced in this version focused on BLE, not Bluetooth Classic.

BLE's energy efficiency has made it a preferred option for IoT. BLE is more prominent in applications where power consumption is crucial (such as battery-powered devices) and where small amounts of data are transferred infrequently (such as in sensor applications). BLE can better support the connectivity of IoT devices for longer periods (especially when the devices are battery-powered). Also, BLE's low data rate makes it extremely suitable for utilization in cases where only state data must be exchanged such as sensors.

This BLE standard defines various profiles (specifications) on how a device can consume very low energy while serving a particular application. This standard provides reduced power consumption at a lower cost while maintaining a similar communication range. A manufacturer can implement customised specifications for their product. A device can have multiple BLE profiles. It is also the dominant low power technology in smartphones. Low energy focus comes with some sacrifices particularly around data transfer rates and the range of operation.

Key Features

- Ultra-low power consumption
- Low Cost
- Small Size
- Faster Connection
- Secure
- Frequency spectrum of 2.4-2.4385 GHz.
- Maximum data rate of 2Mbps
- Typical range of 10-30m



Applications

- Fitness trackers (such as Fitbit, Misfit, etc)
- Smartwatches (Apple / Moto 360 / Pebble)
- Home automation devices such as door locks, light bulbs, sensors, and others
- Medical devices like glucose meters, insulin pumps
- Beacons (Apple iBeacon, Google Eddystone)

Some of the most important technical facts about BLE include:

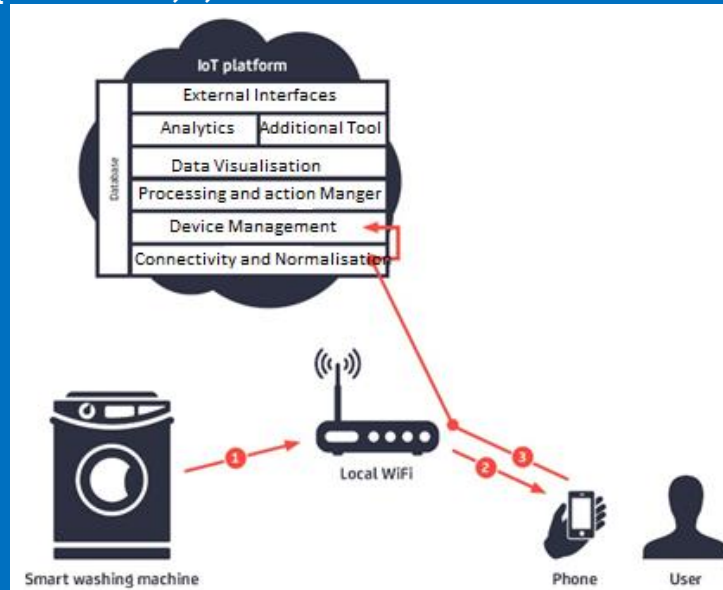
- The frequency spectrum occupied is 2.400 - 2.4835 GHz.
- The frequency spectrum is segmented into 40 numbers of “2 MHz”-wide channels.
- The maximum data rate supported by the radio (introduced in Bluetooth version 5) is 2Mbps.
- The range varies significantly depending on the environment surrounding the communicating BLE devices as well as the mode used. A typical range is 10-30 meters (30-100 feet).
- Power consumption also varies widely. It depends on the implementation of the application, the different BLE parameters, and the chipset used.
- Security is optional in BLE communication, and it is up to the device and applications developers to implement it. For all encryption operations, BLE uses AES CCM with a 128-bit key.
- BLE is designed for low-bandwidth data transfer applications. Implementing BLE for high-bandwidth applications will significantly compromise the low power consumption promise. So, minimizing radio usage as much as possible achieves the optimal power consumption.

Mr. Rajarathinam G
ASP/ECE



Quiz on IoT

1. Have a look at the picture given below and find what will come in the places of 1,2, and 3.



Solution: Choose the appropriate one from the given choices a, b and c.

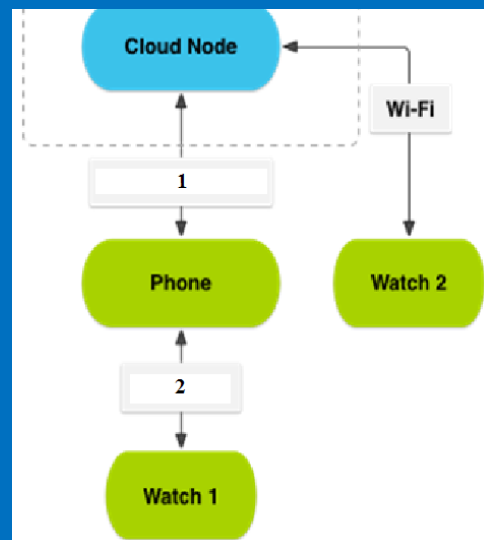
Your Answer

- a. Register the washing machine with mobile device through local WiFi
- b. Register washing machine with IoT Platform
- c. Connect washing machine to local WiFi

2. What kind of communication technology is used in 1 and 2?

Solution:
Choose the appropriate ones from the below choices.

- a. Bluetooth
- b. LTE
- c. LoRa
- d. SigFox



Mr. Rajarathinam G
ASP/ECE



Wearable Antennas – An Overview

In recent years, the demand for wearable electronics and related technology has skyrocketed. Miniaturization of wireless devices, the introduction of high-speed wireless networks, the availability of ultra-compact, low-power SoCs, and ever-evolving battery technologies are some of the significant advancements that have propelled this increase. Wearable electronics have a wide range of uses these days, and the majority of them make use of various antennas to sense, fetch, and share data wireless with a host device or an IoT gateway.



Wearable Antennas - Consumer Applications

Wearable antennas are made to work while you're wearing them. Wearable wireless communication and bio-medical RF systems frequently use these antennas. In the framework of Wireless Body Area Networks, wearable antennas are employed (WBAN). In a WBAN, the antenna is the most important component for wireless communication, which includes in-body, on-body, and off-body communication. A WBAN establishes a wireless communication channel by connecting sensors, actuators, and IoT nodes on the human body, on clothing, or beneath the skin. People of all ages, athletes, and patients can use wearable antennas to monitor vital signs, oxygen levels (Oximetry), and stress levels, among other things.



Wearable Antennas - Military Applications

Invasive/non-invasive devices in consumer, healthcare, and military applications have been substantially facilitated by the introduction of high-efficiency tiny antennas. Smart watches (integrated Bluetooth Antennas), smart glasses (integrated Wi-Fi, GPS, and IR Antennas), body worn action cameras (Wi-Fi and Bluetooth), and small sensor devices in sports shoes (Wi-Fi / Bluetooth) that can be paired with smartphones are just a few examples of consumer-bound wearable devices that use wearable antennas.



Wearable Antennas - Telemedicine Applications

A WBAN gadget allows an elderly person or a patient's health to be monitored continuously without interfering with his daily activities. Heart pacemakers, cochlear implants, and intraocular implants are just a few of the biological applications for implantable antenna sensors. Wearable antennas are used in the military for a variety of purposes, including troop live-location tracking, real-time picture and video transmission enabling quick decentralized communications, and so on. These antennas are also utilized in access/identity management, navigation, and RFID systems, among other uses.

Compact antennas are a component that can be incorporated into wearable devices. Antennas are chosen depending on the wearable device's bandwidth needs, efficiency, electrical performance, polarization effects, size, and application. Microstrip antennas, printed dipole, monopole, printed loops, slot antennas, and planar inverted-Fs (PIFAs) antennas are some of the most often utilized antenna technologies.

Machine Learning in Antenna Design

Machine learning is receiving a lot of attention as a result of the growing amount and variety of data available, as well as advanced processing and affordable data storage. Machine learning techniques are currently a big element of ongoing research, and they're projected to be a big part of today's innovation.

Artificial intelligence (AI) is the science of allowing robots to execute tasks that need human thinking abilities, such as learning, making decisions, and solving problems. To put it another way, AI is the application of human thinking abilities to robots. AI is becoming an increasingly important aspect of today's research, thanks to recent breakthroughs in big data availability, software engineering capability, and affordable high processing power. It is projected to have a huge impact on society, with the ability to build, transform, or optimize various areas and applications of our daily lives, thanks to major advancements in science and engineering.

A computer or machine must contain numerous capabilities in order to implement and develop artificial intelligence. Natural language processing, for example, is essential for effective conversation in English, while knowledge representation is required for data storage. Automated reasoning is required to answer questions and draw conclusions based on the information recorded, whereas machine learning is required to discern patterns in data, make predictions, and adapt to changing conditions. Computer vision and robotics are required for object perception and manipulation. Iterative processing allows AI software to learn autonomously from patterns or features by utilising sophisticated algorithms and vast data set iterative processing allows AI software to learn automatically from patterns or features.

Neural Networks, on the other hand, are a form of machine learning algorithm that attempts to mimic how the human brain functions. They are made up of multiple layers of interconnected nodes. The output of each node is a nonlinear function of its input. Deep Neural Networks (DNNs) are multi-layer neural networks that are commonly referred to as Deep Learning. Both of these methods are machine learning algorithms of some sort.

Machine learning can speed up the antenna design process while retaining high accuracy, reducing errors and saving time, as well as predicting antenna behavior, improving computational efficiency, and reducing the number of simulations required.

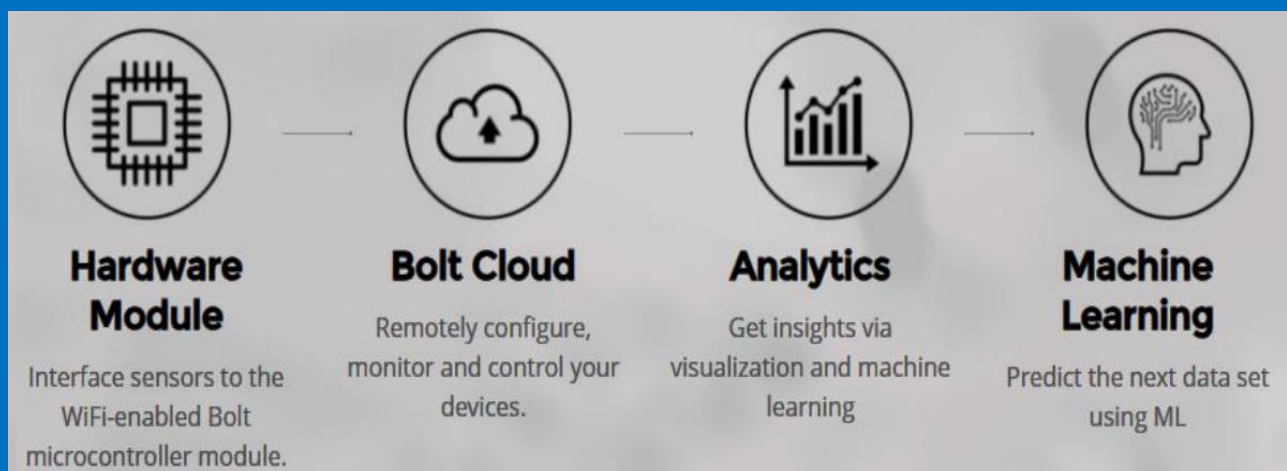
Mr. Arun Francis G
AP/ECE



The BOLT IoT

Bolt IoT is a platform which enables the control of IO devices & collects the data from it through internet. This Platform also ensures safe and secured connectivity between the device and the internet. Bolt is a fully integrated IoT platform for developers that helps them build IoT projects and products quickly and easily. It is a platform designed for Makers and Developers to build IoT Projects. Bolt is one of the best ways to get started with the IoT development and also to learn IoT technology.

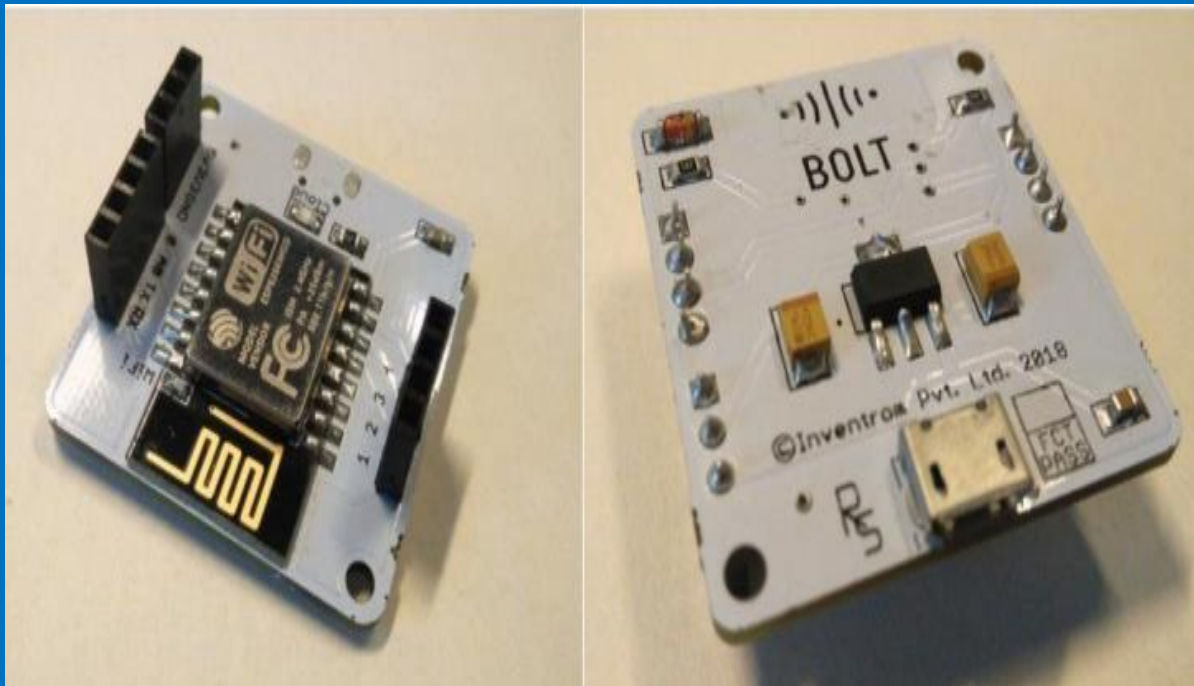
Bolt offers a Wi-Fi module and a cloud platform. The Bolt cloud directly and via APIs, lets enables the data storage, run analytics on it and visualize the data in the form of graphs. Also it can send alerts via SMS and E-Mail when the measured values cross thresholds. Also the Bolt cloud currently supports a powerful dashboard for device management as well as online configuration and a code editor. The below features enable quick prototyping of IoT use cases which allows users to connect simple hardware and graph their data almost instantly. Bolt also lets you quickly run Machine Learning Algorithms to predict your IoT Data as well as detect anomalies.



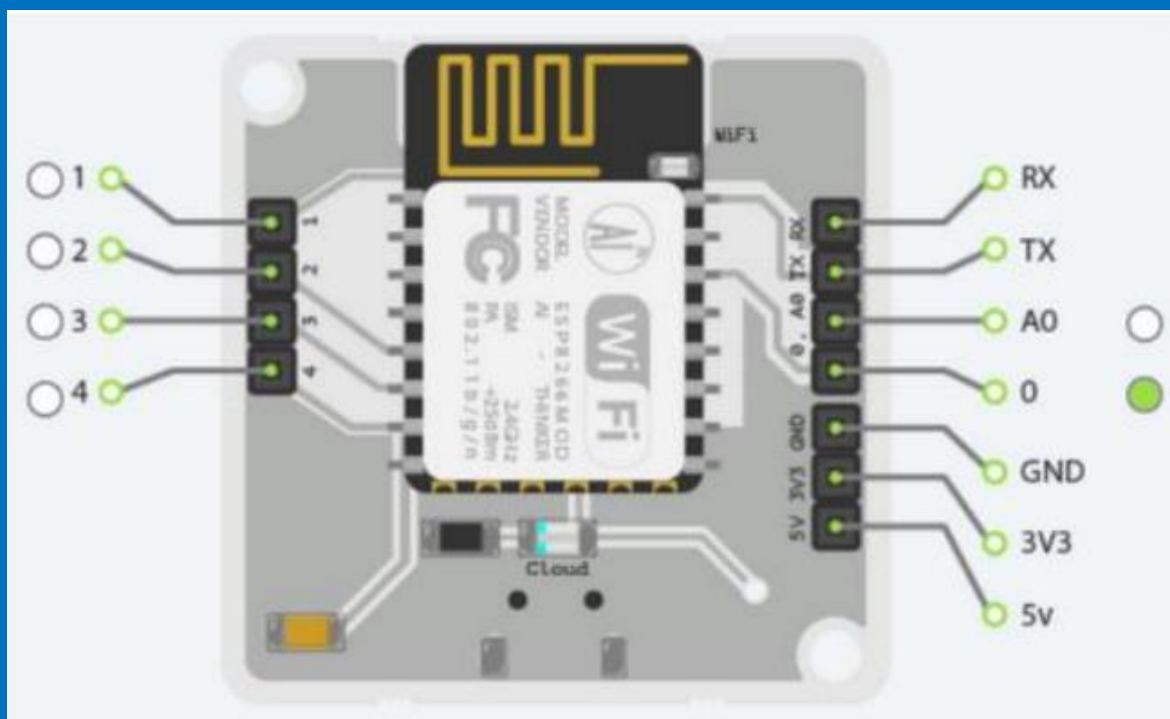
The Bolt IoT Platform consists of three major components:

- 1. Bolt WiFi module**
- 2. Bolt Cloud**
- 3. Bolt Mobile App**

1. Bolt WiFi Module. (Front and backside)



Bolt WiFi Module Pinouts



Pin	Type	Description
A0	Analog Input	<p>This pin comes with an ADC (Analog to Digital Converter).</p> <p>This is the only pin to which we can connect an Analog sensor.</p> <p>This is an input only pin i.e. it can only collect input. It does not give any output.</p>

Pin	Type	Description
0 , 1, 2, 3 & 4	Digital I/O (Input and Output)	Digital IO pins for interfacing IO devices
TX	UART Pin	UART data transmission pin
RX	UART Pin	UART data reception pin
3.3V	Power pin which gives a value of 3.3 volts.	Power supply pins
5V	Power pin which gives a value of 5 volts.	
GND	Ground pin	

Note: When designing any circuit, the correct pin must be used based on the requirement.

2. Bolt Cloud Platform

Bolt Cloud is the heart of the Bolt IoT Platform.

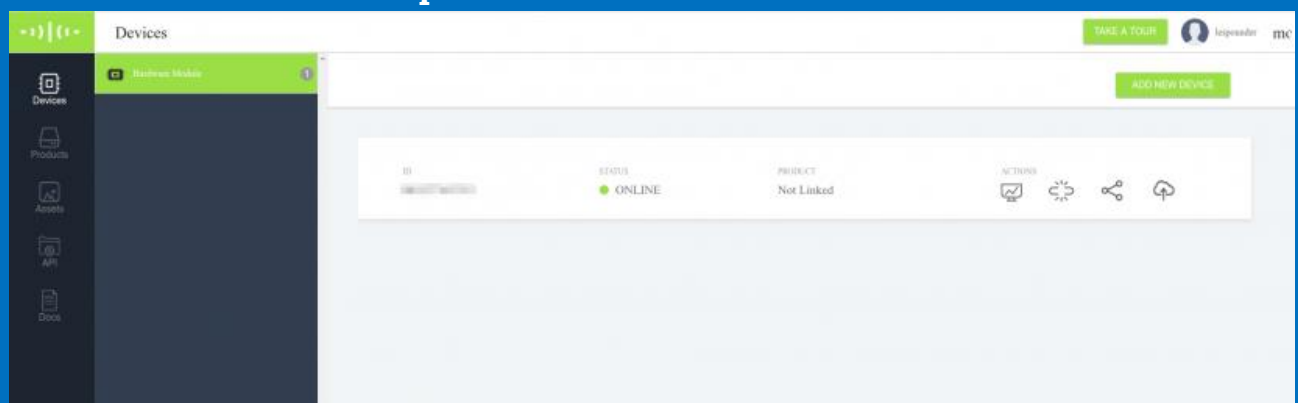
Creating an account on Bolt Cloud

Step 1: Visit cloud.bolttiot.com

Step 2: Click on Sign Up and Create Account

Understanding the sections on Bolt Cloud

The left-hand side pane of the Bolt Cloud has various tabs.



Here is a guide to them:

Tab Name	Function
Devices	Here you will get a list of all the hardware devices connected to your Bolt Cloud account. In most cases, these hardware devices will be the Bolt WiFi Modules and devices you have built using them.
Products	A product is where you write your software code and configure a product or a project. Once your software code is ready, you connect a device to the product. The device will then take all the properties of this product. All the devices with the same product connected to them will behave in the same way.
Alerts	Here you can set up alerts for any product. These alerts are sent when the sensor data crossed a threshold value set by you. As of now you have the option of Email and Push Notification. Few countries have an option of sending SMS as well. Alerts are to be linked to a device.
Assets	These are code files, data files (generally CSV) and images uploaded or created by you on Bolt Cloud.
API	The API contains the API key, the key that enables us to use the Bolt board to gather data or react to input remotely and this key works no matter what supported language we use with it.
Docs	The last section is Docs and there we can find the help that we may need.
Upgrade/Billing	This section allows you to upgrade to Bolt Cloud pro.

3. Bolt IoT Mobile App

Getting started: Installing the mobile app

Install the mobile app and use it to connect the WiFi module to the Internet

Step 1: Connect the Bolt WiFi module to the Internet.

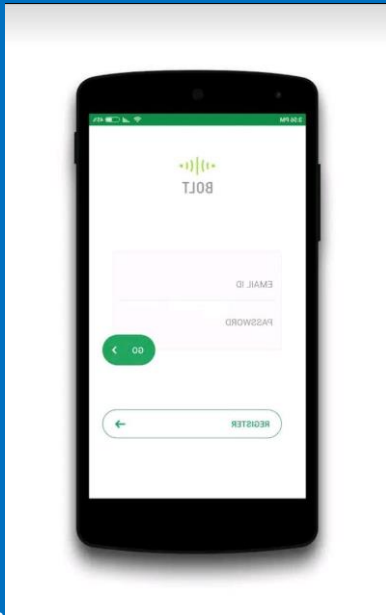
Step 2: Download the Bolt IoT Mobile app

Click on the links below and download the app.

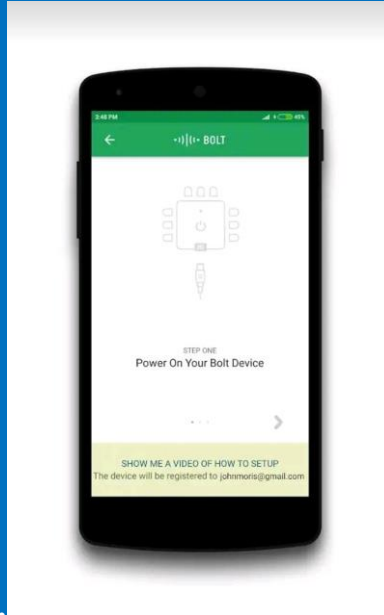
Click here for Android App or search for Bolt IoT on the Play store.

Click here for iOS App or search for Bolt IoT on the Apple store.

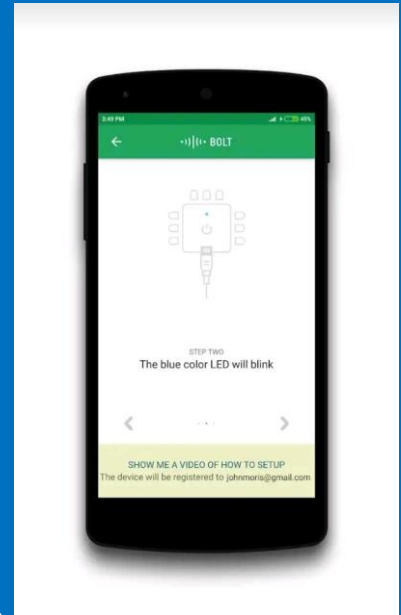
Follow the below steps for Configuring the Bolt IoT App to connect to Bolt WiFi module:



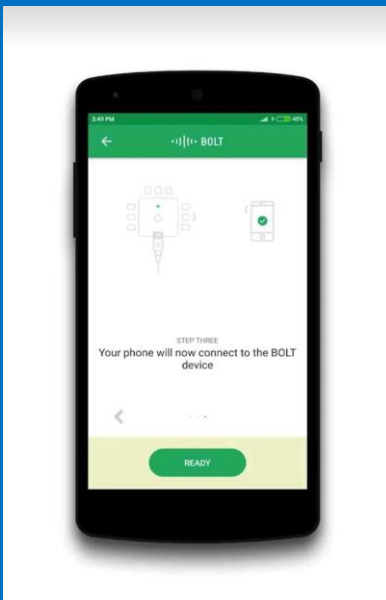
1.



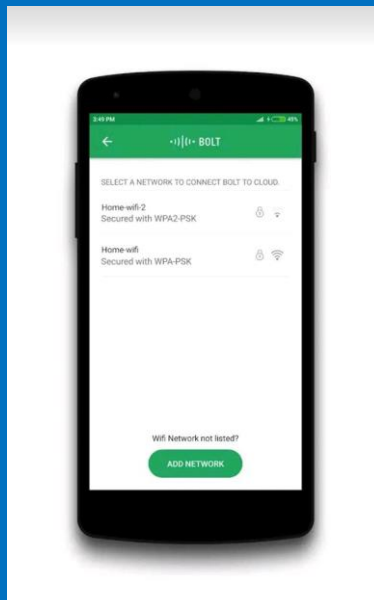
2.



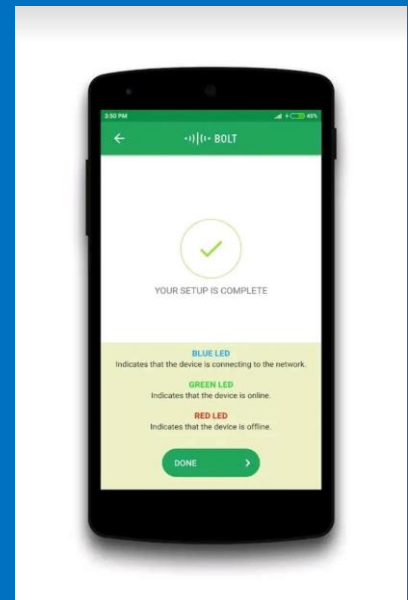
3.



4.



5.



6.

Features



WIFI MICROCONTROLLER MODULE

An easy interface to quickly connect your hardware to cloud over GPIO, UART, and ADC. Also, connects to MODBUS, I2C, and SPI with an additional converter.



ROBUST COMMUNICATION

Bolt is equipped with industry standard protocols to ensure a Secure and fast communication of your device data with the cloud.



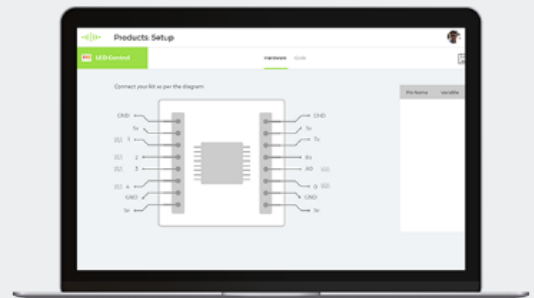
SECURITY

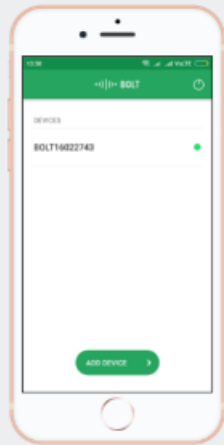
Bolt has built-in safeguards to secure all user data from unwanted third-party intrusions and hacks.



MACHINE LEARNING

Deploy machine learning algorithms with just a few clicks to detect anomalies as well as predict sensor values.





ALERTS

Utilize Bolt's quick alert system providing invaluable information sent directly to your phone or Email. You can config the contact details and set the threshold.



MOBILE APP READY

Customize and control your devices through Mobile apps. Bolt gives you full freedom to design your own mobile app centered around your requirements to monitor and control.



GLOBAL INFRASTRUCTURE AND EASY SCALABILITY

Bolt lets you scale from prototype to millions of devices in just a few weeks time.



OVER THE AIR UPDATES

Simultaneously program or update all your Bolt powered IoT devices wherever they are. Bolt offers you unparalleled scalability and elasticity to help your business grow.

Mr. Ram Prasath S

AP/ECE

Internet of Things (IoT) – Future Technology

Internet of Things (IoT) is a new standard that has changed the traditional way of living into a high tech life style. Smart city, smart homes, pollution control, energy saving, smart transportation, smart industries are such transformations due to IoT.

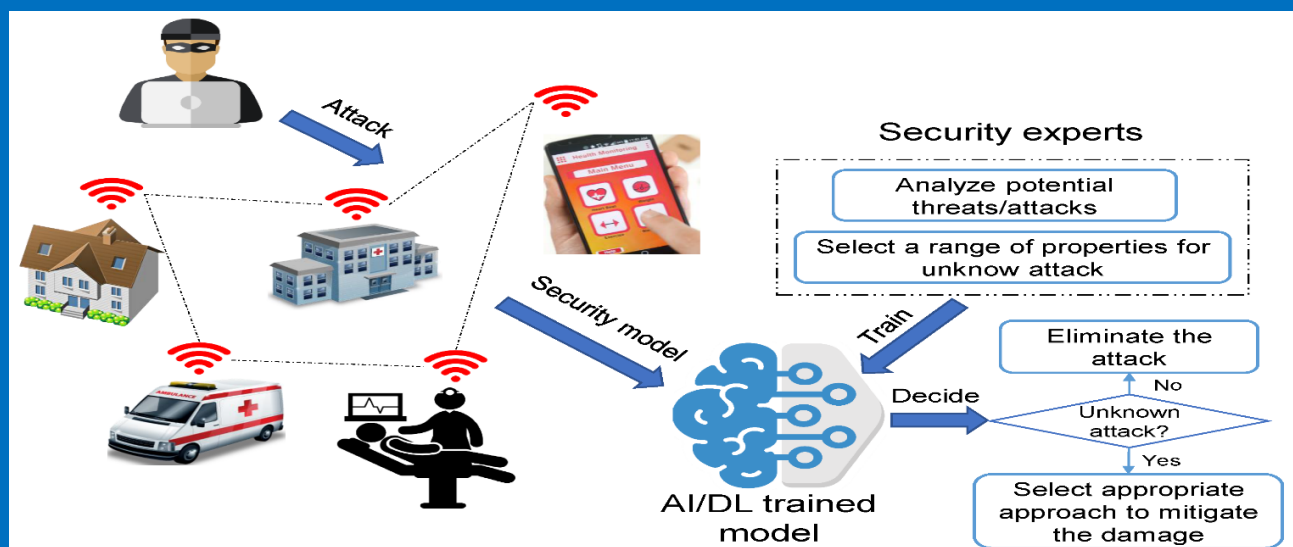
A great transformation can be observed in our daily routine life along with the increasing involvement of IoT devices and technology. IoT has also shown its importance and potential in the economic and industrial growth of a developing region. Also, in trade and stock exchange market, it is being considered as a revolutionary step.

Major IoT applications:

Emerging economy, environmental and health-care:

IoT is completely devoted to provide emerging public and financial benefits and development to the society and people. This includes a wide range of public facilities i.e. economic development, water quality maintenance, well-being, industrialization etc.

Overall, IoT is working hard to accomplish the social, health and economic goals of United Nations advancement step. Environmental sustainability is another important concern.



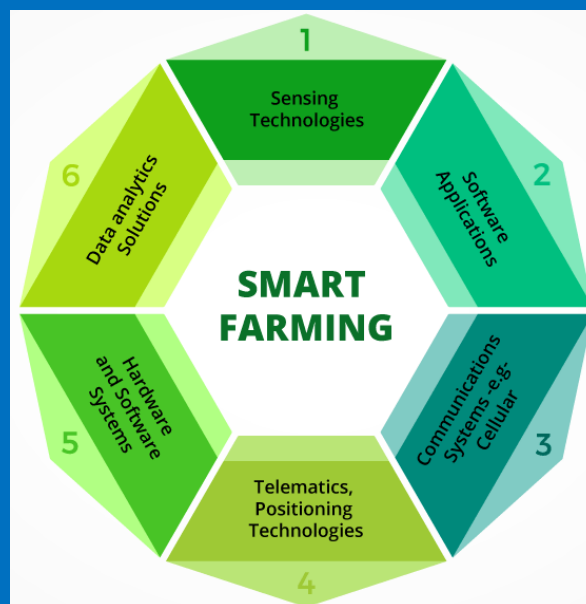
Smart city, transport and vehicles:

IoT is transforming the traditional civil structure of the society into high tech structure with the concept of smart city, smart home and smart vehicles and transport. Rapid improvements are being done with the help of supporting technologies such as machine learning, natural language processing to understand the need and use of technology at home. Various technologies such as cloud server technology, wireless sensor networks that must be used with IoT servers to provide an efficient smart city. Therefore, energy efficient technologies and Green technologies should also be considered for the design and planning of smart city infrastructure.



Agriculture and industry automation:

The world's growing population is estimated to reach approximate 10 billion by 2050. Agriculture plays an important role in our lives. In order to feed such a massive population, we need to advance the current agriculture approaches. Therefore, there is a need to combine agriculture with technology so that the production can be improved in an efficient way.



RTC BASED FARM AUTOMATION SYSTEM

Abstract:

The motivation for this project came from countries where economy is dependent on agriculture and climatic conditions that lead to lack of rain. The key objective of this project is to report on a developed indigenous low cost time based microcontroller based irrigation scheduler who performs user-defined functions and output commands to derive appropriate actuators (relay, solenoids valves, motor). In the present work microcontroller based controlled irrigation system is developed for the agriculture. Irrigation system controls valves by using automated solenoids valves to turn ON and OFF, the main gate valves for specified time. The system is based on microcontroller RTC DS1307, Solenoids valve.

Introduction:

In today's life, everyone gives importance to time. Time does not wait for anybody. Everything should be performed on time. In the world, the agriculture plays very important role in the economy and development of the country. We are experiencing a growing interest in the field of agriculture using the latest technologies. The continuous increase in population of India leads to a rapid improvement in food production technology. In a country like India, the economy is mainly based on agriculture. The main reason agriculture is impacted in India is due to lack of rain. Another important reason of this is due to unplanned use of water, due to which some amount of water goes waste. In the modern irrigation systems, the most significant advantage is that water supply near the root zone of the plants drip by drip due to which a large quantity of water is saved. At the present area, the farmers have been using irrigation technique in India through the manual control in which the farmers irrigates the land at regular intervals. This process sometimes consumes more water or sometimes the water reaches late due to which the crops get dried. Water deficiency can be detrimental to plants before visible wilting occurs. Slowed growth rate, lighter weight fruit follows slight water deficiency. This problem can be perfectly rectified if we use RTC Based Farm Automation System in which the irrigation will take place when there will be intense requirement of water. Irrigation system use valves to turn irrigation ON and OFF. This valve may be easily automated by using controllers and solenoids. Automatic farm or nursery irrigation allows farms to apply the right amount of water at right time, regardless of the availability of labour to turn valves ON and OFF. In addition, farmer using automation equipment are able to reduce run-off from over watering saturated soils, avoid irrigating at the wrong time of day, which will improve crop performance by ensuring adequate water and fertilizer when needed. RTC Based Farm Automation is a valuable tool for irrigation. Now-a-days, fertilization in farm is manual. Hence there is big question of accuracy; also there is necessity of man power and money. Hence here we should use automatic control system, which saves our man power and money and also highest accuracy.

Conclusion:

The RTC Based Farm Automation system proves to be a real time feedback control system which monitors and controls all the activities of

irrigation system efficiently. Microcontroller based Public Garden Automation system is simple and easy. In this system various applications like gate, water pump, light etc are turned ON and OFF for the predefined time. The present proposal is a model to modernize the agriculture industries at a mass scale with optimum expenditure. Using this system, one can save manpower, water to improve production and ultimately high profit.



20L135 – NIKITHA P

CRYPTOGRAPHY

Cryptography is essentially important because it allows you to securely protect data that you don't want anyone else to have access to it is used to protect corporate secrets secure classified information and protect personal information to guard against things like identity theft. Cryptography, a plaintext and this plane takes is actually given to encryption algorithm and the job of this encryption algorithm is to convert this plaintext to its ciphertext now this ciphertext can be transmitted on the Internet and this ciphertext will be received at the receiver side and the receiver will be giving this ciphertext to the decryption algorithm which is the opposite to the encryption algorithm now this decryption algorithm will bring back the original plaintext now in this entire process we can understand two important algorithms are involved one is the encryption algorithm and the other one is the decryption algorithm the role of this encryption algorithm is to convert the plaintext into ciphertext and the job of the decryption algorithm is to convert the ciphertext to its plain text now in this whole process if you observe this encryption algorithm is going to take two important inputs but here we have seen only one input what is that plaintext only what is the next important input the next important input is the key so as mentioned whether it is an encryption algorithm or a decryption algorithm it will be taking two things or two input if it is an encryption algorithm it is going to take plaintext as an input if it is a decryption algorithm it is going to take ciphertext as an input now the second important information that is going to be used by both the encryption and decryption algorithm is the key now this is the key which is the most critical information and which should be kept secret the encryption algorithm will be generally kept public public means even attackers may know what is the encryption algorithm that is used to generate this ciphertext but the real security should lie in the keys this key is the most vital and the most critical information that should be kept more secret than anything else suppose if an attacker is able to know what is the plaintext equivalent for this ciphertext this may be a kissing attempt also but if the attacker knows the key he can understand all the communication

between the sender and the receiver. The word cryptography comes from the Greek meaning hidden writing and some of the earliest forms of secret writing come from ancient Greece well haradas being the father of history as he is known described a way of hiding writing by putting a message on a wooden board and then covering it with a layer of wax during Greece's war with Persia in the 5th century BC this approach was used to send military correspondence this sort of concealment is known as steganography meaning covered writing it was common all over the ancient world from Greece to China but as you can probably guess this approach has some issues the main one being that if the message is discovered its contents will be easily revealed this dilemma gave rise to cryptography which doesn't hide the existence of a message but instead hides its meaning cryptography can be broken down into two subtypes transposition and substitution. Transposition is when a document is rearranged creating an anagram and it is the earlier form of cryptography an early historical example is once again from ancient Greece specifically the city-state of Sparta the Spartans used the device called the sky tail to hide their military communications he consisted of a strip of leather wrapped around a wooden rod the sender would write his message on the leather as it was twirled around the rod-like so when unfurled the message would seem like a jumble of letters but once the receiver wrapped the strip around an identical broad their own the message would become clear transposition has some major flaws though for one a short message has a limited number of scramblings, for instance, the word dog can only be rearranged five ways and larger messages while more difficult.

Surya. K
20L154

SMART UV ROBOTS FOR SANITIZING HOSPITALS

One of the key dimensions of quality of care is cleanliness of health facilities. Patients satisfaction relates to her/his perception of cleanliness in health care facilities such as hospitals, clinics etc., Maintaining cleanliness in a health care facility differs from the conventional cleaning. We can overcome this problem using Robotics .It's good to use modern technology to sanitize the health care facilities. Robots are defined to minimize the efforts of humans and also provide advantages such as increased speed and production, reduction of human error, avoiding accidents etc., The UV sanitization robot uses the power of UV rays to kill harmful microorganisms such as bacteria, fungi, virus... This robot can also give a live video stream of the surroundings. we can monitor the robot and its GUI (Graphical User Interface) allows us to control the robot inside the hospital room without physically being there.

The UV rays restrict the multiplication of toxic germs by destroying their reproductive system. We can make the robot using Raspberry pi and Motor Driver and the connections behind this. Firstly, we have to make the coding for the working of this smart robot. Secondly, Make the GUI by

creating buttons and set their functions. we have to create 5 buttons to operate the robot. Thirdly, we have to set the cam stream to clearly watch the live stream of what happening near its surroundings. we can use OpenCV for taking the video from picamera and can displaying it frame by frame on Raspberry pi desktop. Fourthly, Assemble all the components for making the construction of robot and fix the UV light on the top of the robot. Finally, Test the robot whether it was working well or not.

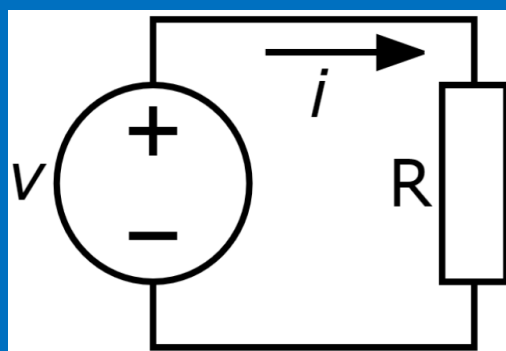


20L152 Sumithra R

Basics of Electrical Circuits

An electrical network is an interconnection of electrical components which consists of electrical elements. An electric circuit is a closed loop network which gives a path for transmitting the electric current. An electric circuit is made up of components connected together by wires. The two basic laws that describe the performance of the electric circuit are Ohm's law and Kirchhoff's rules.

Basic diagram of electric circuit:



Parts of the electric circuit:

Basically an electric circuit has four parts. They are

- Energy source (AC or DC supply)
- Electrical load (any device)
- Conductor (wires)
- Controller (switches)

Basic units of a electric circuit:

Ampere (A), Volt (V), Ohm (Ω) are the basic units of the electric circuit.

Types of Electric circuit:

There are 5 main types of electric circuits. They are:

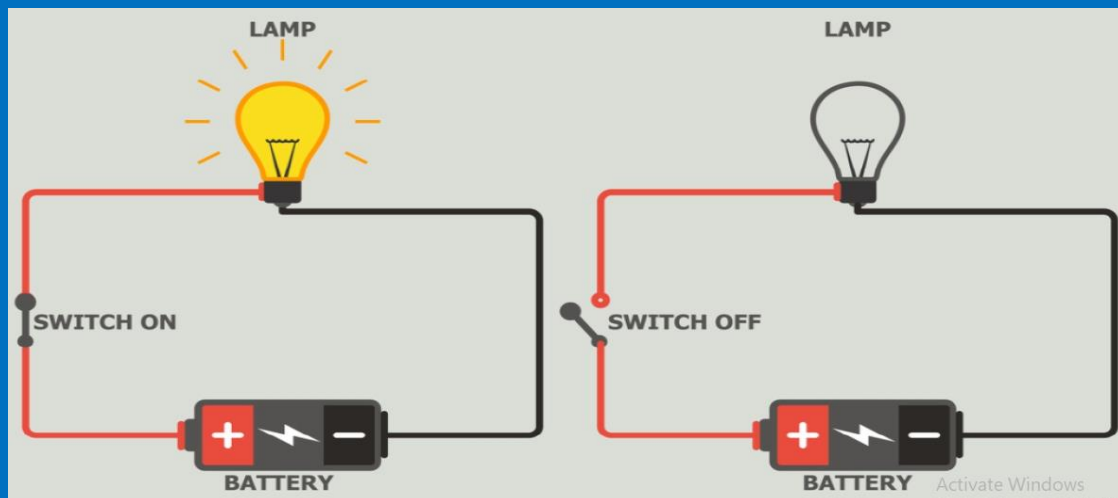
- Series circuit
- Parallel circuit
- Close circuit
- Open circuit
- Short circuit

Working of a electric circuit:

Electrons flow from the negative terminal to the positive terminal of the circuit. Current will flow through the circuit when it is complete or closed and it always flows from the positive terminal to the negative terminal. The current is carried to all parts of the electric circuit with the help of the wires.

Example:

An electric circuit consists of a battery, conducting wires, a switch and a light bulb in which the conducting wires connect the battery, the switch and the light bulb.



20L120 Jency Sharmila

Short Story

MILITARY

A military man was getting ready for combat. At that instant, he had a phone call from his wife. When he attended, she was elatedly expressing that they were blessed with an exquisite female child.

He was facing the perfect moment, where the words were not coming out but tears. He wiped out and said that he would be there within two days and returned to combat.

She was counting days and hoping for his arrival. After a day, a call from the military, informing,

"Your husband lost his soul to save this nation."

Her eyes misted over, and a drop fell on baby's eyes.

Directly, a man is sacrificing.

Indirectly, a woman is sacrificing.

IT'S ALL FOR THIS NATION...

JAI HIND...

19L244 – SOBIKA M

3rd ECE B

Drawings & Arts



Dr. Annalakshmi M

ASP/ECE

**20L314 – Gayathiri D
II ECE C**



Anusri
III ECE



Haritha
III ECE



Sriram
IV ECE





20L147 SHARMILA P



20L152 Sumithra R

கண்ணாடி
என் முகம் காட்டும் கண்ணாடியே உன்
முகம் காண ஆவல் கொண்டேன்...
ஏனென்றால் நான் உன்னிடம்
அழும்போது நீ ஒரு நாளும் அதை
பிறரிடம் கூறி சிரித்ததில்லை,
என் முகப்பருக்களை நீயே முதலில்
காட்டினாய் முளைக்காத மீசையையும்
உன்னைக் கண்டே முறுக்கினேன்
தன்மானம் காக்க வளைந்து போகாமல்
உடைந்து போகும் கண்ணாடியே
உன் முகம் காண ஆவல் கொண்டேன்

~ N.V.K. ❤️

நாள்காட்டியும் தவறி விடுகிறது
நான் உன்னை காணாத
நாட்களை கணக்கில் எடுக்க...

~ N.V.K. ❤️

Programme Educational Objectives (PEOs)

- PEO1:** Graduates will be able to comprehend Mathematics, Science, Engineering fundamentals, laboratory and work based experience to formulate and solve problems related to the domain and shall develop proficiency in computer based engineering and the use of computational tools.
- PEO2:** Graduates will be prepared to communicate and work team based on the multidisciplinary projects practicing the ethics of their profession with a great sense of social responsibility.
- PEO3:** Graduates will recognize the importance of lifelong learning to shine as experts either as entrepreneurs or as employees and thereby broadening their professional knowledge.

Programme Outcomes (POs)

GRADUATES WILL HAVE

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/ Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

GRADUATES WILL HAVE

- PSO1:** Good knowledge and hands-on competence to solve emerging real-world problems related to Electronic Devices and Circuits, Communication Systems, Digital Systems, and Electro-magnetics.
- PSO2:** Demonstrate proficiency in specialized software packages and computer programming useful for the analysis/design of electronic engineering systems and profession.