DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

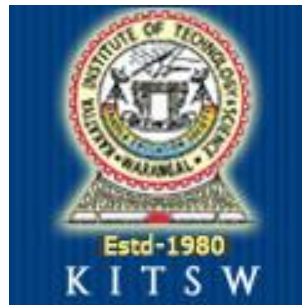# ELECTROMANIA

A TECHNICAL MAGAZINE

KAKATIYA INSTITUTE OF TECHNOLOGY AND SCIENCE

(An Autonomous Institute under Kakatiya University, Warangal)
Accredited by NAAC 'A' Grade with CGPA of 3.21
Warangal-506015, Telangana, India.

ELECTROMANIA

A Technical Magazine

VOL-VIII

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Vision of the Department

- Develop the department into a full-pledged center of learning in various fields of Electronic and Communication Engineering in pursuit of excellence in Education, Research, Entrepreneurship and Technological services to the society.

Mission of the Department

- Imparting quality education to develop innovative and entrepreneurial professionals fit for the globally competitive environment
- To nurture the students in the field of Electronics and Communication Engineering with an overall background suitable for attaining a successful career in higher education, research and Industry

Program Educational Objectives (PEOs)

The PEO's of the B.Tech (Electronics and Communication Engineering) program are focused on making our graduates technologically superior and ethically strong

PEO–I: Building on fundamental knowledge, graduate should continue develop technical skills within and across disciplines in Electronics and Communication Engineering for productive and successful career maintaining professional ethics

PEO–II: Graduates should develop and exercise their capabilities to demonstrate their creativity in engineering practice and team work with increasing responsibility and leadership

PEO–III: Graduates should refine their knowledge and skills to attain professional competence through lifelong learning such as higher education, advanced degrees and professional activities

Program Outcomes (POs)

Engineering program must demonstrate that their students attain the following outcomes:
1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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)
PSO1: Readiness for immediate professional practice.
PSO2: An ability to use fundamental knowledge to investigate new and emerging technologies leading innovations.

EDITORIAL BOARD

PRINCIPAL MESSAGE

I congratulate the Department of Electronics & Communication Engineering for bringing out ELECTROMANIA, a Technical Magazine of the department. It is a great initiative and I feel that such a technical magazine is very well required as it showcases the strength of the department faculty in research and inspires the student community towards research.

I hope this MAGAZINE will be well received by student community and faculty.

-Dr.K.Ashoka Reddy
Principal

EDITOR IN-CHARGE MESSAGE

With a constant endeavor to impart value based quality education, it is our pleasure to bring forth yet another issue of our technical magazine "Electromania", providing the readers with inspirational articles, mind-scintillating puzzles and updates of current trends. Every year, the calendar of events is prepared, which implicitly incorporates all the curricular and extra-curricular activities of the department. This magazine helps the students to meet the criteria of technical excellence and guide them on their way to success. We look forward to many more magazines that give technical information and interesting articles to enrich readers knowledge.

-Dr.G. Raghotham Reddy
Head, Dept. of ECE

FACULTY IN-CHARGE MESSAGE

It gives us great pleasure to release the department magazine of volume-VIII. This is all about the technology that inspires students to do something, that leaves an everlasting mark on the world of technology.

The work was performed in an organized, almost professional manner and credits to my entire student members, for commendable job. We would also like to thank every members of the student community, without whose contribution this volume would not have been possible. We hope you enjoy reading this magazine as much as we enjoyed working towards its creation.

-Sri S.Pradeep Kumar, Asst. Prof.
- Mr. Md Abdul Muqueem, Asst. Prof.

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WHAT TO LEARN

PSPICE

PSpice is a SPICE analog circuit and digital logic simulation program for Microsoft Windows. The name is an acronym for **Personal SPICE** - SPICE itself being an acronym for Simulation Program with Integrated Circuit Emphasis. PSPICE is a circuit analysis tool that allows the user to simulate a circuit and extract key voltages and currents.

Customers of all sizes and in various industries all over the world are using PSpice SPICE circuit simulator today to simulate the circuits to find and fix design issues before the designs go to the manufacturer. With this powerful circuit simulation and analysis environment, engineers can be confident that circuits function as intended and the tolerances specified are correct. This confidence leads to increased manufacturing yield, fewer prototypes, less time spent in the lab, and ultimately a reduced cost of the product, thereby increasing the potential pro fit.

Altera Quartus

The Altera Quartus II design software provides a complete, multiplatform design environment that easily adapts to your specific design needs. It is a comprehensive environment for system-on-a-programmable-chip (SOPC) design. The Quartus II software includes solutions for all phases of FPGA and CPLD design. we can use the Quartus II software graphical user interface (GUI) to perform all stages of the design flow.

LOGISIM

Logisim is an educational tool for designing and simulating digital logic circuits. With its simple toolbar interface and simulation of circuits as you build them, it is simple enough to facilitate learning the most basic concepts related to logic circuits. With the capacity to build larger circuits from smaller sub circuits, and to draw bundles of wires with a single mouse drag, Logisim can be used (and is used) to design simulate entire CPUs for educational purposes.

Logisim is used by students at colleges and universities around the world in many types of classes, ranging from a brief unit on logic in general-education computer science surveys, to computer organization courses, to full-semester courses on computer architecture.
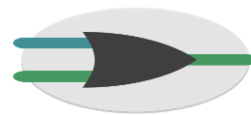
MICROWIND

It is truly integrated EDA software encompassing IC designs from concept to completion, enabling chip designers to design beyond their imagination. MICROWIND integrates traditionally separated front-end and back-end chip design into one flow, accelerating the design cycle and reduces design complexities.

It tightly integrates mixed-signal implementation with digital implementation, circuit simulation, transistor-level extraction and

verification – providing an innovative education initiative to help individuals to develop the skills needed for design positions in virtually every domain of IC industry.

$$\mu\omega i\nu\delta$$

REMCOM

Remcom provides electromagnetic simulation and site-specific radio propagation software for analyzing complex EM problems and antenna propagation. We empower design engineers with unique solutions for navigating today's rapidly changing technologies.

Remcom's products simplify EM analysis for a wide variety of applications including antenna design and placement, 5G MIMO, biomedical applications, SAR validation, microwave devices and waveguides, radar/scattering, wireless propagation, military defense, automotive radar, and more.

WHAT'S TRENDING NOW

INTEL OPTANE MEMORY
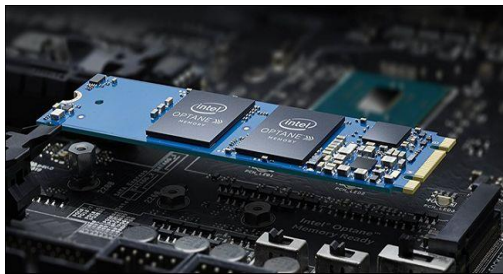
Intel optane memory is a smart memory technology that accelerates computer's responsiveness. It accesses your computer's frequently used documents, pictures, videos, and applications quickly and remembers them after you power off. Enabling you to create, game, and produce with less waiting. Intel optane memory complements standard system memory (RAM) and delivers better overall system responsiveness compared to adding additional RAM.Intel optane memory delivers the best of both when added to following configurations

1)*HDD systems* :Compared to a computer with hard disk drive alone, intel optane memory gives you the power to boot, access storage, launch, and get things done at maximum speed.

2) *HDD and SSD Dual-Drive Systems :*

Get the most out of a dual drive system. A system with Intel optane memory provides SSD like responsiveness on an accelerated HDD data drive automatically accessing frequently used files and applications.

QUANTUM COMPUTER

A quantum computer is a type of computer that uses quantum mechanics so that it can perform certain kinds of computation more efficiently than a regular computer .
Quantum supremacy is defined as the ability of quantum computing to solve problems which can no longer be solved with the world's fastest supercomputer.

Not only organisations are working on achieving this quantum supremacy, but also countries are investing billions in it. China is building the world's biggest quantum research facility. Their objective is to have a quantum computer by

2020 that has the computational power of a million times all computers in the world Now, a regular computer stores information in a series of 0's and 1's.

A quantum computer does not use bits to store information. Instead, it uses something called qubits.

Each qubit can not only be set to 1 **or** 0, but it can also be set to 1 and 0. First company to work on quantum computer is D-WAVE. With the latest being IBM who announced their first 50-qubit quantum processor in November 2017. Note: For working of a quantum computer without any problems the processor should be cooled to the maximum extent. The reason for cooling it is to achieve super conductivity. The temperature at which quantum computer is operated is 0.015K that is -273°C/-460°F.

BRAIN COMPUTER INTERFACE
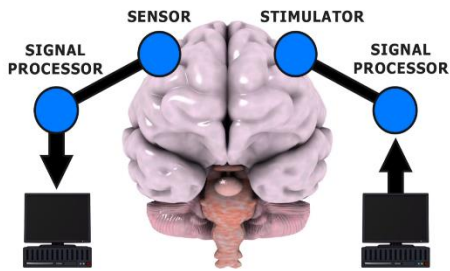
BCI's are currently be either input or output devices. Input BCI's comprised of sensors which acquire electrical brain wave signal together with processing hardware that extracts distinct features and translate them into useful commands Output BCI's translates digital information into electrical signals that fed into the user's brain by power electrode arrays or other stimulator hardware. BCI's can be constructed using one of two approaches.
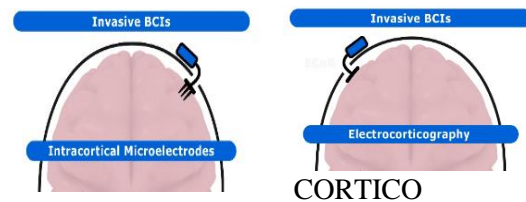
1.Noninvasive BCI's: We employee ELECROENCEPHALOGRAPHY(EEG) to acquire brainwave signals from sensors positioned on the outside of the skull. They feed electrical signal into the brain using a TRANSCRANIAL MAGNETIC STIMULATION(TMS).

2.Invasive BCI's

It requires surgery to position sensors or stimulators inside the skull. Using ELECTRO

CORTICO GRAPHY(ECoG) placing a grid or strip of electrodes on the surface of the brain to acquire brain signals. The INTRA CORTICAL MICRO ELECTRODES can be implanted few millimetres into the brain they serve as sensors to give signals. Using BCI's we can control other person brain using our brain. University of Washington used non invasive BCI's technique on test subject worn a EEG skullcap while watching a monitor screen on which a computer game of launching a rocket is displayed but the the fire button was in the hand of the second subject seated half a mile away in another building and who has a TMS coil placed over the brain to shoot down rocket. The first had to think about pressing the fire button when they did so brainwave signal acquired by EEG processed and transmitted over the internet in turn the TMS device induced a pulse into receiving subjects causing subject pressing the fire button. Split second accuracy was achieved.

L'Oréal UV Sense

L'Oréal's UV Sense is a tiny sensor capable of detecting ultraviolet exposure that's small enough to wear comfortably on your fingernail. The sensor itself is battery-free and includes an **NFC** antenna, a temperature sensor, and a UV sensor.

That sensor, which can store up to three months worth of data, passes information to the accompanying app whenever the wearer holds the device close to his or her smartphone. The app keeps track of your exposure levels and can provide tips for managing sun intake. While the UV Sense is designed to be worn on your nail, L'Oréal will also be releasing accessories so that users can wear it in different ways, too. The beauty company worked with designer and entrepreneur Yves Béhar on the product, in part why it resembles nail art rather than a piece of wearable technology.

FLEXIBLE DISPLAYS

Samsung made a new innovation by announcing its new Infinity Flex Display technology for smartphones at the Samsung Developers Conference in San Francisco. This display bends even further than its pioneered curved edge displays for its Galaxy and Note series.It was for a brief moment but the company showed the prototype version of a device with the Infinity Flex Display technology which contains a 7.3-inch screen (when unfolded), and a thick form factor with side bezels. The device can also open up to three apps all at the same time which is called "Multi-Active Window". In order for

Samsung to achieve the foldable display, six layers of materials were used, namely, Cover Window (PI), Shock-Absorbent Film, Ultra Thin Polarizer, Flexible Layer, and Flexible Backplane. PRICE: $1980 available from APRIL 26-2019.


WHAT'S NEXT:

2-D electronics

Interest in the field started with the discovery of graphene, a structural variant of carbon. Carbon atoms in graphene form a hexagonal two-dimensional lattice, and this atom-thick layer has attracted attention due to its high electrical and thermal conductivity, mechanical flexibility and very high tensile strength. Graphene is the strongest material ever tested. In 2010, the Royal Swedish Academy of Sciences decided to award the Nobel Prize in Physics to Andre Geim and Konstantin Novoselov for their "groundbreaking experiments" in graphene research. Graphnene may have started this 2D revolution in electronics, but silicone, phosphorene and stanene, atom-thick allotropes of silicon, phosphorus and tin, respectively, have a similar honeycomb structure with different properties, resulting in different applications. All four have the potential to change electronics as we know it, allowing for miniaturization, higher performance and cost reduction. Several companies around the globe, including Samsung and Apple, are developing applications based on graphene.

Organic electronics

The development of conducting polymers and their applications resulted in another Nobel Prize in 2000, this time in chemistry. Alan J. Heeger, Alan G. MacDiarmid and Hideki Shirakawa proved that plastic can conduct electricity. Unlike conventional inorganic conductors and semiconductors, organic electronic materials are constructed from organic (carbon-based) molecules or polymers using chemical synthesis. Organic electronics is not limited to conducting polymers, but includes other organic materials that might be of use in electronics. These include a variety of dyes, organic charge-transfer complexes, and many other organic molecules. In terms of performance and industrial development, organic molecules and polymers cannot yet compete with their inorganic counterparts. However, organic electronics have some advantages over conventional electronic materials. Low material and production costs, mechanical flexibility, adaptability of synthesis processes and biocompatibility make organic electronics a desirable choice for certain applications. Commercially available high-tech products relying on organic semiconductors, such as curved television screens, displays for smart phones, colored light sources and portable solar cells, demonstrate the industrial maturity of organic electronics. In fact, several high-tech companies, including LG Electronics and Samsung, have invested in cheap and high-performance organic-electronic devices. It is expected that the organic electronics market will grow rapidly in the coming years.
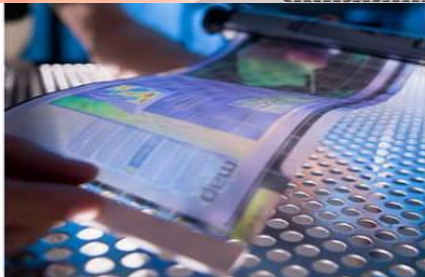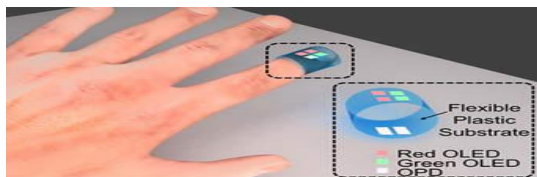
Memristors

In 1971 Leon Chua reasoned from symmetry arguments that there should be a fourth fundamental electronic circuit-board element (in addition to the resistor, capacitor and inductor) which he called memristor, a portmanteau of the words memory and resistor. Although Chua showed that memristors have many interesting and valuable properties, it wasn't until 2007 that a group of researchers from Hewlett Packard Labs found that the memristance effect can be present in nanoscale systems under certain conditions. Many researchers believe that memristors could end electronics as we know it and begin a new era of "ionics".While commonly available transistor functions use a flow of electrons, the memristor couples the electrons with ions, or electrically charged atoms. In transistors, once the flow of electrons is interrupted (for example by switching off the power) all information is lost. Memristors "memorize" and store information about the amount of charge that has flowed through them, even when the power is off. The discovery of memristors paves the way to better information storage, making novel memory devices faster, safer and more efficient. There will be no information loss, even if the power is off. Memristor-based circuits will allow us to switch computers on and off instantly, and start work straight away. For the past several years, Hewlett Packard has been working on a new type of computer based on memristor technology. HP plans to launch the product by 2020.

Molecular electronics:

The ultimate goal of electrical circuits is miniaturization. Also known as single molecule electronics, this is a branch of nanotechnology that uses single molecules or collections of single molecules as electronic building blocks. Molecular electronics and the organic electronics described above have a lot in common, and these two fields overlap each other in some aspects. To clarify, organic electronics refers to bulk applications, while molecular-scale electronics refers to nano-scale, single-molecule applications. Conventional electronics are traditionally made from bulk materials. However, the trend of miniaturization in electronics has forced the feature sizes of the electronic components to shrink accordingly. In single-molecule electronics, the bulk material is replaced by single molecules. The smaller size of the electronic components decreases power consumption while increasing the sensitivity (and sometimes performance) of the device. Another advantage of some molecular systems is their tendency to self-assemble into functional blocks. Self-assembly is a phenomenon in which the components of a system come together spontaneously, due to an interaction or environmental factors, to form a larger functional unit.

PERSONALITIES WHO MADE

A DIFFERENCE

AJAY BHATT

Ajay V. Bhatt is an Indian computer architect who helped define and develop several widely used technologies, including USB (Universal Serial Bus), AGP (Accelerated Graphics Port), PCI Express, Platform Power management architecture and various chipset

improvements. Ajay Bhatt was born in India on 1957. He completed his graduation from Maharaja Sayajirao University of Baroda. He completed his master's degree from The City University of New York, United States.

Ajay Bhatt rose to global celebrity as the co-inventor of USB through an Intel 2009 TV advertisement, where he was portrayed by actor Sunil Narkar. Bhatt received his master's degree from the City University of New York, United States. Bhatt joined Intel in 1990 as a senior staff architect on the chipset architecture team in Folsom. He holds one hundred and thirty-two U.S. and international patents, and several others are in various stages of filing. In 1998, 2003 and 2004, Bhatt was nominated to take part in a Distinguished Lecture Series at leading universities in the United States and Asia. He received an Achievement in Excellence Award for his contribution in PCI Express specification development in 2002. In April 2013 he was awarded the Outstanding Achievement in Science & Technology Award at The Asian Awards in London.

FRANK J. CANOVA

Francis James Canova is an American electronics designer who originated the idea for the IBM Simon and has thus been described as the inventor of the smartphone. Frank Canova was born in Wilmington, Delaware, raised in Green Cove Springs, Florida, and

attended Clay High School, graduating in 1974. He received his advanced education at the Florida Institute of Technology, graduating with a BSc in electrical engineering in 1978.

Canova was working at IBM when he realized that chip-and-wireless technology was small enough to use in a hand-held device. His boss, Jerry Merckel, was working on the development of PCMCIA cards that could be used to expand the memory of laptop computers and realized that they could also be used in the sort of device that Canova was thinking of. Both were working in a team that had been put together by Paul C. Mugge to enliven IBM's product range by developing smaller, lighter, products.Each Simon was shipped with a charging base station, two nickel-cadmium batteries and a protective leather cover. Optional was a PCMCIA pager card designed by Motorola, an RS232 adapter cable for use with PC-Link to access files from a personal computer, and an RJ11 adapter cable to allow voice and data calls to be made over POTS land-lines. The RJ11 adapter helped users reduce expensive cellular phone bills or make calls where cellular coverage didn't exist in 1994. In addition to its ability to make and receive cellular phone calls, Simon was also able to send and receive faxes, e-mails and cellular pages. Simon featured many applications, including an address book, calendar, appointment scheduler, calculator, world time clock, electronic notepad, handwritten annotations, and standard and predictive stylus input screen keyboards.

VIJAY SHEKHAR SHARMA

Vijay Shekhar Sharma is an Indian billionaire businessman. He is the founder of mobile payments company Paytm. He is the founder of One97, a Telecom Products and Services Company founded in 2000. Sharma was born in Aligarh, Uttar Pradesh. With an Electronics and Communications degree from Delhi College of Engineering, he is the quintessential entrepreneur with many successful ventures. Sharma is a leader in his industry, and his many firsts include ground breaking business models and customer communication products .

Sharma is also the founder of Paytm Mobile Solutions Private Limited and serves as its Chief Executive Officer. Mr. Sharma is responsible for the strategy and direction for One97 Communications and leads it in all areas relating to business expansion as well as product road map. He serves as an Advisor of Socialblood.org. He serves as an Investment Advisor of One97 Communications Limited, Investment Arm. Mr. Sharma has more than 10 years of experience in the telecom and new media industries, having founded his first venture XS Corps while he was at college, which he sold to Lotus Interworks LLC, New Jersey in 1999. Prior to founding One97 Communications, Mr. Sharma played key roles in a number of organizations such as Riverrun Software Services Group Limited, Inter Solutions Software Private Limited, focusing on

the design and development of various products and applications for the technology, media and telecom industries. He serves as a Member of Advisory Board of Milaap Social Ventures India Pvt. Ltd. He holds a Bachelor's degree in Engineering from Delhi College of Engineering.

ANN MOKOSINSKI

Ann Makosinski is a 16-year-old student who competed against thousands of other young inventors from around the world to win first prize and a $25,000 scholarship at Google's International Science Fair. She invented a battery-free flashlight. A free energy device that is powered by the heat in your hand

While visiting the Philippines, Ann found that many students couldn't study at home because they didn't have electricity for lighting. Unfortunately, this is a common problem for developing regions where people don't have access to power grids or can't afford the cost of electricity. Ann recalled reading how the human body had enough energy to power a 100-watt light bulb. This inspired her to think of how she could convert body heat directly into electricity to power a flashlight. She knew that heated conductive material causes electrons to spread outwards and that cold conductive material causes electrons to condense inwards. So, if a ceramic tile is heated, and it's pressed against a ceramic tile that is cool, then electrons will move from the hot tile towards the cool tile producing a current. This phenomena is known as the thermoelectric effect.

Ann started using ceramic tiles placed on top of each other with a conductive circuit between them to create the amount of electricity she needed for her flashlight. Her idea was to design her flashlight so that when it was gripped in your hand, your palm would come in contact with the topside of the tiles and start heating them. But although the tiles generated the necessary wattage, Ann discovered that the voltage wasn't enough. So she added a transformer to boost the voltage to 5V, which was more than enough to make her flashlight work. Ann successfully created the first flashlight that didn't use batteries, toxic chemicals, kinetic or solar energy, and that always works when you picked it up.

CAREER PROSPECTS

There are many opportunities for an ECE students to get into PSU's. **As** on April, 2018, there are 8 Maharatnas, 16 Navratnas and **73** Miniratnas in India**.** Many of the PSU'S recruit based on GATE scorecard secured by the student. List of few Maharatnas, Navratnas and Miniratnas which recruit through Gate Scorecard are

List of Maharatnas

- National Thermal Power Corporation (NTPC)
- Oil and Natural Gas Corporation (ONGC)
- Steel Authority of India Limited (SAIL)
- Bharat Heavy Electricals Limited (BHEL)
- Indian Oil Corporation Limited (IOCL)
- Coal India Limited (CIL)
- Gas Authority of India Limited (GAIL)
- Bharat Petroleum Corporation Limited (BPCL)

List of Navratnas

- Bharat Electronics Limited (BEL)
- Container Corporation of India (CONCOR)
- Engineers India Limited (EIL)
- Hindustan Aeronautics Limited (HAL)
- Hindustan Petroleum Corporation Limited (HPCL)
- National Aluminium Company (NALCO)
- National Buildings Construction Corporation (NBCC)

List of Miniratna-I

- Airports Authority of India (AAI)
- Antrix Corporation
- Balmer Lawrie
- Bharat Coking Coal Limited[BCCL]
- Bharat Dynamics Limited[BDL]
- Bharat Earth Movers Limited[BEML]
- Bharat Sanchar Nigam Limited (BSNL)
- Bridge and Roof
- Central Warehousing Corporation

List of Miniratna-II

- Artificial Limbs Manufacturing Corporation o India
- Bharat Pumps & Compressors[BPC]
- Broadcast Engineering Consultants India
- Central Mine Planning and Design Institute
- Central Railside Warehouse Company
- Indian Medicines & Pharmaceuticals Corporation Limited
- MECON

Apart from the above Mentioned companies, there are many jobs in research fields in ISRO, DRDO, BARC etc which recruit students through GATE Scorecard or they separately conduct their own intake exam every year. For the post of Grade 1 engineers, graduates in electronics and telecommunication are preferred who successfully get through ESE(IES) exam.

- Junior Telecom officer in Indian Telecommunication Service
- Indian Railway Stores Service
- Central Power Engineering Service
- Assistant Naval Stores Officer Grade- I
- Indian Inspection Service Group
- Indian Telecommunication Service

An ECE student who are interested to get into the field of VLSI should initially get trained in designing simulation with industrial software tools which will be provided by training institutes like VEDA IIT, VECTOR. .

PROJECTS:

Speak to Arduino and Control It with Google Assistant: In this project, we'll Learn how to make a connection between an internet service and Arduino boards. At the end of this article, you will know how to get data from Google Assistant, know how to use IFTTT protocol, be familiar to webhooks and http requests, be able to speak to your Arduino.

The Google Assistant is an artificial intelligence-powered virtual assistant developed by Google that is primarily available on mobile and smart home devices. Users primarily interact with the Google Assistant through natural voice, though keyboard input is also supported.

If This Then That, also known as IFTTT, is a free web-based service to create chains of simple conditional statements, called applets. An applet is triggered by changes that occur within other web services such as Gmail, Facebook, Telegram, Instagram, or Pinterest

Google Assistant to Arduino:

In this project, we want to control different parts of an Arduino like I/O pins, PWM, Serial port and so on by sending a string from Google Assistant to Arduino Serial port. First of all, We need to define some specific phrases for Google Assistant to find out what we mean. Then we will make an applet in IFTTT website and make a connection between Google Assistant and our database. After that we read data from database by ESP8266 module and send it to the Arduino. Let's get started!

Implementation: First of all, you need a device to run your Google assist. Go to assistant.google.com and see all devices that support the assistant. In this project, we use an Android phone device. Open ifttt.com and create an account. After signing in, Click on My Applets then click on New Applet. Now you can add your service as THIS in your applet. Click on THIS and search for Google Assistant. You have 4 choices to define your phrase for google assist. Choose phrase with a number ingredient. In the next page you can add your phrase. For example you want to say "Set PWM of pin 9 to 255". Just type it as your phrase and replace "255" with a "#" symbol. You can add more phrases with the same meaning like "PWM 9 to 255". Now add a response so that the Google Assistant can let you know that your command was understood and the necessary action was taken, for example "The PWM is updated". When you are done click on Create Trigger. In "THAT" part of your applet you have lots of services to choose form search for "Webhooks" and choose that. Click "Make a web request." Add URL of your Server to receive data. Set method on POST and select Application/json for

content type. Now you should add a body of content. Something like this: {"Number":"{{NumberField}}"}. Now click on "Create action."

Server and Database: We write sample code for Server to get data from IFTTT and store in database. You can change models to make your data stored as your interest. Download from Here.(https://electropeak.com/learn/guides/speak

ESP8266 & Arduino Code: First we write a code for ESP-01 to get data from database and send it to the Arduino via Serial port. Then we write another code for Arduino to get data from ESP-01 and execute the command (e.g. change the PWM). You can use Arduino IDE to compile both codes and Upload them to the boards. Before you can use the ArduinoJson library, you have to make sure the library is installed on your computer. To do a quick check, head over to the library manager in the Arduino IDE (Sketch > Include Library > Manage Libraries) and type "ArduinoJson" in the text box, if you see a green colored "INSTALLED" label beside the name of the library, that means you are all good to go and you can proceed on to the next step. If you don't see the label, click on the box/division once and you will see the "Install" button. Hit install and you are all set for the next step.
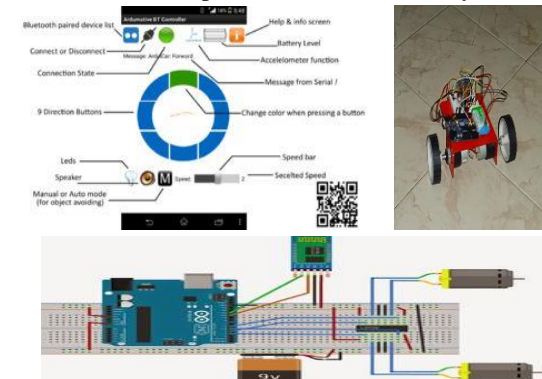
Arduino Bluetooth Control:

Hello, in this project I will show you how to transform an RC toy car to Bluetooth controlled through your Android smartphone! Before starting, make sure that you have:1.Arduino uno board ,2.L293D motor driver,3.HC-06 Bluetooth module,4.toy Car that can fit all the above !.For power, you can use the existing batteries (4x 1.5V AA), or replace them with a LiOn rechargeable battery pack.

Circuit Diagram and Arduino Program:

Connect the components according to the circuit diagram and Program the arduino with the uploaded bluetooth program the program link is provided below. assemble the components and make the mechanical structure.

Android app : First enable Bluetooth and establish connection with BT module. (ex. HC-06, password 1234) Use "Help & info" button if you cannot

understand how it is working.now after connecting the Android with blue tooth module start controlling the toy car.

ARDUINO MOBILE PHONE*:*

Here we are going to build a Simple Mobile Phone using Arduino, in which GSM Module is used to Make the Call, answer the Call, send SMS, and read SMS, and also this Arduino phone has Mic and Speaker to talk over this Phone. This project will also serve as a proper interfacing of GSM Module with Arduino, with all the Code needed to operate any Phone's basic functions.

Components Required: Arduino Uno,GSM Module SIM900,16x2 LCD,4x4 Keypad,Breadboard or PCB,Connecting jumper wire,Power supply,Speaker,MIC,SIM Card.

Working Explanation:

In this Arduino Mobile Phone Project, we have used Arduino Uno to control whole system's features and interfacing all the components in this system. A 4x4 Alphanumeric Keypad is used for taking all kind of inputs like: Enter mobile number, type messages, make a call, receive a call, send SMS, read SMS etc. GSM Module is used to communicate with the network for calling and messaging purpose. We have also interfaced a MIC and a Speaker for

Voice Call and Ring sound and a 16x2 LCD is used for showing messages, instructions and alerts.Alphanumeric is a method to enter numbers and alphabets both by using same keypad. In this method, we have interfaced 4x4 keypad with Arduino and written Code for accepting alphabets too.

Explaining Four Features of Arduino Mobile Phone:

1. **Make a Call**:

To make a call by using our Arduino based Phone, we have to press 'C' and then need to enter the Mobile Number on which we want to make a call. Number will be entered by using alphanumeric keypad. After entering the number we again need to press 'C'. Now Arduino will process for connecting the call to the entered number by using AT command:**ATDxxxxxxxxx; <Enter> where xxxxxxxxx is entered Mobile Number.**

2. **Receive a Call:**Receiving a call is very easy. When someone is calling to your system SIM number, which is there in GSM Module, then your system will show 'Incoming…' message over the LCD with incoming number of caller. Now we just need to Press 'A' to attend this call. When we press 'A', Arduino will send given command to GSM Module: **ATA <enter>**

3. **Send SMS:** When we want to send a SMS using our Arduino based Mobile Phone, then we need to Press 'B'. Now System will ask for Recipient Number, means 'to whom' we want to send SMS. After entering the number we need to press 'D' and now LCD asks for message. Now we need to type the message, like we enter in normal mobile, by using keypad and then after entering the message we need to press 'D' to send SMS. To Send SMS Arduino sends given command: **AT+CMGF=1 <enter>**

AT+CMGS="xxxxxxxxxx" <enter>   where: xxxxxxxxxx is entered mobile number

4**. Receive and Read SMS:**This feature is also simple. In this, GSM will receive SMS and stores it in SIM card. And Arduino continuously monitors the received SMS indication over UART. We just need to Press 'D', to read the SMS, when we see the New Message symbol .Below is the SMS Received indication displayed on the Serial port is:

+CMTI: "SM" <SMS stored location>

+CMTI: "SM",6 Where 6 is message location where it stored in SIM card.

When Arduino gets this 'SMS received' indication then it extracts SMS storing location and sends command to GSM to read the received SMS. And show a 'New Message Symbol' over the LCD.**AT+CMGR=<SMS stored location><enter>**
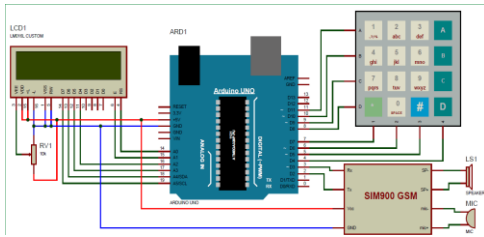
AT+CMGR=6

Now GSM sends stored message to Arduino and then Arduino extract main SMS and display it over the LCD and then after reading this SMS Arduino Clear the 'New SMS symbol' from the LCD.

Note: There is no coding for MIC and Speaker.

Circuit diagram and explanation:

Circuit Diagram of this for interfacing GSM SIM900 and Arduino is given above. 16x2 LCD pins RS, EN, D4, D5, D6 and D7 are connected with pin number 14, 15, 16, 17, 18 and 19 of Arduino respectively. GSM Module's Rx and Tx pins are directly connected with Arduino's pin D3 and D2 respectively (Ground of Arduino and GSM must be connected with each other). 4x4 keypad Row pins R1, R2, R3, R4 are directly linked to pin number 11,10, 9, 8 of Arduino and Colum pins of keypad C1, C2, C3 are linked

with pin number 7, 6, 5, 4 of Arduino. MIC is directly connected at mic+ and mic- of GSM Module and Speaker is directly connected at SP+ and SP- pins for GSM Module.Programming code link : ------ (https://circuitdigest.com/microcontroller-projects/call-and-message-using-arduino-sim900-gsm)

REAL TIME VEHICLE TRACKING SYSTEM:

In this we are going to learn a real time vehicle tracking system by using this we can find current location of our vehicle over internet. But this project is only working on local server range. First we can send a few data to local server with a hyperlink that carries contemporary car location coordinates. Then we will redirect to the vehicle place in GOOGLE map by way of clicking at the same hyperlink.

Block diagram:
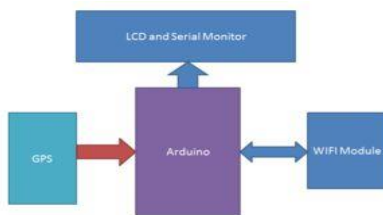
Project description : To track our car we want discover coordinate of car with the aid of using GPS module. GPS module communicates continuously with the satellite for taking coordinates. Now Arduino gets GPS strings from GPS using Serial uart Communication. Now Arduino extract the required GPS Coordinates in form of Latitude and longitude from the GPS strings. before this Arduino send command to ESP8266 for configuring, connecting to the router and getting IP deal with.

After it Arduino initialize GPS my getting coordinates and the lcd indicates a page Refresh message, that means, user need to refresh page. whilst person will refresh the page Arduino gets the GPS coordinates and ship the equal with some additional records to website (Local server) with a GOOGLE map hyperlink. Now by way of clicking this link person will redirect to the GOOGLE map with a coordinate and then he/she will be able to get the car current Point at the red spot at the GOOGLE map.

Circuit and connections:

Circuit is quite simple for this assignment we most effective wishes an Arduino UNO, GPS Module and ESP8266 WIFI module. And there may be a 16x2 lcd is likewise related for showing fame. This liquid crystal display is optionally connected at at 14-19(A0-A5) Pins of Arduino. ESP8266's Vcc and GND pins are direct to 3.3V and GND. And CH_PD is likewise connected with 3.3V. for GPS module I used a 12 volt adaptor(user may use five volt for powering the GPS module) and gnd to gnd of Arduino and Tx of GPS is directly linked at virtual UART rx pin 10 of Arduino due to the fact we have used software Serial for interface GPS Module with Arduino and same for software Serial is likewise used for ESP8266 for interface it with Arduino assigning pin 2 as Rx and pin 3 as Tx. And Arduino Tx (pin 3) is direct to Rx of ESP8266 and Rx is direct to Tx

(pin 2) of Arduino. inbuilt UART is used for showing speaking facts among Arduino and WIFI module on the serial monitor.

Project link on YouTube: (**https://youtu.be/wVkO2neomN4**).
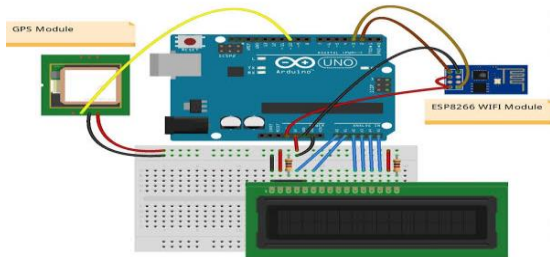
PROJECTS ON IOT

Send Data From ESP to the Webpage with Minimal Efforts:

Things used in this project

Hardware components: NodeMCU ESP8266 Breakout Board-1, ESP Wemos D1 Mini-1Ultrasonic Sensor - HC-SR04 (Generic)- 1 Software apps and online services:RemoteMe.org cloud

Connections:

VCC – 5v.GND – GND,Trig – trough Level converter or resistors set – D3,Echo – trough Level converter or resistors set – D2


Webpage: Webpage

You need an account at (https://app.remoteme.org) in sign up tab you can create your account for free. After creating

the account, go to the variables tab and on the right on the top "Add" fill in:

After this step, we have our variable in the system, which will be update by ESP and displayed on the webpage.To add a website.Go to the "Devices", "New Device" tab and then "New Web Page":Fields described here ,Now we will add a component to display the variable. Open the web page bar, click on index.html, then "Edit With wizard", and "Insert Component":Choosing the "1" magnifier we choose our variable "distance" – because we want the status of this variable to display our component.After clicking "Insert", we can open our website in the new tab (index.html open in new tab) we get:Of course, gauge shows 0 – the default value of the variable. In order for the gauge to move, we have to change our variable by the ESP code.ESP SketchBefore upload sketch make Sure You have installallrequiredlibraries:(https://remoteme.org/network-devices/).

To start with, we need to add our device in RemoteMe: Go to the "Devices", "New Device" tab and then "New Network device".

For clear idea on website building check: (**https://remoteme.org/network-devices/**) It's time to generate the code for arduino, click "burger menu" and "Code generator wizard":In the first step, we mark our variable, in the second the parameters of our Wifi network, in the next steps we do not change anything. In the last step, click "View" to display our code, which should be pasted to the Arduino IDE.Sending distances to the remoteMe system we used the setDistance function
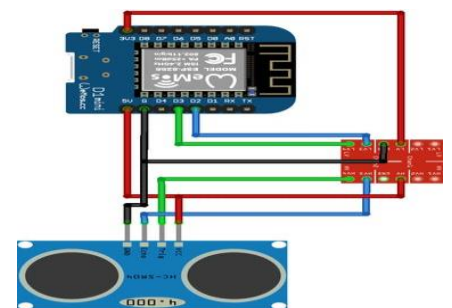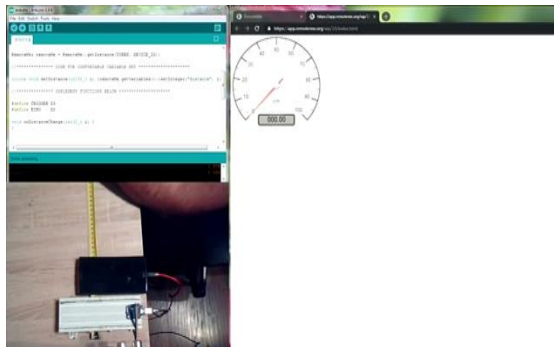
generated by the "wizard". The code block also makes sure that you do not send measurements more than 700ms, because RemoteMe will not allow you to send more messages in a minute than 110 minutes. After uploading the ESP program, with the open web page, we will see that our gauge shows the measured distances.

Smartphone: To open the website it is best to scan the QR code available after clicking index.html -> get anymous link -> "green QR code icon". This will allow us to open and automatically log in to our account.

Forreference:

(https://www.hackster.io/maciek85/send-data-from-esp-to-the-webpage-with-minimal-efforts-195ac0)

TECHNOLOGY - THE NEW AGE PROBLEM SOLVER

It is no secret that technology has eased our lives to a great extent. Things once perceived to be impossible are today common. Technology is nearly invincible now; many big problems can be solved through technology by anyone, anywhere. The ability of technology to solve problems in different areas is the key reason why it has become so important in every human field.

Today, robots can replace many of the manual tasks performed by humans, algorithms can automate many of routine processing tasks, and computers help solve many human problems. AI and robotics are undoubtedly the next technology waves which could automate most human tasks.

EDUCATION

Education is one of the easiest problems to tackle using technology. Actually there are several websites that provide free resources (courses, tests, discussion forums) that can be used to educate yourself, even though you may be thousands of miles away from the world's best universities and schools. As internet access becomes more widespread and the cost of computers keeps declining. Chromebook is a fantastic computer that can be used for this purpose), kids in poor countries will have better access to education. Virtual Reality headsets currently developed by Facebook Inc. and a few other companies will also open the door to huge opportunities in the realm of distant learning.

Technologies like online courses and robots in the classroom allow for a higher-quality and standardized delivery of curriculum by experts who really understand the subjects being taught. This type of education dramatically increases access both for urban and rural classrooms that lack the resources to maintain a well-trained staff.

POVERTY

The solution to poverty is productivity growth and improvements in income distribution. Worldwide poverty rates declined significantly over the last 200 years and as technological innovation keeps steaming ahead, poverty rates will continue to decline.

PHYSICAL INFRASTRUCTURE

If a poor country doesn't have a reliable energy system, roads, ports, or telecommunication infrastructure, corporations won't come, no matter how cheap their labour is. Innovations in the telecommunication space brought down the costs of providing internet services and allowed countries like India to join certain global markets.

Major technological breakthroughs have been happening in the clean energy space and solar energy is on its way to becoming cheaper than carbon-based energy sources. Tesla Motors Inc. is at the forefront of the struggle to propagate the use of solar energy and solar-based transportation. In the future we will be generating our own electricity from rooftop solar panels/tiles, store the excess energy in batteries, and drive electric vehicles.

UNEMPLOYMENT

Without jobs, people not only are a drag on their society, but they can't contribute to its growth and build on the services cycle, which is why tackling unemployment is so important. While fears are that innovation will actually lead to less jobs, as robots and drones take over jobs that could've been handled by people, those robots and drones also require labor to build them, it's more likely that other services will continue to pop up to replace departing ones, in one way or another.

A good example is the rapid growth in app development upon the success of a completely separate product, the smartphone. The number of app publishers on Google's Android platform surged from a few thousand to nearly 400,000 in the span of just 4 years, from 2010 to 2014, creating millions of new jobs during that time.

FOOD SECURITY

One of the biggest fears among people is overpopulation. There is one major problem that will come with the projected growth of people: feeding everyone. According to projections by the United Nations, the population of Earth will be 9.6 billion by 2050, and if we stay on our current trajectory for food production, we won't have enough food to feed everyone. Over the next 35 years, production will rise 38–67 percent, but it needs to rise 60–110 percent. Researchers at MIT are looking to solve this problem through a project called City FARM. The project is seeking to make urban farms more efficient through data science and monitoring every individual plant with sensors that "listen" to the crops. Using the sensors, the crops will get everything they need in low quantities, making the process of growing food much more efficient. In fact, it will use 98 percent less water than conventional farms. It will also quadruple the growth speed of vegetables while eliminating the need for chemical fertilizers and pesticides. Finally, the nutrient density of the crops will be doubled, and the flavor can be strengthened or changed. Then, once the ideal "recipe" is ready, the data is loaded onto an open source database, where anyone can download it to grow their own crops by plugging the data into their own farm.

WATER SECURITY

783 million people do not have access to clean water. In addition to that, 2.5 billion people do not have access to adequate sanitation. Looking to solve both problems is Peter Janicki's Omniprocessor, which extracts water from human waste.

Sewer sludge is put into the Omniprocessor, where it is boiled in a large tube. The water

vapor escapes from the waste and goes into a cleaning system inside the machine. Within minutes, it is filtered, and clean water is available. One machine can continually provide clean water to 100,000 people. But what really makes the Omniprocessor so innovative is that the leftover waste is turned into steam, which powers the machine. If there is leftover power, it goes to powering the community.

HEALTH CARE:

I strongly believe that by incorporating the right technology tools into the health care system, we could see a huge improvement in patient outcomes, as well as big savings for hospitals. To accomplish this on a larger scale, we need to see professionals in the medical industry who are willing to embrace the technology and technology companies that are open to listening to the needs of medical professionals.

TECHNOLOGY NEWS

Shakti Processor Program

SHAKTI is an open-source initiative by the RISE group at IIT-Madras, which is not only building open source, production grade processors, but also associated components like interconnect fabrics, verification tools, storage controllers, peripheral IPs and SOC tools. The SHAKTI project is building a family of 6 processors, based on the RISC-V ISA. We family. While the primary focus of the team is architecture research, these SoCs will be competitive with commercial offerings in the market with respect to area, power and performance.   .
Apart from front-end design, SHAKTI is also actively working with partners to develop a base VLSI flow (front and back-end) for a large part of the ecosystem. While all the tools might not be open-source, the scripts and environment to

plug-in SHAKTI components will be released in open-source.

Mission Shakti:

On March 27, India announced it had successfully conducted an anti-satellite (ASAT) missile test, called "Mission Shakti." After the United States, Russia and China, India is now the fourth country in the world to have demonstrated this capability.

According to the official press release, India destroyed its own satellite by using technology known as "kinetic kill." This particular technology is usually termed as "hit-to-kill." A kinetic kill missile is not equipped with an explosive warhead. Simply put, what India did was to launch the missile, hit the target satellite and destroy it with energy purely generated by the high speed of the missile interceptor. This technology is only one of many with ASAT capabilities, and is the one used by China in its 2007 ASAT test.

Hyper Loop Transportation technologies

India May Be Next in Line for 600 Km/h Hyperloop Transport System. Hyperloop Transportation Technologies, or HTT, announced plans to start a futuristic high-speed transportation system in the US about 3 years back, and the vision is quite close to reality

now. Elon Musk-backed company is now planning to expand to other countries and India could be one of them.

Compared to HTT's vision, existing transportation systems around the world aren't fast and convenient enough for travel between two cities. Even in case of China, Japan and France that have extremely fast trains, the transport system isn't as casual as a subway or a metro. Hyperloop is a result of such vision to allow passengers to travel between two places in almost one-tenth the time it would take by a regular medium.

The first proposed plan is expected to go live in 2019, with a route between Los Angeles and San Francisco. A usual 6 hour journey between the two cities will now reduce to about 35 minutes one way, which means the average speed of Hyperloop would be close to 700 km/hr.


ELECTRONIC PUZZLE:
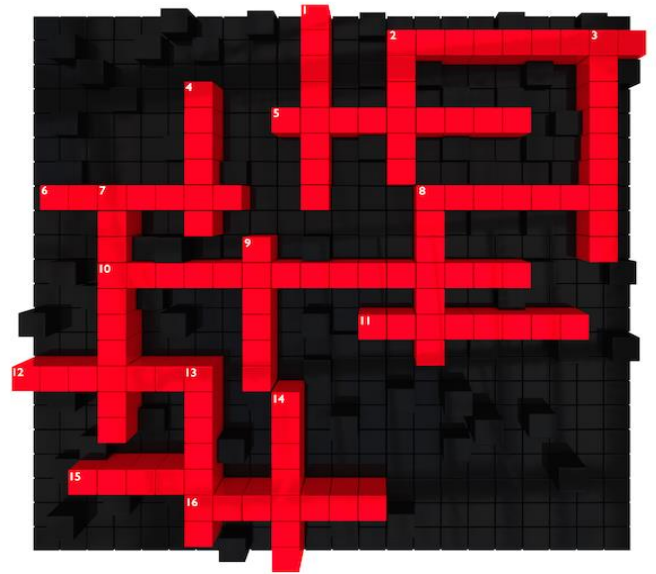
Across

2. A diagram that shows the electrical connections of the electronic components
5. Current is considered to be the movement of _____.
6. A voltage source that converts chemical energy to electrical energy

8. A flow of electric charge
10. A characteristic of a secondary cell
11. A material that is composed of a mixture of elements
12. The term used to designate electrical pressure
15. A short circuit will have a _____ current flow.
16. The part of an atom that has no electric charge

Down

1. A voltmeter is used in _____ with the circuit.
2. A device that opens or completes an electrical path
3. A material that opposes the movement of free electrons
4. One coulomb passing a point in one second
7. A resistive component that is designed to be temperature sensitive.   .
8. A unit of charge that contains 6.25×10^{18} electrons
9. An atoms atomic number is determined by its number of. _____   .
13. A substance that is found only in its pure form
14. It is used to measure current.

ANSWERS:
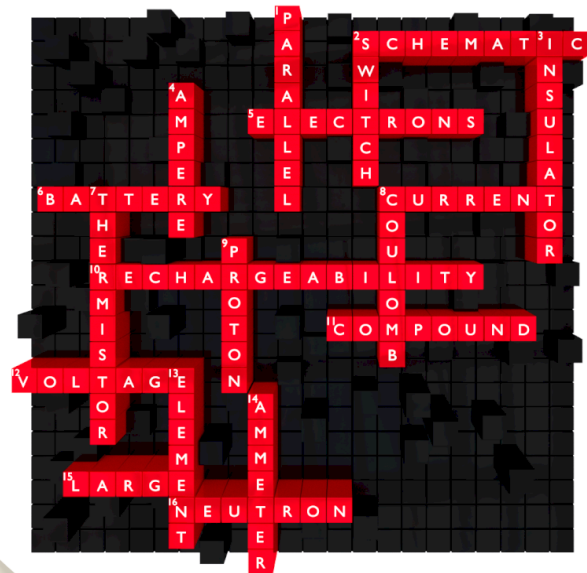
graduates of 2018-2019

Difficult missions will bring difficult challenges which may sometime produce temporary setbacks.The test of human is in accepting the failure and going on trying until he or she succeeds. Managing failure is the essence of leadership.

-APJ Abdul Kalam