

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

(An Autonomous Institute under Kakatiya University, Warangal)
Warangal – 506015, Telangana, India

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DEPARTMENT OF
ELECTRONICS &
COMMUNICATION
ENGINEERING

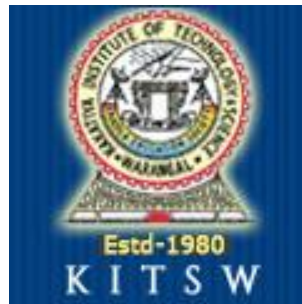
ELECTROMANIA-16

A TECHNICAL MAGAZINE

VOLUME - VI
DEC-16

KAKATIYA INSTITUTE OF TECHNOLOGY AND SCIENCE
(An Autonomous Institute under Kakatiya University, Warangal)
Warangal-506015, Telangana, India.

VOL-VI DEC-16



ELECTROMANIA'16

A Technical Magazine

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

EDITORIAL BOARD

We wish you a very happy and prosperous new year-2017

CHIEF EDITOR MESSAGE

It is heartening to note that ECE department of KITSW is regularly publishing the technical magazine "ELECTROMANIA" and its VI volume is just brought out. I congratulate them for such fine efforts. Such magazines should enhance the teaching learning process in the institute and offer latest technical knowledge in the line with our vision and mission statements. The students and faculty must scan through the number of online journals that we are subscribing and bring out the quintessence of such information into the technical magazine. Only then I believe the performance our students would improve paving the way for quality research work which should be our main focus for the times to come.

And our efforts would continue.....

-Dr. Y.Manohar

PRINCIPAL MESSAGE

Every student of this Institute must have a highest grade of goal to reach in the life. This is very important because goals allow us to trace objectives and evaluate our progress. If you have a friend who is struggling with problems just help him stay motivated. The best you can do is send a message of encouragement to him to succeed in reaching the goal of his desire. Finally I congratulate the ECE department and student coordinators in releasing this technically informative ELECTROMANIA-16.

- Dr. P. Venkateswara Rao

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.

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

FACULTY IN-CHARGE MESSAGE

We are glad to bring this wonderful technical magazine ELECTROMANIA'16, Volume-VI. This is a productive technical material and subsidiary skill developing tool for the students. We applaud the coordination and efforts behind the team to bring out this issue. We would like to place on record our gratitude and heartfelt thanks to all those who have contributed to make this effort a success. We truly hope the pages that follow will make an interesting read.

- Smt.A.Vijaya, Assoc. Prof
-Sri S.Pradeep Kumar, Asst. Prof

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What to learn

SURFACE DIAL

Surface Dial is a completely new way to interact with technology and create in the most natural, immersive way. Store, customize, access, navigate, and reimagine physical tools in the digital world – from concept to creation



It makes everyday tasks simple and fun. We can adjust the volume on your favorite Groove track, scroll through news articles

without touching your keyboard or mouse, Fly through your local city in Windows Maps.

By Press and holding Surface Dial, surface studio displays a radial menu of tools, making it easier and faster to do the things, supporting our workflow.

Haptic feedback provides helpful vibrations through the aluminum body into our fingertips, to help us to stay in the moment and feel totally in touch with our work.

SIMPLIFY3D



Simplify3D software controls every aspect of your 3D print. It translates 3D models into instructions your printer understands. Better instructions mean better prints, so a simple software upgrade makes all the

difference in the world.Simplify3D is compatible with more 3D printers than any other software available.

Advantages of simplify 3D are:

- 1)Hassle-Free Printing.
- 2)Lightning-Fast Slicer
- 3)Smart Supports
- 4)Optimized Dual Extrusion
- 5)Simplified Multi-Part Printing
- 6)Better 3D Printing Results

WAVESURFER

WaveSurfer is an audio editor widely used for studies of acoustic phonetics. It is a simple but fairly powerful program for interactive display of sound pressure waveforms, spectral sections, spectrograms, pitch tracks and transcriptions. It can read and write a number of transcription file formats used in industrial speech research including TIMIT.

Wavesurfer is written in Tcl/Tk using the Snack audio library. It therefore runs on most platforms, including Microsoft Windows,Mac OS X, Linux, Solaris, HP-UX, FreeBSD, and IRIX. It is scriptable and supports plugins.Wavesurfer provides basic audio editing operations, such as excision, copying, pasting, zero-crossing adjustment, and effects such as fading, normalization, echo, inversion, reversal, replacement with silence, and DC-removal, but, in view of its scientific orientation, does not offer effects of interest to musicians such as flange.

SNAPCHAT SPECTACLES

Spectacles are sunglasses that *Snap* .BY single tap we can make our memory — from our perspective. Then, relive it later in Snapchat. The specs shoot first-person video clips, or Snaps, that you can transfer directly to the Snapchat app. The specs can record up to 10 seconds of video from the wearer's perspective. Each tap of a button mounted on the frames records another clip, while a ring of tiny lights lets people know you're recording. The camera-glasses use a 115-degree-angle lens that resembles the human eye's natural field ofview



Spectacles connect directly to Snapchat via Bluetooth or Wi-Fi and transfer your Memories directly into the app in circular video format which plays full screen on any device, in any orientation

These glasses, which can be recharged in their case, will come in only one size.

TESLA SOLAR ROOF

Tesla unveiled a beautiful rendition of its solar roofs. They're practically indistinguishable from an ordinary roof, but the shingles absorb sunlight to generate electricity for your home and car.

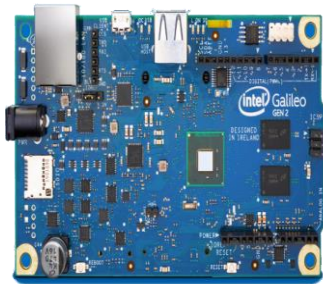


Solar tiles are manufactured with durable, long lasting tempered glass in four styles that complement and power our home.Solar tiles integrated into the roof are invisible when viewed from the street, yet are fully exposed to the sun from above.Tesla also introduced power wall which can power a 2 bed room home for a

full day. It is compatible ,stackable and with a built-in inverter. Its installation is simple in both indoor and outdoor.

What's now

INTEL GALILEO



Intel Galileo is the first in a line of Arduino-certified development boards based on Intel x86 architecture and is designed for the maker and education

communities. Intel released two versions of Galileo, referred to as Gen 1 and Gen 2.

Intel Galileo combines Intel technology with support for Arduino ready-made hardware expansion cards (called "shields") and the Arduino software development environment and libraries. The development board runs an open source Linux operating system with the Arduino software libraries, enabling re-use of existing software, called "sketches". Intel Galileo can be programmed through OS X, Microsoft Windows and Linux host operating software. Intel Galileo features the Intel Quark SoC X1000, the first product from the Intel Quark technology family of low-power, small-core products. Intel Quark represents Intel's attempt to compete within markets such as the Internet of Things and wearable computing. Designed in Ireland, the Quark SoC X1000 is a 32-bit, single core, single-thread, Pentium (P54C/i586) instruction set architecture (ISA)-compatible CPU, operating at speeds up to 400 MHz.

GOOGLE ASSISTANT

Google Assistant is an intelligent personal assistant developed by Google. It is considered an extension of Google Now. Unlike Google Now, Google Assistant can engage in two-way conversations. The assistant is currently integrated in the Allo app only available in Preview Edition. It is also integrated with the Google Pixel, currently the only Android phone to have it integrated into its software. It will be included in Google Home, a smart voice-enabled wireless speaker, and proposed versions of Android Wear.

Google Assistant, in the nature and manner of Google Now, can pull information, check weather, etc. Unlike its brethren, however, it can engage in a two-way conversation, using Google's natural language processing algorithm.

GNU OCTAVE

GNU Octave is software featuring a high-level programming language, primarily intended for numerical computations. Octave helps in solving linear and nonlinear problems numerically, and for performing other numerical experiments using a language that is mostly compatible with MATLAB. It may also be used as a batch-oriented language. It is free software.

Octave is written in C++ using the library. Octave uses an interpreter to execute the Octave scripting language. Octave is extensible using dynamically loadable modules. Octave interpreter has an OpenGL-based graphics engine to create plots, graphs and charts and to save or print them. Alternatively, gnu plot can be used for the same purpose.

What's next

Nano-sensors and the Internet of Nano-things

The Internet of Things (IoT), built from inexpensive micro-sensors and microprocessors paired with tiny power supplies and wireless antennas, is rapidly expanding the online universe from computers and mobile gadgets to ordinary pieces of the physical world:



thermostats, cars, door locks, even pet trackers. New IoT devices are announced almost daily, and analysts expected to up to 30 billion of them to be online by 2020.

The explosion of connected items, especially those monitored and controlled by artificial intelligence systems, can endow ordinary things with amazing capabilities—a house that unlocks the front door when it recognizes its owner arriving home from work, for example, or an implanted heart monitor that calls the doctor if the organ shows signs of failing. But the real Big Bang in the online universe may lie just ahead. Scientists have started shrinking sensors from millimeters or microns in size to the nanometer scale, small enough to circulate within living bodies and to mix directly into construction materials. This is a crucial first step toward an Internet of Nano Things (IoNT) that could take medicine, energy efficiency, and many other sectors to a whole new dimension.

Some of the most advanced nano-sensors to date have been crafted by using the tools of synthetic biology to modify single-celled organisms, such as bacteria. The

goal here is to fashion simple bio-computers that use DNA and proteins to recognize specific chemical targets, store a few bits of information, and then report their status by changing color or emitting some other easily detectable signal.

Many nano-sensors have also been made from non-biological materials, such as carbon nanotubes, that can both sense and signal, acting as wireless nano-antennas. Because they are so small, nano-sensors can collect information from millions of different points.

Power from the air

Even the smallest Internet-connected devices typically need a battery or power cord for much longer. Technology that lets gadgets work and communicate using only energy harvested from nearby TV, radio, cell-phone, or Wi-Fi signals is headed toward commercialization. The researchers who developed the technique have demonstrated Internet-connected temperature and motion sensors, and even a camera, powered that way.



Transferring power wirelessly is not a new trick. But getting a device without a conventional power source to communicate is harder, because generating radio signals is very power-intensive and the airwaves harvested from radio, TV, and other telecommunication technologies hold little energy.

It is proved that weak radio signals can indeed provide all an Internet gadget needs, using a principle called backscattering. Instead of generating original signals, one of their devices selectively reflects incoming radio waves to construct a new signal—a bit like an injured hiker sending an SOS message using the sun and a mirror. A gadget using the technique absorbs some energy from the signal it is modifying to power its own circuits. We can get communication for free in this way. RFID chips for the contactless smart cards used in mass transit also rely on backscattering, but they require specialized reader devices and can communicate only within a few inches because the reflected signals are weak and the reader itself presents interference.

The passive Wi-Fi consumes just 1/10,000th as much power as existing Wi-Fi chipsets. It uses a thousandth as much power as the Bluetooth LE and ZigBee communications standards used by some small connected devices and has a longer range. A device using passive Wi-Fi to communicate, for example, a security camera, could power its other circuits using energy harvested from the Wi-Fi signals it is backscattering, or by feeding on other signals such as TV and radio broadcasts.

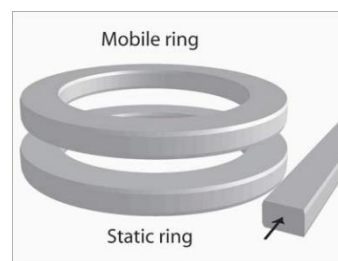
The researchers believe that tiny passive Wi-Fi devices could be extremely cheap to make, perhaps less than a dollar. In tomorrow's smart home, security cameras, temperature sensors, and smoke alarms should never need to have their batteries changed.

Smart optical microchips

A new theory developed at MIT could lead to "smart" optical microchips that adapt to different wavelengths of light, potentially advancing telecommunications, spectroscopy and remote sensing.

Drawn by the promise of superior system performance, researchers have been exploring the concept of microchips that manipulate light instead of electricity. In this new theory, it was shown how such chips could feature tiny machines with moving parts powered and controlled by the very light they manipulate, giving rise to fundamentally new functionality.

Earlier this year, an MIT team composed of many of the same researchers showed that photonic circuitry could be integrated on a silicon chip by polarizing all of the light to the same orientation. The current work shows how tiny mobile machines can be built on such chips, taking advantage of the substantial pressures exerted by photons as they strike the walls of a cavity.



In other words, this new, unique resonator is like a wine glass that self-adjusts to the pitch of the singer's voice and follows it along throughout song. Physical systems that adapt to

driving light and behave like these nano-machines do not exist elsewhere in nature. By coupling the resonating cavities with nano-scale cantilevers, optical devices analogous to microelectromechanical systems (MEMS) devices can be created. Although the researchers focused on ring-shaped cavities, their model could be applied to other structures as well.

PERSONALITIES WHO MADE A DIFFERENCE

ANU SRIDHARAN



Anu is the founder of NextDrop, a company which allows Indian residents in the urban areas to track the availability of piped water through SMS. The company already serves around 18,000 people in Karnataka. She is determined to change the way in

which technology allows us to interact with our urban systems.

AnuSridharan was 23 years old when she became the chief executive officer of a startup in Hubli- a town some 500 kilometers from Bangalore in Karnataka. Today, more than 5000 people pay her tiny startup called NextdropRs 10 every month to get a text message delivered to their phone. For them, the text message is crucial as it alerts them when water begins to flow from the municipal water tap nearby.

NextDrop began by tackling the problem of erratic water supply – in most of urban India, water is available only a few hours at a time or a few times a week, but residents have no way of knowing when. Working with operators in the field.

Anu also served as the Education and Health director for a water/sanitation project in the slums of Mumbai, India called “Haath Mein Sehat”, where she piloted a successful volunteer recruitment and community-training model.

Anu has also been selected to the Forbes “30 Social Entrepreneurs Under 30” list. Anu’s greatest takeaway from Nextdrop’s experience so far has been the unexpected ease at which the Karnataka Government, with whom they have partnered, has opened up to using technology.

VINOD DHAM



VinodDham(born in 1950) is an inventor, entrepreneur and venture capitalist. He is popularly known as the Father of the Pentium chip, for his contribution to the development of highly successful Pentium

processors from Intel.He is a mentor, advisor and investor; and sits on the boards of many companies including promising startups funded through his India-based fund – Indo US Venture Partners,where he is the founding Managing Director.

VinodDham’s accomplishment as an Indian-American technology pioneer from Silicon Valley, is being celebrated at a first-ever exhibition on South Asians in the National Museum of Natural History at the storied Smithsonian in Washington DC, highlighting Indian-Americans who have helped shape America.In 2000, he was appointed to serve on the President’s advisory Commission on Asian Americans and Pacific Islanders by President Clinton.In 1 Jan' India’s premier magazine India Today listed Dham among the Global Indian Achievers. Dham was profiled at the

PravasiBhartiyaDiwas in 2007, organised by the Ministry of Overseas Affairs of the government of India.

Dham was awarded the NRI Achievement Award at the NRI Global Summit in Oct 2009 by the NRI institute. Dham was profiled among the first and notable Indian American achievers by the Asian Pacific. On 13 November 2014, Dham was honored with 'Lifetime Accomplishments Award' by VC Taskforce, a Silicon Valley-based organization boasting 6000 members dedicated to promoting innovation through Venture Community.

ROBERT NOYCE



Robert Norton Noyce (December 12, 1927 – June 3, 1990), nicknamed "the Mayor of Silicon Valley," co-founded Fairchild Semiconductor in 1957 and Intel Corporation in 1968. He is also credited (along with Jack Kilby) with the realization

of the first integrated circuit or microchip that fueled the personal computer revolution and gave Silicon Valley its name.

After graduating from the Massachusetts Institute of Technology in 1953, he took his first job as a research engineer at the Philco Corporation in Philadelphia. He left in 1956 for the Shockley Semiconductor Laboratory in Mountain View, California. He joined William Shockley, a co-inventor of the transistor and eventual Nobel Prize winner, at the Shockley Semiconductor Laboratory, a division of Beckman Instruments.According to Sherman Fairchild, Noyce's impassioned presentation of his vision was the reason Fairchild had agreed to create the semiconductor division for the traitorous eight.Noyce and Gordon Moore founded Intel in 1968 when they left Fairchild Semiconductor.

In July 1959, he filed for U.S. Patent 2,981,877 "Semiconductor Device and Lead Structure", a type of integrated circuit.Noyce was a holder of many honors and awards. President Ronald Reagan awarded him the National Medal of Technology in 1987.Two years later, he was inducted into the U.S. Business Hall of Fame sponsored by Junior Achievement. Noyce received the Franklin Institute's Stuart Ballantine Medal in 1966.He was awarded the IEEE Medal of Honor in 1978 "for his contributions to the silicon integrated circuit, a cornerstone of modern electronics.

CAREER

ONLINE COURSES:

C-DAC

The Centre for Development of Advanced Computing (C-DAC) is a research and development organization under the Department of Electronics and Information Technology, Govt of India. C-DAC provides several courses in the field of advanced computing and software development. Among these are the hpc certification course *C-DAC Certified HPC Professional Certification Programme (CCHPCP)*. CDAC organizes advanced computing diploma programs through the Advanced Computing Training School (ACTS) located all over India. The PG Diploma courses include specialisations in Embedded System Design, VLSI.

TASK

Telangana Academy for Skill and Knowledge (TASK) is a none profit organization created by Government of Telangana for bringing synergy among institutions of Government, Industry & Academia with an objective of offering quality human resources and services to the industry. Granting access to modules for enhancing student's technology, personal and organization skills at highly subsidized rates.

CAREER IN AIRPORT AUTHORITY OF INDIA

AIR TRAFFIC CONTROLLER

Air traffic control officers (ATCOs) assist not only flights taking off from and landing in India, but also those flights — between other countries — which fly over Indian airspace. They do so by visual observation from the ATC tower's windows and through radar. During peak hours at midnight at Delhi's international airport, the busiest in India, an ATCO might have to handle 200-300 planes overflying the capital's airspace. ATCOs are employed by Airports Authority of India (AAI).

SKILLS NEEDED:

- Logical thinking
- Communication skills
- Ability to make decisions at jet speed
- Focus on work for hours at a stretch

HOW TO GET INTO AAI:

After science in Class 12, an engineering degree in electronics, telecommunication, radio engineering, or electrical with first class Or, a master's in electronics or any discipline with electronics, telecom, radio physics, as specialization subjects. Clear the Airports Authority

of India's written test, followed by a voice test, personal interview and a medical examination.

HIGHER EDUCATION

MBA

If you want to make a career in the management sector, hold managerial positions, then MBA is the right choice. You may specialize in your area of interest which may be the all time popular fields like HR, Marketing, Sales or the new growing domains like Digital Marketing, International Relations etc. CAT (Common Admission Test) serves as a gateway for an MBA at the IIMs and many other leading institutes. Some other popular exams are XAT (Xaviers), NMAT, SNAP, CMAT, TISS, IRMA etc.

SHORT TERM COURSES

There are various short term courses and diploma courses you can opt for after your B.Tech. It can be a certificate course in embedded technology, VLSI, robotics, ethical hacking, protocol testing, machine designing etc. or a diploma course in any specific domain. Such courses are generally job oriented and serve as a bridge between what you know and what the industry expects you to know in order to absorb you into their organization.

ENTREPRENEURSHIP:

“Taking risks and experimenting are things all of us can do—and not just in our careers.”As India is becoming the buzzing land for entrepreneurs across the globe, more and more start-ups are venturing in India with their products. The India Entrepreneurship Report 2015 has reported tangible enthusiasm for entrepreneurship as being a good prospect to earn a livelihood in the country. SV.CO, the newly launched digital platform of Startup Village Kochi, has organised a six-month entrepreneurship programme for students and joined hands with Facebook to provide access to its developer teams in Menlo Park, California

TIPS FOR SUCCESS FOR ENGINEERING STUDENTS

A career in engineering is very interesting and at the same time very challenging. Engineering students are shaped to take major leadership roles worldwide only if they take steps to succeed. Here are some best tips, most of which would work for any career-aspiring college student

1. Identify the people who inspire you, and find out what makes them tick.

If you love Apple products, Steve Jobs may be your idol, or perhaps you love the Segway and its creator, Dean Kamen. You can easily find out a lot of

information about Jobs and Kamen—or just about any other prominent person in technology—so use it to look into what's helped these people and their companies become so successful. Then emulate their good traits in your personal, scholastic, and professional life.

2. Work in teams as much as you can.

Whether it's creating a solar-powered car, participating in a sport, or writing for the school paper, get involved with an organization that requires a team effort to produce great results. Throughout your career, you can be sure you'll work in teams, and the skills you develop in school will help prepare you to lead teams when you graduate.

3. Make your summers productive.

Employers place tremendous value on practical experience. Seek out internship opportunities actively and early in your academic career. Try to demonstrate through your internships a series of evolving leadership experiences, and use the internships to build your portfolio of actual projects/products. New graduates who can show a commitment to using their summer to continue to learn are always viewed more seriously by a prospective employer.

4. Ask Questions.

Remember the saying that “it is better to remain silent and be thought a fool than to open one’s mouth and remove all doubt?” Don’t believe it. It’s dangerous, especially for engineers. Asking questions forces us to consider all the options. It extends our comfort zone and helps us to grow.

5. Don’t Stop Learning.

Smart young engineers recognize that a diploma is just the first step in a career that will require constant education and a fair amount of re-education. A continual stream of learning for young engineers is required for success.

JOB OPPORTUNITIES:

CIVIL SERVICE AS A CAREER OPTION

Civil Servants are bureaucrats who often significantly influence decision making of the government. Though you may not be as highly paid as a private sector executive, but the power and status associated with this field more than makes up for it. In fact, civil servants are often called the real power behind the government. The officers of the Indian Civil Services are general managers who have a wide variety of duties and responsibilities ranging from maintenance of law and order, collection of taxes, to developmental work within State and Central areas of jurisdiction, implementation of social welfare activities, etc. They head the Union and the State Secretariats as well as the district administrations throughout the country. The broad areas of work for a civil servant are:

*** Indian Administrative Services (IAS)**

An IAS officer manages the general administration of the state including the development function. Policy formulation, implementation and control at different levels are your main responsibilities. At the district level your responsibilities also include overseeing law and order situations and collecting taxes.

*** Indian Police Service (IPS)**

Here lies the excitement for all you budding KiranBedi’s. As an IPS officer you'll be the brain behind not just the police force but also the CRPF, BSF, CISF, etc. Your main task will be to maintain law and order at all times. Planning pro-active strategies and implementing and controlling the police force are also your responsibilities. The ones craving for some adventure will have ample in the form of tackling crime and law and order emergencies.

*** Indian Foreign Service (IFS)**

You'll work in the Ministry of External Affairs and manage Indian offices like Indian High Commission, Indian Consulates, Indian Embassies abroad. Work related to Passport services, Visa services, Consular services, etc. will be routed through you. Of course, you'll also promote trade and cultural relations with foreign countries.

*** Indian Railway Service (IRS)**

If employed here, you'll look after different divisions of the Railways like the Traffic Service (again this is divided into Commercial and Operations.), Accounts Services, Police Services, Personnel Services, etc. The operations division is in charge of the movements of passenger and goods train and all the activities related to movement including passenger comfort and safety.

*** Indian Postal Service (IPS)**

This is one of the largest organisations in the world with numerous offices all over the country. They head different operational divisions of the Postal service and manage the entire operations.

*** Indian Audit and Accounts Services (IA & AS)**

Accounting and auditing of different Central Government departments is the main responsibilities of these officers. They work with the Central Government.

*** Indian Civil Accounts Services (ICAS)**

They work in the Ministry of Finance, Office of the Comptroller and Auditor General of India, Office of the Chief Controller of India, etc.

*** Indian Defence Accounts Services (IDAS)**

In this department of the **Indian Civil Service** you'll look after the accounts of the Defence forces, Army, Air Force, Navy and other protective services. Your main functions will be accounting and auditing.

*** Indian Information Service (IIS)**

In this department of the **Indian Civil Service** it's your responsibility to ensure that only correct information reaches the media. Organising press conferences, controlling official media and organising festivals is your business.

INTERNSHIPS:

'Intern', used on glossy American TV dramas such as The West Wing and Grey's Anatomy, certainly sounds more impressive than 'work experience'. In the US, doing an internship with a major company, law firm, newspaper, TV network or even at the White House, is generally perceived by graduates as a fast track to a successful career.

NITI:

NITI Aayog, Government of India had initiated an Internship Scheme in 2015. Based on the experience in the past years a review was made. Now in supersession of all the previous guidelines in this regard, The NITI Aayog announces the revised Internship Scheme. This Scheme seeks to engage students pursuing Under Graduate/Graduate/Post Graduate Degrees or are ResearchScholars enrolled in recognized University/Institution within India or abroad, as "Interns".

These "Interns" shall be given exposure to various Verticals/Divisions/Units within NITI Aayog and would be expected to supplement the process of analysis within NITI Aayog through empirical collection and collation of in-house and other information. For the "Interns" the exposure to the functioning of the Indian Government may be an add-on in furthering their future interests.

COMPANIES OFFERING INTERNSHIPS FOR ECE STUDENTS:

Many companies are there which cover the above 4 sectors, few of the top companies which have been consistently training students for industrial training programs are listed down below

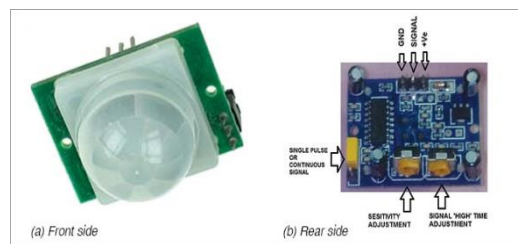
- BSNL
- Siemens
- Intel
- Nokia India
- Videocon
- AT&T
- NAL (National Aerospace Lab)
- DRDO

- BHEL
- Honey well India

PROJECTS

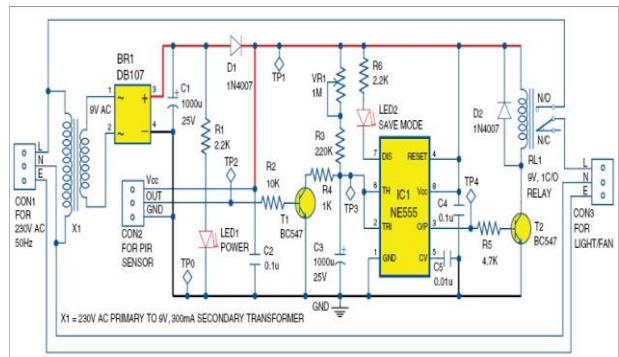
INFRARED BASED POWER SAVER:-

Quite often you forget to switch off the light or fan when going out of the room. The simple circuit presented here will automatically switch off electrical appliances like lights or fans as you vacate a room, after a predetermined time period. It will also switch on the light when you enter the room again. This will reduce unnecessary power consumption.



Circuit and working:

The circuit diagram of the PIR sensor based power saver is shown in Fig. 2. It is built around bridge rectifier DB107 (BR1), PIR motion sensor connected across connector CON2, timer NE555 (IC1), two 1N4007 rectifier diodes (D1 and D2) and a few other components.



The circuit uses a PIR sensor, which detects the presence of people through change in the infrared radiation from the room when people enter or leave the room. The PIR sensor outputs around 3.3V high signal whenever it detects radiation change in front of it. IC1, resistor R3, potmeter VR1 and capacitor C3 are used as a timer here to convert small time span of PIR signal to a long delay. Output of IC1 at pin 3 drives transistor T2,

which, in turn, controls relay RL1. Electrical loads like lights or fans are controlled through this relay.

PARTS LIST	
Semiconductors:	
IC1	- NE555 timer
T1, T2	- BC547 npn transistor
D1, D2	- 1N4007 rectifier diode
BR1	- DB107 bridge rectifier
LED1, LED2	- 5mm LED
Resistors (all 1/4-watt, ±5% carbon):	
R1, R6	- 2.2-kilo-ohm
R2	- 10-kilo-ohm
R3	- 220-kilo-ohm
R4	- 1-kilo-ohm
R5	- 4.7-kilo-ohm
VR1	- 1-mega-ohm potmeter
Capacitors:	
C1, C3	- 1000µF, 25V electrolytic
C2, C4	- 0.1µF ceramic disk
C5	- 0.01µF ceramic disk
Miscellaneous:	
CON1-CON3	- 3-pin connector
X1	- 230V AC primary to 9V, 300mA secondary transformer
RL1	- 9V, 1C/O relay
	- PIR sensor module

230V AC mains power is connected across connector CON1. It is stepped down to 9V through transformer X1, rectified by bridge rectifier BR1 and filtered by capacitor C1. Thus we get around 9V DC at test point TP1. This 9V DC voltage is used as power supply for the circuit.

When the circuit is first switched on, capacitor C3 charges through potmeter VR1 and resistor R3. During this time, voltage at pins 2 and 6 of IC1 is less than two-thirds of its supply voltage, and so output pin 3 goes high. This energises the relay through transistor T2, and the appliance is switched on. When capacitor C3 charges above two-thirds of the supply voltage, IC1's output pin 3 goes low and de-energises the relay and switches off the appliance after some delay that can be adjusted through potmeter VR1. Whenever motion is detected by the PIR, its output pin goes high (around 3.3V) for a while depending on the setting on the PIR. The high signal from the PIR is fed to the base of transistor T1, which, in turn, discharges capacitor C3 through resistor R4. When the capacitor's charge (voltage) reaches less than two-thirds of the power supply, output pin 3 of IC1 goes high again (initial stage) and load is switched on. When the load is switched off, LED2 glows. This indicates that the circuit is under power-save mode.

LUGGAGE SECURITY ALARM:

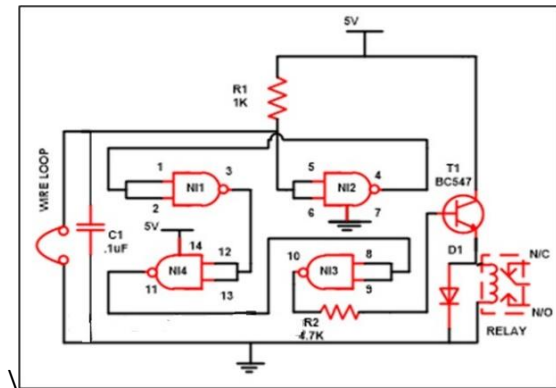
During our journey through train and bus, we carry many important things and all the time we have fear that someone might lift our luggage. So to protect our baggage, we normally lock our baggage through old ways by the help of chain and lock. After all locks, we still remain in fear that someone may slash the chain and take away our valuable material. To overcome with these fear, here is an easy circuit which is based on the NAND gate.

Luggage Security Alarm Circuit Description:

The basic building block of this circuit is CD4011 along with some other components viz. resistors, capacitor along with transistor and relay which is used to save your important things from robbery with the help of this easy circuit. It produces a warning beep, when someone

tries to unlock the lock as an effect of its wire loop will split and alarm is produced.

Luggage Security Alarm Circuit Diagram:



Circuit Components:

S.No	component	Model no	quantity
1	IC	IC1(CD4011)	1
2	Resistors	R1(1K)	1
		R2(4.7K)	1
3	Capacitor	C1(0.1µF)	1
4	Miscellaneous	Relay	1
		T1(BC547)	1
		D1(1N4007)	1

Functioning of these circuits is very easy when we will receive; output is based on the voltage on pin 5. At the time when power supply is attached to the circuit pin 5, voltage is at zero as loop is unbroken. Hence at pin 4, voltage is high which is coupled with pin1 and pin 2 which is also at high state. As you can also find from the truth table of the NAND gate that if both the inputs are at high state, then the output is low hence at the pin 3 of gate 1, we get low which is once more attached to pin 12 as well as 13 moving them also to the low which in turn makes the pin 11 to switch at high switching pin 8 as well as pin 9 also at high and low voltage at pin 10 due to this transistor linked to it via a resistor will not boost the base of it and the alarm will not receive by us. This implies that our baggage is secure. Now suppose that someone attempt to take your baggage then the loop attached to it broken down. At the time loop break down, pin 5 as well as pin 6 shift to high and just opposite work will take place which we will explained above due to which pin 10 reaches to high state and transistor begin its conduction and alarm is receive by us. And the alarm will not stop till the time we once again interact with the loop. Based on the rating of the relay that you are using in your circuit value of the battery will vary in the range of 6-15V. If you wish, you can directly fix the buzzer without using relay. We are using the relay in our circuit because if anybody wants

to connect the alarm directly with the AC, then also it will work without making any damage.

PROBLEMS IN SOCIETY

ETHICAL ISSUES IN ARTIFICIAL INTELLIGENCE AND MACHINE REASONING

It is pointed out the oncoming problem with artificial intelligence is ethical dilemma posed by machines that are more competent than us. Within two or three decades the difference between automated driving and human driving will be so great you may not be legally allowed to drive your own car, and even if you are allowed, it would be immoral of you to drive, because the risk of you hurting yourself or another person will be far greater than if you allowed a machine to do the work.

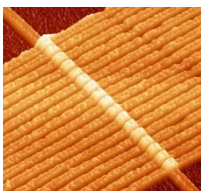
One of the central questions debated is how we will delegate moral/ethical decision-making to machines. The "how" question is not about the mechanics of implementing a decision in software. The "how" question is more about who decides and what decisions are encoded in our machines. This is already done: algorithms decide when to deploy air-bags or when to release steam from a boiler when the pressure exceeds a threshold.

GENERATING ENERGY AT LOW COST

Among all our problems, our inability to produce energy in a sustainable way seems to be the most intractable. Although it is possible on paper to produce all our energy from renewable sources, the costs are prohibitive. A big switch to renewable would also need substantial re-engineering of our industries. Which is why most projections posit only small and gradual increases in the share of renewables in our energy mix. Solar energy will get better, and emerging grid storage technologies will let us use it at night, too. In the long-run, the only low-carbon energy source seems to be nuclear energy. Third and fourth generation nuclear energy technologies are safer and far more environment friendly than the current second generation ones. By mid-century, perhaps, fusion energy would solve the energy problem forever.

Technology News

MEMRISTOR



A **memristor** (a portmanteau of memoryresistor) is a hypothetical non-linear passive two terminal component relating electric charge and magnetic flux linkage.

The memristor would hypothetically operate in the following way: The memristor's electrical resistance is not constant but depends on the history of current that had previously flowed through the device, *i.e.*, its present resistance depends on how much electric charge has flowed in what direction through it in the past; the device remembers its history — the so-called non-volatility property. When the electric power supply is turned off, the memristor remembers its most recent resistance until it is turned on again.

SNAKE ROBOT



Are you, like many, afraid of snakes? What about robots? What about snake robots? Now here's an idea that is truly "outside the box!" This innovation, which uses nature for inspiration, is

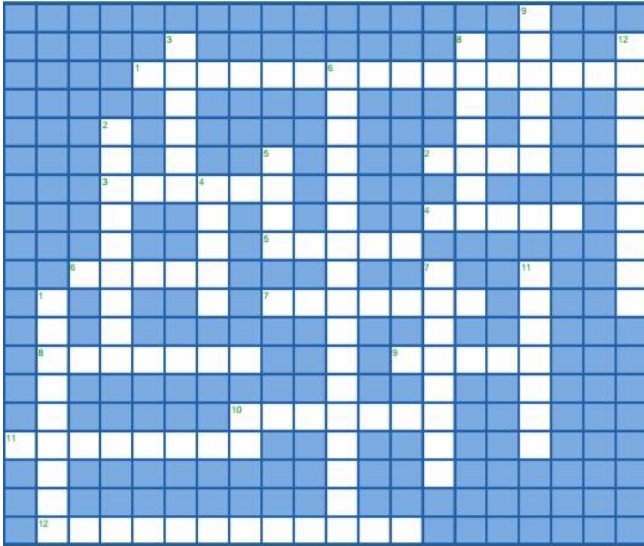
just one incredible example of biomimicry a growing field of science at the intersection of engineering, design, and biology.

What is the potential for the snake robot? Consider the many dirty jobs that, performed by humans, endanger lives, or jobs that require access to small spaces, spaces that even conventional robots, with limbs or wheels, could never access. Consider the possibility for assisting in minimally-invasive surgery, for inspection of power plants, for aiding in search and rescue efforts, in archaeological digs.

OMNI PROCESSER

A product of the rigorous data-driven analysis of our engineering team, this next generation Omni Processor has just undergone the first stage of testing and upgrades at our Sedro-Woolley, WA facilities, and is now in the second wave of testing and redesigns to fully confirm all expected performance parameters. Solid waste streams of paper and plastic are now able to be processed with this model simultaneously with sludge if desired. Our multi-stage sludge drying system allows the plant to process higher volumes of waste than our pilot model. The water treatment system is more sophisticated, and now addresses the elimination of ammonia—present in sludge which has been sitting in an anaerobic state for some time.

ELECTRONIC CROSS WORD PUZZLE



Across:

1. Two resistors connected together, across a power supply (9, 7).
2. Process used to remove unwanted copper from PCB (4).
3. Colour band used to indicate the number 7 (6).
4. Colour band used to indicate the number 0 (5).
5. Connects the components together on a PCB (5).
6. A component which allows current to flow only in one direction (5).
7. Makes a sound (7).
8. A collection of components, connected together (7).
9. The L in LED (5).

10. Flows through a circuit (7).
 11. Electronics that works with real voltages (9).
 12. Type of capacitor, which is polarized (12).
- Down:**
1. Shape of the schematic symbol for a resistor (9).
 2. Stores charge (9).
 3. Electrically joints components to a PCB (6).
 4. Energy that allows the electronics to work (5).
 5. Check the board works, after construction (4).
 6. A chip / part with two row of pins (10, 7).
 7. Component with colored bands to determine its value (8).
 8. Something that can only be true/ false, 0 or 1 (7).
 9. Used to turn things on and off (6).
 10. Letters used to mark commercial electronics sold in Europe (2).
 11. Measured across components such as batteries (7).
 12. A component that acts like an electronic switch (10).



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GRADUATES OF 2015-2016



Strength is the sign of vigor, the sign of hope,
the sign of health, and the sign of everything
that is good. As long as the body lives, there
must be strength in the body, strength in the
mind, strength in the hand.

-Swami Vivekananda

