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 -15

A TECHNICAL MAGAZINE

VOLUME-V

DEC - 15

ECE

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ELECTROMANIA'15

a technical magazine

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

EDITORIAL BOARD

We wish you a very happy and prosperous new year-2016

CHIEF EDITOR MESSAGE

It is said that inventions and discoveries are made by maniacs. The overall environment in the institution is congenial for a steady growth of knowledge, personal development and research attitude. I earnestly hope that through this magazine more maniacs are developed contributing to the research basket of the institute. I congratulate the department of ECE and the editorial board of the technical magazine "ELECTROMANIA", which is a step taken to gear up and monitor to cope with emerging trends of industry. I wish that this magazine will enrich reader's knowledge by providing a glimpse of new technological trends and guide the students in their path to successful career. We should create and develop maniacs.

-Dr. Y.Manohar

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PRINCIPAL MESSAGE

A student with zeal to become a professional ,a parent who wishes to see his son/daughter as a valuable engineer professionally contributing to the society will make sizable contribution of finance from his/her family income. In an educational institution the cost of education for the person touches upto 5 lakhs towards tuition fee, institution fee etc….The total returns on this expenditure is in the form of few theory courses along with practical skill development in laboratories, on an average all together 390 classes per semester and approximately the investment per semester is 62500/-, i.e. each class costs the sum of Rs.160.**If you bunk for one day Rs.1120 is the loss.**

So "My dear friends it is worthwhile to think about this naked fact, do justice to your family, institution and society".

- Prof.K.Gururaj

EDITOR IN-CHARGE MESSAGE

With the spirit and our constant endeavor to impart value based quality education, it is our pleasure to bring forth yet another issue of our technical magazine "Electromania". It is very important for engineering students to know the latest technological trends ,as engineers continue to forge ahead in their fields in frontier beyond the available scientific knowledge and evolve new products . This magazine helps the students to meet the minimum criteria of technical excellence and guide them on their way to success.

-Prof.G. Raghotham Reddy

FACULTY IN-CHARGE MESSAGE

Technical education should incorporate all elements that enable engineering graduates to become well suited for market place ,however equal emphasis must exist between practical and innovative need based research aspects of quality education. Keeping this in view "Electromania" is a small initiative by the dept of ECE. I am sure that this technical magazine inspires the readers with its content comprising of the latest technological trends, tips and guidelines for students and a couple of projects. I am confident that this magazine will give impetus to research culture among the students.

- Smt.A.Vijaya

CONTENTS

WHAT TO LEARN

Raspberry pi:

Raspberry pi is a series of credit card – sized single-board computers developed in UK by the Raspberry pi foundation with the intention of promoting the teaching of basic computer science in schools and third world countries. The Raspberry pi hardware has evolved through several versions that features variations in hardware performance, memory capacitance , and peripheral device supports.

Matlab Simulink by Mathworks

Matlab Simulink is the one of the most highly advanced software used for circuits simulation and building the models. This software is used by many electronics engineers and students do their projects using this software because the model design and advanced features makes this software more reliable. Also online tutorials are available for this software.

Electric VLSI Basic Design Software

The Electric VLSI Design System is an open-source Electronic Design Automation (EDA) system that can handle many forms of circuit design, including:

•Custom IC layout

•Schematic Capture (digital and analog)

•Textual Languages (such as VHDL and Verilog)

Circuits Cloud

Circuits Cloud is an online free analog/digital circuit simulator. It is a NGSPICE-based simulator. Circuits Cloud is a cloud-computing-based application where the user can access the application through the internet while all their data are stored online. Circuits Cloud was created and developed for educational purposes. Circuits Cloud was initially developed as an online digital circuit simulator.

Logisim

Logisim is an educational tool for designing and simulating digital logic circuits. With its simple toolbar interface and simulation of circuits , 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 to design and simulate entire CPUs for educational purposes.

Cadence

Cadence Design Systems produces software and hardware for designing integrated circuits, systems on chips (SoCs) and printed circuit boards. Today's chips may have billions of transistors that are far smaller than the wavelength of light used to print them.

The design of chips and systems with such complexity – while meeting demands for performance, low power, and time to market – is possible only with advanced electronic design automation (EDA) tools. EDA software and hardware enables everything from the design of individual transistors to the development of software before any hardware is built. Another crucial enabling factor is semiconductor intellectual property (IP), which provides pre-verified building blocks for memory controllers, interface protocols, or specialized processors that are integrated into SoCs.

Cadence's product offerings are targeted at various types of design and verification tasks which include:

- Encounter Platform
- Incisive Platform
- Virtuoso Platform

TINA

TINA is an acronym of "Toolkit for Interactive Network Analysis.

TINA Design Suite is a powerful yet affordable circuit simulator and PCB design software package for analyzing, designing and real time testing of analog, digital, HDL, MCU, and mixed electronic circuits and their PCB layouts. We can also analyze SMPS, RF, communication and optoelectronic circuits; generate and debug MCU code using the integrated flowchart tool and test microcontroller applications in a mixed circuit environment. A unique feature of TINA is that a can be brought

to life with the optional USB controlled TINA Lab II and LabXplorer hardware, which turns a computer into a powerful, multifunction T&M instrument. With TINACloud, in addition to the installable versions, now one can also edit and run circuit simulation designs online on PCs, Macs, thin clients, tablets, smart phones, smart TVs and e-book readers without any installation.

FEKO

FEKO is a computational electromagnetics software product developed by Altair Engineering. FEKO performs "field calculations involving bodies of arbitrary shape".It is a general purpose 3D electromagnetic (EM) simulator.

The software is based on the Method of Moments (MoM) integral formulation of Maxwell's equations and pioneered the commercial implementation of various hybrid methods such as:

- Finite Element Method (FEM) / MoM
- MoM / Physical Optics (PO)
- MoM / Geometrical Optics (GO)
- MoM / Uniform Theory of Diffraction (UTD)

IE3D - Scalable EM Simulation Solution

IE3D from Mentor Graphics, formerly Zeland Software is the first SCALABLE EM design and verification platform that delivers the modeling accuracy for the combined needs of high-frequency circuit design and signal integrity engineers across multiple design domains.

For many companies, there is no longer just one EM problem at hand, but several different ones each presenting a unique bottleneck and delaying overall design closure. IE3D's multi-threaded and distributed simulation architecture and high-design capacity is the most cost-effective EM simulation and modeling solution for component-level and circuit-level applications. IE3D offers the highest simulation capacities and fastest turnaround times for the broadest number of applications making it the best choice for improving design team productivity and meeting design schedules on time.

WHAT'S NOW

Google's Project Loon

What is project loon?

Many think of the Internet as a global community. But two-thirds of the world's population does not yet have Internet access. Project Loon is a network of balloons traveling on the edge of space, designed to connect people in rural and remote areas, help fill coverage gaps and bring people back online after disasters.

Project Loon balloons float in the stratosphere, twice as high as airplanes and the weather. In the stratosphere, there are many layers of wind, and each layer of wind varies in direction and speed. Loon balloons go where they're needed by rising or descending into a layer of wind blowing in the desired direction of travel. By partnering with Telecommunications companies to share cellular spectrum Google company has enabled people to connect to the balloon network directly from their phones and other LTE-enabled devices. The signal is then passed across the balloon network and back down to the global Internet on Earth.

Project Loon began in June 2013 with an experimental pilot in New Zealand where a small group of Project Loon pioneers tested Loon technology. The results of the pilot test as well as subsequent tests in New Zealand, California's Central Valley and in Northeast Brazil are being used to improve the technology in preparation for the next stages of the project.

Fractal Antennas

Antenna designers are always looking to come up with new ideas to push the envelope for antennas using a smaller volume while striving for every higher bandwidth and antenna gain. One proposed method of increasing bandwidth (or shrinking antenna size) is via the use of fractal geometry, which gives rise to **fractal antennas**.

Fractals are complex geometric designs that repeat themselves, or their statistical properties on many scales and are thus “self similar.”

Fractals through their self-similar property are natural systems where this complexity provides the sought-after antenna properties.

The first use of fractals as antennas was called “fractal loading,” which uses bends or holes over a variety of size scales to emulate the effects of discrete inductors and capacitors. The arrangement of these fractal bends or holes act as lumped or continuous loading elements. Of course, the equivalent circuit of such a loaded antenna would have multiple capacitors and coils. In contrast the antenna made from fractals is loaded purely by shaping alone. Fortunately, “shaping” as a substitute for discrete components is a long-used approach resulting in tuned micro-strip antennas, meander line antennas and even “stubby coil” antennas.

Some key benefits of fractals are:

- Very broadband and multiband frequency response that derives from the inherent properties of the fractal geometry of the antenna.
- Compact size compared to antennas of conventional designs, while maintaining good to excellent efficiencies and gains.
- Mechanical simplicity and robustness; the characteristics of the fractal antenna are obtained due to its geometry and not by the addition of discrete components.
- Design to particular multi frequency characteristics containing specified stop bands as well as specific multiple pass bands.

Future communications systems will use cognitive radios that require vast bandwidths with one antenna. For the soldier this spells the need for a single antenna, or simple antenna system that can be body-worn and not physically interfering with other needs. As the future soldier looks more and more like the “Borg” from Star Trek, the communications needs will have to keep up. Since 1997, fractal antennas have been used to make body worn antennas that have the fewest compromises and work best for most terrestrial and Sat-Com applications. It is anticipated that such antennas will likely be the enabling choice in both legacy and future communications applications.

WHAT'S NEXT

Virtual Reality

Virtual Reality (VR), which can be referred to as immersive multimedia or computer-simulated life, replicates an environment that simulates physical presence in places in the real world or imagined worlds and lets the user interact in that world. Virtual reality artificially creates sensory experiences, which can include sight, hearing, touch and smell.

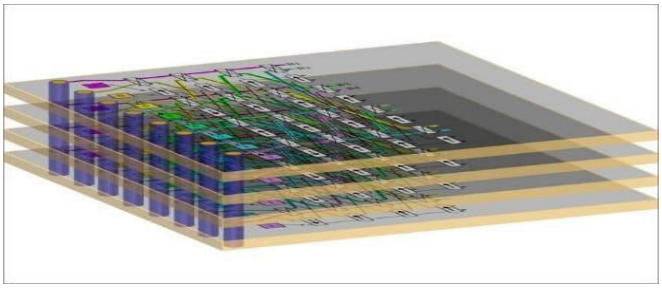
Most up to date virtual reality environments are displayed either on a computer screen or with special stereoscopic displays and some simulations include additional sensory information and focus on real sound through speakers or headphones targeted towards VR users. Some advanced haptic systems now include tactile information generally known as force feedback in medical, gaming and military applications. Furthermore, virtual reality covers remote communication environments which provide virtual presence of users with the concepts of telepresence and tele existence or a virtual artifact (VA) either through the use of standard input devices such as a keyboard and mouse or through multimodal devices such as a wired glove or omnidirectional treadmills. The simulated environment can be similar to the real world in order to create a life-

like experience—for example in simulations for pilot or combat training—or it differs significantly from reality such as in VR games.

Windows Holographic is a mixed reality computing platform by Microsoft enabling applications in which the live presentation of physical real-world elements is incorporated with that of virtual elements (referred to as "holograms" by Microsoft) such that they are perceived to exist together in a shared environment. A variant of Windows for augmented reality computers (which augment a real-world physical environment with virtual elements) Windows Holographic features an augmented-reality operating environment in which any Universal Windows App can run. In addition, with Holographic APIs which are part of the Universal Windows Platform and supported as standard in Windows 10 (including versions for mobile devices and Xbox One), mixed reality features can be readily implemented in any Universal Windows App, for a wide range of Windows 10-based devices.

Three Dimensional Integrated Circuit

In microelectronics, a “three dimensional integrated circuit” (3D IC) is an integrated circuit manufactured by stacking silicon wafers and/or dies and interconnecting them vertically using through-silicon via (TSVs) so that they behave as a single device to achieve performance improvements at reduced power and smaller footprint than conventional two dimensional processes. 3D IC is just one of a host of 3D integration schemes that exploit the z-direction to achieve electrical performance benefits. They can be classified by their level of interconnect hierarchy at the global (package), intermediate (bond pad) and local (transistor) level. In general, 3D integration is a broad term that includes such technologies as 3D wafer-level packaging (3DWLP); 2.5D and 3D interposer-based integration; 3D stacked ICs (3D-SICs), monolithic 3D ICs; 3D heterogeneous integration; and 3D systems integration.



While traditional CMOS scaling processes improves signal propagation speed, scaling from current manufacturing and chip-design technologies is becoming more difficult and costly, in part because of power-density constraints and in part because interconnects do not become faster while transistors do. 3D ICs address the scaling challenge by stacking 2D dies and connecting them in the 3rd dimension. This promises to speed up communication between layered chips compared to planar layout. 3D ICs promise many significant benefits including:

- Footprint, Cost, Heterogeneous integration, Shorter interconnect, Power, Design, Circuit security, Bandwidth.

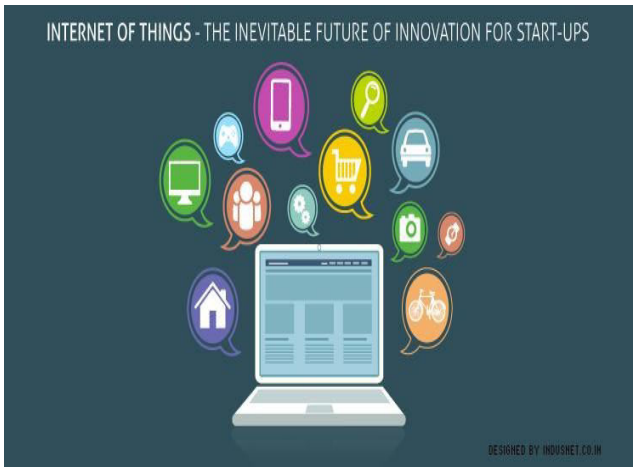
Challenges:

- Cost ,Yield ,Heat ,Design complexity ,TSV-introduced overhead, Testing ,Lack of standards ,Heterogeneous integration supply chain ,Lack of clearly defined ownership

Internet Of Things (IOT)

Internet of things revolve around increased machine to machine communication. It is built on cloud computing and a network of data gathering sensors It is mobile, virtual, instantaneous and it is going to make everything in our life from streetlights to seaports “smart”.

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors and network connectivity which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure creating opportunities for more direct integration between the physical world and computer-based systems and resulting in improved efficiency, accuracy and economic benefit.



Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. “Things," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors or field operation devices that assist firefighters in search and rescue operations. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include smart thermostat systems and washer/dryers that use Wi-Fi for remote monitoring. Typically, IoT is expected to offer advanced connectivity of devices, systems and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications

like a Smart Grid and expanding to the areas such as smart cities.

PERSONALITIES WHO MADE A DIFFERENCE

Susant Pattnaik

The most ordinary and common people usually do something very extraordinary and uncommon. Susant

Pattnaik is one such young lad who hails from Bhubaneswar, Odisha who is a serial inventor, serial entrepreneur, inspirational/ motivational speaker and has been awarded the President's Award six times. Still in his teens, Susant has become one of the youngest speakers to have spoken at TED. Being a greatly motivated inventor his areas of interest include scientific innovations & research. His first successful invention, Susant's Breathing Sensor Apparatus, a device through which disabled people can perform their daily necessary jobs through breathing actions, won him innumerable national and international awards and considerations. He has been appreciated by numerous worthy personalities, like the Former President of India Dr. APJ Abdul Kalam via NIF at IIM Ahmadabad in 2009 as the best invention of the year, the Former President of India Smt Pratibha Patil, The President of India Shri Pranab Mukherjee, Former DG of CSIR Dr R A Mashelkar, Dr Sam Pitroda, Mr James Cameron and many others. Organisations such as MIT Technology Review published his technology at a tender age of 17 and others like NASA, Intel and NIF etc have appreciated and valued him.

Today, he is no more a wonder-kid of the block but rather a social tech entrepreneur that the world is both inspired by and in awe of. Susant is also helping unsupported inventors to take their creations to the next level.

Indra Krishnamurthy Nooyi

Indra Krishnamurthy Nooyi (born 28 October 1955) is an India-born, naturalized American, business executive and the current Chairperson and Chief Executive Officer of PepsiCo, the second largest food and beverage business in the world by net revenue. She has consistently ranked among the World's 100 Most Powerful Women. In 2014, she was ranked 13 in the list of Forbes World's 100 most powerful women .

Nooyi was born to a Tamil-speaking family in Madras (presently Chennai), Tamil Nadu, India. She was educated at Holy Angels Anglo Indian Higher Secondary School in Madras. She received a bachelor's degree in Physics, Chemistry and Mathematics from Madras Christian College in 1974 and a Post Graduate Diploma in Management (MBA) from Indian Institute of Management Calcutta in 1976. Beginning her career in India, Nooyi held product manager positions at Johnson & Johnson and textile firm MetturBeardsell. She was admitted to Yale School of Management in 1978 and earned a master's degree in Public and Private Management. While at Yale, she completed her summer internship with Booz Allen Hamilton. Graduating in 1980, Nooyi joined the Boston Consulting Group (BCG) and then held strategy positions at Motorola and Asia Brown Boveri.

Awards and recognition:

Forbes magazine ranked Nooyi on the 2008, 2009, 2010, 2011, 2012, 2013, and 2014 lists of The World's 100 Most Powerful Women. Fortune magazine has named Nooyi number one on its annual ranking of Most Powerful Women in business for 2006, 2007, 2008, 2009 and 2010.In 2008, Nooyi was named one of America's Best Leaders by U.S. News & World Report. In 2008, she was elected to the Fellowship of the American Academy of Arts and Sciences.

In January 2008, Nooyi was elected chairwoman of the U.S.-India Business Council (USIBC). Nooyi leads USIBC's Board of Directors, an assembly of more than 60 senior executives representing a cross-section of American industry.

Nooyi has been named 2009 CEO of the Year by Global Supply Chain Leaders Group. In 2009, Nooyi was considered one of "The TopGun CEOs" by Brendan Wood International, an advisory agency. After five years on top, PepsiCo's Indian American chairman and CEO

Indra Nooyi has been pushed to the second spot as most powerful woman in US business by Kraft's CEO, Irene Rosenfeld.
Nooyi was named to Institutional Investor's Best CEOs list in the All-America Executive Team Survey in 2008 to 2011.

Charles K. Kao

Charles K. Kao is an electrical engineer and physicist known as the "godfather of broadband." In 2009, he won the Nobel Prize in Physics for his pioneering research into the transmission of laser light through glass fibers in optical cables which has led to the widespread use of fiber optics in modern telecommunications. Unusually, he shared the Prize with two other physicists who had pursued unrelated work.

Kao earned his PhD in electrical engineering from University College London. He then joined the Chinese University of Hong Kong, where he founded the Department of Electronics. He also served as Vice Chancellor of the university for a decade. Today, he lives in retirement.

Kao began his experiments with fiber optics in the 1960s with strands of glass fibers thinner than a human hair and cheaper to produce than fishing line, which transmitted nearly limitless amounts of digitized data via pulses of laser light. Today, fiber optic cables make up the main infrastructure of modern telecommunications systems, including both telephony and data transmission. Thus, the Internet depends directly upon Kao's work.

Kao, a native of Shanghai, also founded the Independent Schools Foundation Academy (ISF) in Hong Kong in 2000. The Academy is a non-profit, bilingual, private independent school for grades one through 12, and is an inquiry-based learning environment.

Kao has received numerous awards including the Asian of the Century Award in 1999, the Prince Philip Medal in 1996 and the IEEE Alexander Graham Bell Medal in 1985 in addition to the Nobel Prize.

CAREER

ONLINE COURSES

edX

edX is a massive open online course (MOOC) provider. It hosts online university-level courses in a wide range of disciplines to a worldwide student body. EdX courses consist of weekly learning sequences. Each learning sequence is composed of short videos interspersed with interactive learning exercises where students can immediately practice the concepts from the videos. The courses often include tutorial videos that are similar to small on-campus discussion groups, an online textbook.

Coursera

Coursera is a company that offers massive open online courses (MOOCs). Coursera works with top universities and organizations to make some of their courses available online and offers courses in physics, engineering, humanities, medicine, biology, social sciences, mathematics, business, computer science, digital marketing, data science and other subjects. Each course includes short video lectures on different topics and assignments to be submitted usually on a weekly basis.

NPTEL

NPTEL provides free online courseware in the form of web courses and video lectures. These lectures utilize a multitude of facilities of the video medium such as chalk-and-talk, tablet writing, power point, two and three dimensional animations, interactive codes, etc.

MIT Open Course Ware (MIT OCW)

It is an initiative of the Massachusetts Institute of Technology (MIT) to put all of the educational materials from its undergraduate- and graduate-level courses online, partly free and openly available to anyone, anywhere. MIT Open Courseware is a large-scale, web-based publication of MIT course materials.

5 Tips to Engineer your Career

Getting an engineering degree is a ticket to rewarding careers and sometimes a handsome paycheck. But before one enters the field as a professional engineer, some serious studying, a few late nights and a few tips to get you through your first year are in order.

A guide for electronics engineering students who are just starting out their academic studies and also those who want to set themselves apart in a competitive career environment.

1. Pay attention to basics

It may not sound important, but most of the interviewers will start with active and passive components, building blocks of electronics systems and nonetheless faultfinding techniques. “A strong foundation of the basics of electronics is must” .Strong fundamentals of electronics will help you to understand complex topics that you may get exposed to after joining the industry.

2. Get trained to have an extra edge

If you’ve just entered the college, your course curriculum may not provide all the learning you need. Make an effort to gain some extra skill, be it technical or interpersonal.

3. Exploit your internship

Even if it is not compulsory in your course curriculum to do an internship, do one anyway. In fact, try enrolling for more than one if possible. Taking up a project or internship to build something is essential as there is plenty of learning for the student to imbibe whether the project succeeds or not.

Colleges have included industry visits, seminars and projects for this purpose. Unfortunately, many students treat these courses lightly. My advice would be to take the internship seriously, for the soft skills they impart will be invaluable.

4. Know the industry trend

A fresh electronics engineer needs to be conversant with global trends and pioneering research done worldwide. To acquaint himself with the challenges that will face him in the future, the engineering student should re-examine and realign his goals with the current scenario that prevails.

The electronics industry is very large today. There are multiple sub-disciplines. Even some software disciplines require a sound knowledge of electronics along with a strong grip on programming, e.g., electronic design automation.

5. Understand your aptitude

Last, but the most important of all, don’t follow the herd. “Since majority of the technical skills are quite well-founded within students, they need to match real-life practical applications, especially from a problem-solving perspective. Students should have the ability to assess the situation, identify key issues that need to be addressed, break down complex problems into simpler manageable problems and resolve the problem to develop workable solutions.

Companies are looking for people who can fix problems with minimal direction. They don’t want to have to tell people to react when fires are burning,”, so once you’ve understood your aptitude and carefully evaluated the job market, you can make your leap.

In the third or fourth year of engineering, the students should begin to think of what industry they wish to join and start digging into the relevant literature. If you are fortunate enough, you may get to do an internship in the industry of your choice.

In fact, there has been a spurt in various application fields of electronics engineering—defense, infrastructure (railways, aerospace, metro and telecom), biomedical, consumer appliances, industrial power, instrumentation engineering, automotive, etc. So once you figure out what is of your interest, work towards developing skills required for that vertical.

Finally, your future is in your hands. So don’t hesitate to spend enough time exploring all the possible ways before final settlement.

A small trick:

Often it's hard to remember whether the given circuit is High pass circuit or Low pass circuit.

It is harder to remember whether low pass circuit acts as differentiating circuit or integrating circuit. Same confusion with high pass filter. So here is trick.

Remember the word DHIL (in Hindi DHIL means heart), you can expand DHIL as Differentiator is High pass and Integrator is Low pass.

Higher Education Oppurtunities

There is a lot of scope for students doing M.S or M.Tech in the field of electronics and communication. Having masters will certainly improve your career prospects and help you get hired by top MNC's.

Governments across the globe are spending millions of dollars. You will get scholarships and financial aid to do PhD from various government and non government organizations. If you plan to do MS or PhD programs in US, you had to go through GRE and TOEFL exams. For M.Tech, you should score high in GATE exams.

Top Universities for MS, Ph.D.:

- Massachusetts Institute of Technology
- Stanford University
- University of California , Berkeley(UCB)
- University of Illinois, Urbana-champaign
- California Institute of Technology
- Georgia Institute of Technology
- University of Michigan, Ann Arbor
- Carnegie Mellon University
- Princeton University

Internships are great experience:

Student and graduate "internships" are very important, because they substantially increase the chance of graduates finding employment. To an employer, a candidate who has spent time working for a firm within a particular industry shows dedication to a particular career, enthusiasm for a particular job and importantly, has experience.

Internships are also very useful to interns themselves as they offer the chance to find out what working for a particular company, or within a certain industry, is really like. Internships also allow interns to make contacts with managers and recruiters, which can later be used to negotiate full-time employment.

Some of the top companies offering internship for ECE students are:

- Airport authority of India
- Doordarshan
- Prasar Bharti
- BSNL
- ECIL (Electronics Corporation of India Limited)
- NTPC (National Thermal Power Corporation)
- DVC (Damodar Valley Corporation)
- BEL (Bharat Electronics Limited)
- Nokia semiens
- Bharti Airtel
- Reliance Communications
- Idea Cellular
- Tata Communications

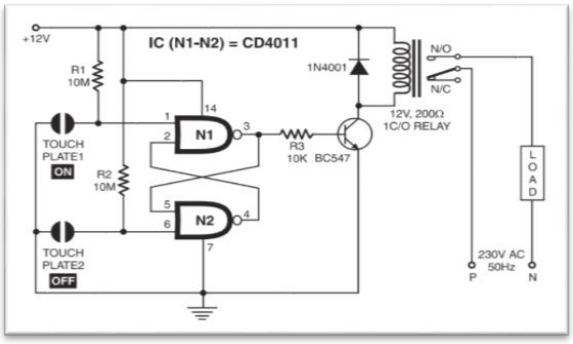
PROJECTS

Simple Touch -Sensitive Switch

Description:

This touch-sensitive switch is built around NAND gate IC CD4011 and transistor BC547. When someone touches plate 1 (which is connected between pin 1 of gate N1 and ground), the RS flip-flop comprising gates N1 and N2 is set. The resulting high output at pin 3 of gate N1 energizes the relay via relay driver transistor. The relay, in turn, switches on the load operating on mains. On the other hand, when someone touches plate 2 (which is connected between pin 6 of gate N2 and ground), the RS flip-flop is reset. The resulting low output at pin 3 of gate N1 de-energizes the relay via relay driver transistor. The relay, in turn, switches off the load operating on mains. The diode across the relay coil protects the transistor from back e.m.f induced in the relay when it de-energizes.The circuit works off a 12V power supply. If you want to control heavier loads, the current rating of the relay should be increased accordingly.

S.No	Component	Specification	Quantity
1	Resistors	10 M Ω	2
		10 K Ω	1
2	Diode	1N4001	1
3	IC	CD4011	1
4	BJT	BC547	1
5	RPS	12V	1

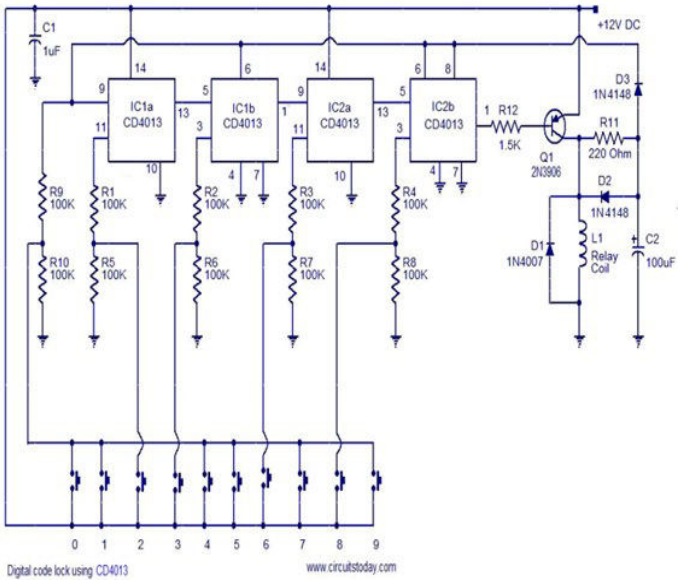


Digital Code Clock

S.No	Component	Specification	Quantity
1	Resistors	100 K Ω	10
		220 Ω	1
		1.5 K Ω	1
2	Diodes	1N4007	1
		1N4148	2
3	Capacitors	1 μF	1
		100 μF	1
4	IC	CD4013	1
5	RPS	12 V	1

Description:

This is a simple but effective code lock circuit that has an automatic reset facility. The circuit is made around the dual flip-flop IC CD4013. Two CD 4013 ICs are used here. Push button switches are used for entering the code number. One side of all the push button switches are connected to +12V DC. The remaining end of push buttons 2,3,6,8 is connected to clock input pins of the flip-flops. The remaining end of other push button switches are shorted and connected to the set pin of the flip-flops.



The relay coil will be activated only if the code is entered in correct sequence and if there is any variation, the lock will be reset. Here is correct code is 2368.When you press 2 the first flip- flop(IC1a) will be triggered and the value at the data in (pin9) will be transferred to the Q output (pin13).Since pin 9 is grounded the value is “0” and so the pin 13 becomes low. For the subsequent pressing of the remaining code digits in the correct sequence the “0” will reach the Q output (pin1) of the last flip flop (IC2b).This makes the transistor ON and the relay is energized .The automatic reset facility is achieved by the resistor R11 and capacitor C2.The positive end of capacitor C2 is connected to the set pin of the flip-flops. When the transistor is switched ON, the capacitor C2 begins to charge and when the voltage across it becomes sufficient the flip-flops are reset. This makes the lock open for a fixed amount of time and then it locks automatically. The time delay can be adjusted by varying the values of R11 and C2.

PROBLEMS IN SOCIETY

E-waste Pollution –A Threat to Human Life

In a study, researchers took air samples from one of the largest e-waste dismantling areas in china and examined their effects on human lung epithelial cells. The results showed that the sample of pollutants caused significant increase in inflammatory response and oxidative stress which may lead to oncogenesis,cancer and cardiovascular diseases.

Virtual Communication effects the Real Life

In the society, especially students are living in the world where virtual communication is normal. Almost every student has an account in Facebook or twitter or what else is out there. Though the students are sitting close to each other, they are busy with their gadgets. So, it is lack of social interactivity in the real life. People spend more and more time at computer which makes them isolated from real life and wasting time by checking purposeless posts and information .

TECHNOLOGY NEWS

Digital Pen

A digital pen is one of the new electronic inventions that can help us record information. Despite the digital age, we still use pens. But it would be great to have our handwritten notes and drawings digitally recorded without having to use a scanner. The Zpen from Dane-Elec is a wireless pen that uses a clip-on receiver to digitally record what you write. It uploads the information to your computer where it can be viewed, edited and filed as a word processing document. The digital pen utilizes character recognition software and works by recording movement. Features include profile creation, a dictionary and fifteen language options.

Electronic Pills-Collecting Data Inside the Body

After years of investment and development, wireless devices contained in swallow able capsules are now reaching the market. These pills contain sensors or tiny cameras that gastrointestinal tract before being excreted from the

body a day or two later. These new electronic inventions transmit information such as acidity, pressure and temperature levels or images of the esophagus and intestine to your doctor's computer for analysis levels or images of the esophagus and intestine to your doctor's computer for analysis.

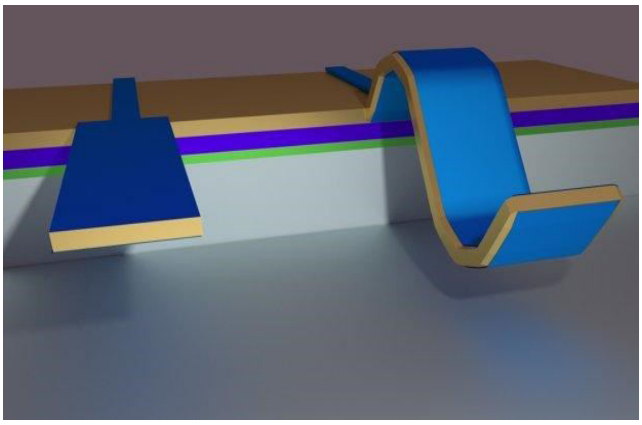
Instant Prints

Creating instant prints from a digital camera is one of the new electronic inventions in printing. The Polaroid PoGo is a small portable printer that weighs only a few ounces. The printer produces full color 2" x 3" prints using an "inkless" technology. The images are created from heat activated crystals in the photo paper. The photos are water proof, tear proof and smear proof.

This new electronic invention connects to a digital camera using a USB cable, or to a mobile phone through wireless Bluetooth. It uses rechargeable batteries or an AC adapter.

Flexo-Electric Nano Materials

A novel 'flexo-electric' material that generates electricty upon compression has been developed. The material shows significant advantages over piezoelectric materials as it is non-toxic and generates a higher voltage at the nanoscale. It is hoped that the material will be used in self charging pacemakers and ultra-sensitive sensors. The new material has an inherent mechanical tension that causes the material to change shape upon



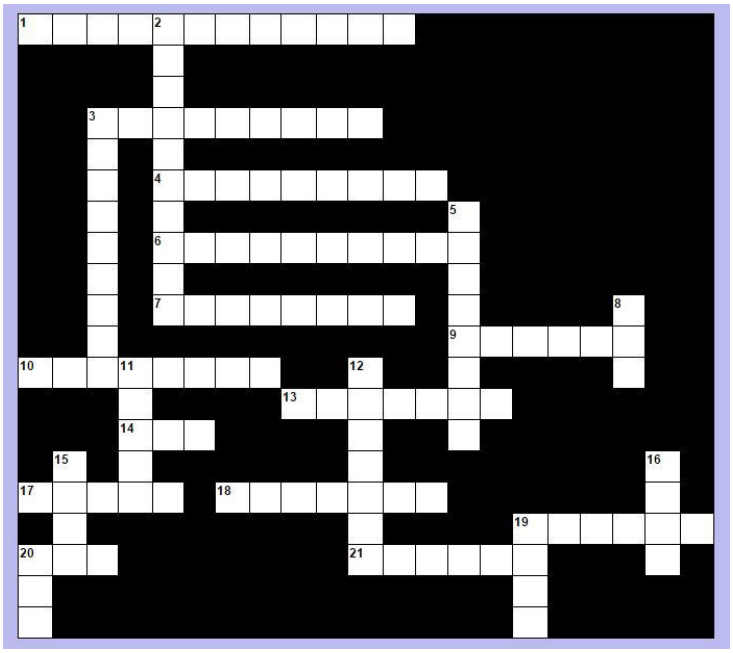
the application of an electric voltage is applied. This behaviour also means that if the materials shape is changed by an external force electricity is generated. This flexo-electric effect increases as the material thickness decreases, meaning the thinner the material the greater the voltage generated.

'Ultrahaptics' Ultrasonic Tactile Display for Virtual Controls

A concept car with a cockpit that relies (only a little bit ironically) on touchless gestural interfaces for control. If we're going to have to use mid-air,hand-wavy interfaces in near the future—whether for cars or wearables or around the home—an important issue to consider (as with any user interface) is tactile feedback. For example, when you press a virtual button in mid-air that doesn't feel like anything, how do you know that you've actually pushed it? There's an array of ultrasonic speakers that are paired with a Leap Motion sensor that tracks the location of your hand in space. By creating constructively interfering intersections of ultrasonic waves, the Ultrahaptics system can generate silent points of turbulence in the air that that essentially trick you into thinking your fingertips are touching objects when they're not. An array of ultrasonic emitters created this illusion anywhere up to a meter from the sensor (although this distance can be increased). Ultrahaptics says that they can be arranged in different locations and orientations and they can still work together in the same way, as long as its software knows the exact position of the ultrasonic emitters.

Never give up on what you really want to do. The person with big dreams is more powerful than one with all the facts.

Puzzle



Across:

1. A connection that should not be there
3. Electricity can flow through
4. Does not conduct electricity -
6. Temperature changes its resistance
7. This component reduces the flow of electricity
9. This means three in the colour code
10. An adjustable resistor
13. Measured in amps!
14. Short for a type of circuit board
17. The unit of potential difference and emf
18. A source of power!
19. Buzzers and leds are examples of an -
20. A light sensitive resistor
21. Turn a circuit on or off with this

Down:

2. This component is able to switch or amplify
3. This component stores electric charge.
5. A solder joint that does not conduct electricity -
8. 2% tolerance
11. Sensors are -
12. What comes between input and output?
15. 5 per cent tolerance
16. Helps the solder flow
19. Resistors are measured in -
20. Usually produces a red light!

Funny lines

I entered the college

Thinking it to be a grand voyage

With lots of thoughts

And lots of hopes

To find some love {to study my love}

And true friends somehow {and to find true friends somehow}

I dreamt of happy days

And life is beautiful

And thought, my life too would be colorful

But,

Days passed by

And exams came near by

I should study thought I

And made my brain a fry

But nothing went in

And nothing came out

Getting me golden zeroes

And making me one of the top heroes :) :) :)

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K I T S W

GRADUATES OF 2014-2015

"Even if the destination or desired object be far away or difficult to achieve, one can reach it or get it if one is determined. Nothing is impossible for a determined person"

-Acharya Chanakya