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Step 1: Be inspired!

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Step 3: Ensure your work is original!

Step 4: Ensure it is related to your Engineering interests!

Step 5: Show us what you've got!! Mail it to corpcom@caddcentre.ws

We hope your submissions will reach us before the 20th of each month and that the images would be in the jpg format and articles within 250 words. We wish you all the best!

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Corporate Office: #91, Dr. Radhakrishnan Salai, Gee Gee Crystal, 8th Floor, Mylapore, Chennai - 600 004. Ph: (91 44) 4596 6100.

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MONTHLY NEWSLETTER

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IN THIS ISSUE

Be the Engineer of your career

Don't fit in when you were born to stand out!

An engineer's calling is a noble calling indeed! Engineers have shaped the course of society - their innovations have continuously improved the standard of life of common people. It is vital therefore to understand the contributions made by various engineering fields to society, as this will inspire budding engineers to contribute towards society's development.

In the "Be the engineer of your career" series of the current edition of CADDZOOM, let us take a look at the advancements made in the field of electronic engineering!

Electronic Engineering

Electronics is defined as "The science and technology of the conduction of electricity in a vacuum, a gas, or a semiconductor, and devices based thereon". If electronics is also about the conduction of electricity, you may wonder how electronics differs from electrical engineering.

Electronic devices and electrical devices manipulate electricity differently to do their work. Electrical devices take the energy of electric current and transform it in simple ways into some other form of energy - most likely light, heat, or motion. In contrast, electronic devices do much more. Instead of just converting electrical energy into heat, light, or motion, electronic devices are designed to manipulate the electrical current itself to coax it into doing interesting and useful things.

One of the most common things that electronic devices do is manipulate electric current in a way that adds meaningful information to the electric current. For example, audio electronic devices add sound information to an electric current so that you can listen to music or talk on a cell phone.

Reference: www.ntnu.edu

Electronics today is used for electronic components, integrated circuits, and electrical systems. Our new technology-based lives are run by the development of miniaturized electrical circuits (microchips) and broadband phone and internet through optical fibers or across wireless channels.

Within transportation, we have advanced electrical navigation systems, landing systems for planes, and anti-collision systems for ships and cars. Modern cars are provided with constantly advancing electronics, such as airbag systems, ABS brakes, anti-spin systems and theft alarms.

Modern electronics has revolutionized medical diagnosis by introducing new techniques like CT (Computer Tomography), MR (Magnetic Resonance), and ultrasound imaging devices. The industry applies electronics for controlling and supervising production processes and developing new technologies. Finally, computers have become common facilities in offices and at home. Through systematic miniaturization of electrical components and circuits, computers and other advanced electronics today are now available for ordinary users for moderate prices. This advancement in technology and electronics will continue with increasing speed in times to come.

Nano-Electronics

Nano-electronics refer to the use of nanotechnology on electronic components, especially transistors. Although the term nanotechnology is generally defined as utilizing technology less than 100 nm in size, nano-electronics often refer to transistor devices that are so small that inter-atomic interactions and quantum mechanical properties need to be studied extensively. As a result, present transistors do not fall under this category, even though these devices are manufactured with 45 nm, 32 nm, or 22 nm technology.

Application of Nano Electronics in Computers

Nano-electronics holds the promise of making computer processors more powerful than are possible with conventional semiconductor fabrication techniques. A number of approaches are currently being researched, including new forms of nanolithography, as well as the use of nano-materials such as nano-wires or small molecules in place of traditional CMOS (Complementary Metal - Oxide Semiconductor) components. Field effect transistors have been made using both semiconducting carbon nanotubes and with heterostructured semiconductor nanowires.

Electronic Cotton

Electronics can now be worn, thanks to transistors that are made from cotton fabrics. Scientists at the Textiles Nanotechnology Laboratory at Cornell University in Ithaca, New York, and the University of Cagliari in Italy have found a way of making transistors from cotton fibers.

They say that the applications for their research could include carpets that know how many people have walked on them, firefighting suits that detect airborne pollutants and clothing that can incorporate heart-rate and sweat monitoring sensors.

The idea of turning cotton clothing into a computerized circuit board seemed impossible, as the fabric is a natural insulator. The team got round this problem by applying a layer of gold nanoparticles to individual strands, along with the conductive polymer PEDOT. To make a full transistor, the researchers coated the conductive cotton with a semiconducting polymer, which carries current between two electrodes - spots of conductive silver paint at either end of the cotton strand. Varying the voltage in the gate as current flows in the circuit makes the transistor switch between being very conductive and resisting current.

This process improved the conductivity of the cotton by a factor of about 1000, with the material still retaining its suppleness. However, it's still no match for a silicon circuit, because the electrons don't travel as fast. This limits the applications that are possible – for instance, you can't use this process to turn clothing into an MP3 player – but creating material sensors is entirely possible.

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.

Ice Touch Screen

A team at Nokia in Finland has created one of the unlikeliest computer displays yet - the world's first ice touch screen. The team made their wall an interactive one by using digital projection technology, rather than peppering the ice with sensors that would raise the cost of the installation. The ice screen uses rear-diffused illumination (RDI), a technique first used by Microsoft in its tablet-based interactive touch screen, Surface, launched in 2008.

A near-infrared light source mounted behind the "screen" bathes it in invisible light, and an array of near-infrared cameras, also behind the wall, are focused on the front surface. A hand placed on the ice reflects the light towards the camera array and the signal each camera receives helps a nearby PC establish the hand's position, size and motion. The PC is also connected to a projector, which uses the data to project imagery beneath the user's hand.

Reference: www.inventor-strategies.com
www.newscientist.com

Job profiles of an electronic engineer

1. Design Engineer: Takes specifications, defines architecture, does circuit design, runs simulations, supervises layout, tapes out the chip to the foundry, evaluates the prototype once the chip comes back from the fab.

2. Product Engineer: Gets involved in the project during the design phase, ensures manufacturability, develops characterization plan, assembly guidelines, develops quality and reliability plan, evaluates the chip with the design engineer, and evaluates the chip through characterization, reliability qualification and manufacturing yield point of view (statistical data analysis). He is responsible for production release and is therefore regarded as a team leader on the project. Post production, he is responsible for customer returns, failure analysis, and corrective actions including design changes.

3. Test Engineer: Develops test plan for the chip based on specifications and data sheet, creates characterization and production program for the bench test or the ATE (Automatic Test Equipment), designs test board hardware, correlates ATE results with the bench results to validate silicon to compare with simulation results. He works closely with the product engineer to ensure smooth release to production and post release support.

4. Applications Engineer: Defines new products from system point of view at the customer's end, based on marketing input. His mission is to ensure the chip works in the system designed or used by the customers, and complies with appropriate standards (such as Ethernet, SONET, WiFi etc.). He is responsible for all customer technical support, firmware development, evaluation boards, data sheets and all product documentation such as application notes, trade shows, magazine articles, evaluation reports, software drives and so on.

5. Process Engineer: This is a highly specialized function which involves new wafer process development, device modeling, and lots of research and development projects. There are no quick rewards on this job! If you are R&D oriented, highly trained in semiconductor device physics area, do not mind wearing bunny suits (the clean room uniforms used in all fabs), willing to experiment, this job is for you.

6. Packaging Engineer: This is another highly specialized job function. He develops precision packaging technology; new package designs for the chips, does the characterization of new packages, and does electrical modeling of the new designs.

7. CAD Engineer: This is an engineering function that supports the design engineering function. He is responsible for acquiring, maintaining or developing all CAD tools used by a design engineer. Most companies buy commercially available CAD tools for schematic capture, simulation, synthesis, test vector generation, layout, parametric extraction, power estimation, and timing closure; but in several cases, these tools need some type of customization. A CAD engineer needs to be highly skilled in the use of these tools is able to write software routines to automate as many functions as possible and have a clear understanding of the entire design flow.

Reference: www.kokanastha.com