**THE AGE OF ELECTRONICS**

Electronics is the science or practice of using electricity in devices similar to transistors and radio tubes so as to get results not possible with ordinary electrical equipment. Here the electricity always flows in the metal conductors. When electricity passes through space as occurs within a tube or through the junction as in a transistor, such action is called electronic. Thus, if a device passes its electricity through internal space or through the junction, the device is called electronic.

Without electronics there might be no radio, television, sound pictures or long-distance telephone calls. Most of these equipments serve to carry or to give information; so from the very beginning communication was a main purpose of electronics.

The science of electronics now deals almost exclusively with transistors or other solid-state devices. However, until approximately 1955 vacuum tubes were the principle components of electronic circuits. A vacuum tube consists of several metal electrodes of various shapes all packaged inside a glass or metal envelope which is highly evacuated. A red hot electrode (filament or cathode) emits electrons which are attracted to a positively charged electrode called the plate or anode. The electrons pass through the metallic grid electrode, and the voltage on the grid controls how many electrons reach the plate. Vacuum tubes are classified according to the number of electrodes. A diode is a valve with two electrodes. A triode has three electrodes: a filament, a plate and a control grid, and so on

Vacuum tubes are still widely used in oscilloscopes, high power high frequency radio transmitters and in some special low noise amplifiers. Vacuum tubes are much larger then transistors. They require considerably more electric power to operate. However, they can handle high voltages and high powers at high frequencies somewhat more easily. They are also capable of withstanding temporary overloads in voltage or current which would destroy a solid-state device and then returning to normal operation

In 1948, American scientists Bardeen, Brattain and Shockley invented the first transistor. At present, transistors are used in the vast majority of devices. The invention of transistors and solid-state devices led to acceleration in the growth of electronics. Transistors are made from parts which do not wear out. They waste very little power. They require no heating to generate their free electrons. This means that transistor equipment is more efficient and lighter than analog equipment.

**TRANSISTOR**

The transistor is the key element in practically all modern electronics and one of the greatest inventions of the 20th century. Its importance in today’s society rests on its ability to be mass produced using a highly automated process (semiconductor device fabrication).

Although several companies each produce over a billion individually-packaged (known as discrete) transistors every year, the vast majority of transistors now produced are in integrated circuits (IC) along with other electronic components, to produce complete electronic circuits.

The essential usefulness of a transistor comes from its ability to use a small signal applied between one pair of its terminals to control a much larger signal at another pair of terminals. This property is called gain. A transistor can control its output in proportion to the input signal, that is, act as an amplifier. Vast numbers of products include amplifiers for sound reproduction, radio transmission, and signal processing. Modern transistor audio amplifiers are common and relatively inexpensive.

Or, the transistor can be used to turn current on and off in a circuit as an electrically controlled switch, where the amount of current is determined by other circuit elements. Transistors are commonly used as electronic switches for any devices.

Prior to the development of transistors, vacuum tubes (valves) were the main active components in electronic equipment. The key advantages that have allowed transistors to replace vacuum tubes in most applications are:

· Small size and minimal weight.

· Highly automated manufacturing process.

· Lower possible operating voltages.

· No warm-up period for cathode heaters required after power application.

· Lower power dissipation and greater energy efficiency.

· Higher reliability and greater physical ruggedness.

· Extremely long life.

· Insensitivity to mechanical shock and vibration.

There are also some limitations in using transistors. Silicon transistors do not operate at voltages higher than above 1000 volts. In contrast, high power, high frequency operation is better achieved in electron tubes due to improved electron mobility in a vacuum. Silicon transistors are much more sensitive than electronic tubes to an electromagnetic pulse.

**ROBOTS**

The word “robot” appeared first in a play called RUR (Rossum’s Universal Robots) written by a Czech playwright Karel Čapec. It comes from the czech word “robota” meaning slave labour.

In 1954 American inventor George Devol began his work that eventually led to the development of industrial robots as we know them today.

The automatically controlled industrial manipulators are divided into three generations: programmed, adaptive and intellectual. Characteristic of the first generation – the programmed robots – is that their control system acts according to a rigid oft-repeated programme all the time. But the programmed robot is easily retuned to various action programmes. They will continue to be the main type of robots.

Adaptive robots, or robots of the second generation, are being developed along with them. Where they differ is that they possess the most elementary senses in their manipulators – tactile (sense and touch), power (reaction to the magnitude of the work effort), locating (reaction to the distance to the object and the speed of approaching it), and light (reaction to the object located within a beam of light).

The third generation – the intellectual robots – possesses far richer means for sensing (including sight), for processing information and carrying out a decision.

Many of the robots in use today do jobs that are especially difficult for human workers. These are the types of jobs that require great strength or pose danger. For example, Spray painting, the assembly of electronic parts, space projects, nuclear reactor stations, and underwater exploration research

The use of industrial robots has produced the improvement in productivity, greater humanization of working life, prevention of labour accidents, improvement of product quality and the development of new industries.

**TELEVISION**

The television set is evidently the most important and popular electronic product of all time. In 1939 at the World’s Fair in New York a tiny nine-by-twelve-inch box was the centre of attention for hundreds of people. They were the first to see a television set in action.

When World War II broke out electronic factories that began the TV production stopped making them and started making war materials instead, but by 1958 there were millions of TV.

At present TV communication is provided with the help of a system of artificial earth satellites

Nowadays many countries also have cable TV, a system using wires for the transmission of television programs. Cable television first appeared in 1949 as a means of transmitting TV signals to rural and mountain areas far from big cities.

The next major advance for TV was digital television. In a digital system the usual continuous signal is replaced by a digital code containing detailed information on brightness, color, etc. Essentially, it is a minicomputer with a visual display. TV set can automatically video-record the programs when you are absent or occupied.

By the end of 1980s television has moved to a new and the most important stage in its development since the appearance of colour television. Technically it is called high-definition television (HDTV) or Hi-Vision. This is the much higher resolution television of the 21st century. The result is a picture several times sharper than in the existing TV sets. The plasma display makes it possible to produce a large, bright, colour, flat TV screen so thin and light that it can also be hung on a wall like a framed picture.

**Computer crimes**

Computer crimes are 'clean' white-collar crimes.

Computer crime basically falls into three categories:

• Theft of computer time for development of software for personal use or with the intention of selling it. It is difficult to prove programs were stolen when copies are made because the originals are still in the hands of the original owners.

• Theft, destruction, or manipulation of programs or data. Such acts may be committed by disgruntled employees or by persons wishing to use another's property for their own benefit.

• Altering data stored in a computer file.

The Trojan Horse is the name given to the crime in which a computer criminal is able to place instructions in someone else's program that allow the program to function normally but perform additional, illegitimate functions as well.

Salami shaving method means manipulating programs or data so that small amounts of money are deducted from a large number of transactions or accounts and accumulated elsewhere.

Piggybacking means using another person's identification code or using that person's files before he or she has logged off.

Software piracy is unauthorized copying of a program for sale or distributing to other users.

Data diddling is a technique whereby data is modified before it goes into the computer file. Once in the file, it is not as visible.

Mail bombing is inundating an email address with thousands of messages, slowing or even crashing the server.

Most computer crimes are discovered by accident and are not always guaranteed to be prosecuted. There are a number of reasons for this. First, law enforcement agencies do not fully understand the complexities of computer-related fraud. Second, few attorneys are qualified to handle computer crime cases. Third, judges are not educated in the ways of computers and may not consider data valuable. In short, the chances of committing computer crimes and having them go undetected are, unfortunately, good.

**Information Security**

A biological virus is a very small, simple organism that infects living cells, known as a host, by attaching itself to them and using them to reproduce itself.

Similarly, a computer virus is a very small program routine that infects a computer system and uses its resources to reproduce itself.

When the user runs an infected program, it is loaded into memory carrying the virus. It can then use a reproduction routine to infect other programs. This process continues until the computer is switched off.

The virus may also contain a payload that remains dormant until a trigger event activates it, such as the user pressing a particular key. It might do something relatively harmless such as displaying a message on the monitor screen or it might do something more destructive such as deleting files on the hard disk.

When it infects a file, the virus replaces the first instruction in the host program with a command that changes the normal execution sequence. This type of command is known as a JUMP command and causes the virus instructions to be executed before the host program. The virus then returns control to the host program which then continues with its normal sequence of instructions and is executed in the normal way.

To be a virus, a program only needs to have a reproduction routine that enables it to infect other programs. Viruses can, however, have four main parts. A misdirection routine that enables it to hide itself; a reproduction routine; a trigger that causes the payload to be activated; and a payload. A program that has a payload but does not have a reproduction routine is known as a Trojan.

To prevent or limit the effects of disaster you should take security measures and protect hardware and software. (If your work deals with the use of the Internet, you should implement network controls by installing firewalls to protect external and internal attacks. Another way of protection is using encrypted data including monitoring username and password use. Don't use common names or dictionary words in passwords. To protect from natural disasters, install uninterruptible power supplies and surge protectors.)

Periodically make full backups, which copy all files. Virus protection programs are another way of feeling safe. Use only vendor-supplied software products that guarantee they are virus-free.