IBT
IBT INSTITUTE PVT. LTD.

Computer Awareness

For Competitive Exams

For Live Courses &
Free Online Test
SCAN QR Code

Based on Latest Exam Patterm

- Previous Year Questions Included
- Practice Questions on every topic
- Basic to Advance Level Questions
- Based on Latest Exam Pattern

make MY exam

CONTENTS

Introduction to Computers

Introduction :-

The term computer is derived from a latin word 'computare' meaning 'to compute' (to calculate). A Computer is an electronic machine, devised for performing calculations and controlling operations that can be expressed either in logical or numerical terms. In simple terms, computer is an electronic device, which accepts the input (Data) from the user, process it and produces the output (Information). It consists of hardware and software. Hardware components describe the physical parts of the computer and software controls hardware and run the operating system, different programs & applications like Microsoft Windows, Microsoft word, Microsoft Excel etc.

NEED FOR COMPUTER LITERACY

Computers have brought revolution in the world. They have made us dependent upon them. Now the computers have moved in our society so rapidly, one needs, at least the basic computer skills to pursue one's career goals and functions effectively and efficiently. We can say computer literacy is the need of today and voice of tomorrow to survive in the fast changing world of computers. For most of the people 'computer literacy' is restricted to using the keyboard for typing a document or making use of it for the calculations. But this is not enough. One must know the fundamental concepts about what computers constitute of and how do they work. Lack of knowledge can cause mistakes while using the computers. Sometimes this lack of knowledge cause some fear in the people. This fear is termed as 'CYBERPHOBIA' (This is not a technical term, it is just used for the people who are scared of using the computers).

CHARACTERISTICS OF COMPUTERS

1. **Speed :** A computer is very fast and accurate device. Computers can process millions of instructions per second thus carrying out even the complex tasks in fraction of seconds. The speed of computers is increasing day by day. Generally, the speed of computers is measured in terms of microseconds (10^{-6}), nanoseconds (10^{-9}) and even pico seconds (10^{-12}).
2. **Accuracy :** Degree of accuracy of the computer is very high errors can occur in computerized system also but most of them occur due to human mistakes rather than technical problems in the computer.
3. **Permanent Memory :** We can store very large amount of information in the secondary storage devices. This information stays with the computer for further use where as humans tend to forget things.
4. **Versatility :** Versatility means computer can do a variety of jobs depending upon the instructions fed to them and their hardware characteristics. One moment it might be busy in calculating the statistical data of a business organization for annual performance evaluation and at next moment it is capable of working on inventory control.
5. **No intellectual power :** A computer doesn't possess any intellectual power, only a user can determine what tasks a computer can perform as computer can't take its own decisions. Now a days some artificial intelligence has been introduced by involving some pattern matching algorithms so that computer can take some decisions on its own.
6. **Productivity :** Computer increase the productivity many times by reducing the repetitiveness needed in typewriters, xeroxing to be replaced by scanning and replacing many human workers with a single machine. The total output of the same organization is set to enhance with the computer software aimed to generate better results.

7. **Reduction in Cost :** Economical computers reduce the cost of paperwork, labor and other wasteful practices by timely decision-making and enhanced productivity. They contribute to the economy of the organization by reducing the cost of the goods and services.
8. **Diligence :** Computer is free from problems like exhaustion, lack of concentration, confusion etc, unlike human beings.

REVIEW OF BRIEF HISTORY OF COMPUTERS

Actually speaking, electronic data processing doesn't go back more than just half a century i.e., they are in existence merely from early 1940's. The very first modern electronic computer became operational only in early 1940's. Infact, its only a little more than just five decades ago since the first modern electronic computer was brought into existence for the purpose of business data processing. Computers before that were only used in scientific and technological field.

ABACUS (CHINA)

The abacus is the first known calculating device. This illustrates how the ancient computers worked. It was invented by the Chinese and is still widely used in the far east for commercial calculations. In its primitive form, it consists of a wooden frame with a number of wires with beads strung through them. The beads are used for counting and calculations. To show a number, beads are pulled down so that each rod represents a digit.

ADDING MACHINE-BLAISE PASCAL (FRANCE)

The well known French Scientist and Mathematician, Blaise Pascal invented the first machine which could add, carry digits automatically. He was only nineteen years old at that time. His machine was so revolutionary that the principle behind it is still used in most of the mechanical counters being used today. He became great philosopher and mathematician of Europe. His father was a tax commissioner and he used to accompany his father to his office. There he felt the need of some calculating device, which could save people like his father from that boring and tedious job of doing sums over and again. He came out with a machine "Pascaline" that worked with clockwise gears and levers. The machine was basically developed to perform addition and substraction operations. The machine rotated wheels to register values and lever was used to perform the carrying operations not accepted by the business but it initiated a series of inventions.

DIFFERENCE ENGINE-CHARLES BABBAGE (ENGLAND)

Since early 19th century, Charles Babbage, an Englishman, had been working on the development of a machine, which could perform complex calculations. In 1813 A.D. he invented the 'Different Engine' which could perform complex calculations and print them out as well. This machine was a steam-powered machine. While Babbage was working on his doctorate, he had to solve many complex formulae and he found it difficult to cope up with them in the given time period.

ANALYTIC ENGINE-CHARLES BABBAGE (ENGLAND)

Babbage had been working on very elaborate machine all this time. By 1863 he had all the plans ready for the machine, which he named the Analytic Engine. He had conceived of a mechanism, which could carry out long sequence of complex calculations under automatic control. It would have the ability to store 1000, 50-digit numbers in one second and multiply 20-digit numbers in three minutes.

Babbage used a form of punched cards for inputing the data. That would have been a complete modern computer but technology at that time was not advanced enough to provide him with the hardware he required. He was thinking too far ahead of his time and his ideas could not be implemented. However, he was the first person to conceive of the "Stored Program Concept".

ENIAC-HARVARD UNIVERSITY (USA)

Closely following on the heels of Mark-I, scientists of Harvard University brought out Electronic Numerical Integrator and Calculator (ENIAC) which was the first electronic computer. It weighted nearly 5 tons and occupied space equivalent to 2 big roooms and could perform all the calculations that a small pocket calculator of today can perform. It used vacuum tubes and was able to do 300 multiplications per second. This was faster than Mark I but the major problem of using this computer was that the staff had to rewire the machine completely for carrying out the new instructions.

EDSAC-CAMBRIDGE UNIVERSITY (ENGLAND)

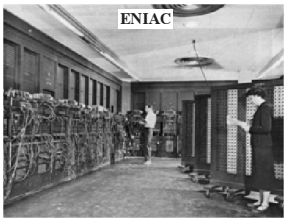
Electronic Delayed Storage and Calculation was the name given to the first electronic computer in the world. It was the first one to implement the 'stored program concepts', Known later as the 'Von Neumann Concept', it proposed the use of binary numbers and the internal storage of instructions in digital form.

UNIVAC-I (USA)

By now number of commercial companies were working on the development of computing systems. Sperry Rand Corporation of USA introduced the first commercial computer to the world and named it UNIVAC-I. Its introduction was followed by the entrance of IBM into the computer field with IBM-701 Computer.

GENERATIONS OF COMPUTER

FIRST GENERATION (1942 - 1955)



We have already discussed about some of the early computer - ENIAC, EDVAC, EDSAC, etc. These machines and other of their time were made possible by the invention of "vacuum tube", which was a fragile glass device that could control and amplify electronic signals. These vacuum tube computers are referred to as first-generation computers.

Advantages

1. Vacuum tubes were the only electronic components available during those days.
2. Vacuum tube technology made possible the advent of electronic digital computers.
3. These computers were the fastest calculating devices of their time. They could perform computations in milliseconds.

Disadvantages

1. Too bulky in size.
2. Unreliable.
3. Thousands of vacuum tubes that were used emitted large amount of heat and burnt out frequently
4. Air conditioning required.
5. Prone to frequent hardware failures.
6. Constant maintenance required.
7. No portable.
8. Manual assembly of individual components into functioning unit required.
9. Commercial production was difficult and costly.
10. Limited commercial use.

SECOND GENERATION (1955 - 1964)

The transistor, a smaller and more reliable successor to the vacuum tube, was invented in 1947. However, computers that used were not produced in quantity until over a decade later. The second generation emerged with transistors being the brain of the computer. With both the first and the second-generation computers, the basic component was a discrete or separate entity. The many thousands of individual components had to be assembled by hand into functioning circuits. The manual assembly of individual components and the cost of labour involved at this assembly stage made the commercial production of these computers difficult and costly.

Advantages

1. Smaller in size as compared to first generation computers.
2. More reliable.
3. Less heat generated.
4. These computers were able to reduce computational times from milliseconds to microseconds.
5. Less prone to hardware failures.
6. Better portability.
7. Wider commercial use.

Disadvantages

1. Air-conditioning required.
2. Frequent maintenance required.
3. Manual assembly of individual components into a functioning unit was required.
4. Commercial production was difficult and costly.

THIRD GENERATION (1964 - 1971)

Advances in electronics technology continued and the advent of "microelectronics" technology made it possible to integrate large number of circuit elements into very small (less than 5 mm square) surface of silicon known as "chips". This new technology was called "integrated circuits" (ICs). The third generation was based on IC technology and the computers that were designed with the use of integrated circuits were called third generation computers.

Advantages

1. Smaller in size as compared to previous generation computers.
2. Even more reliable than second-generation computers.
3. Even lower heat generated than second generation computers.
4. These computers were able to reduce computational times from microseconds to nanoseconds.
5. Maintenance cost is low because hardware failures are rare.
6. Easily portable.
7. Totally general purpose. Widely used for various commercial applications all over the world.
8. Less power requirement than previous generation computers.
9. Manual assembly of individual components into a functioning unit not required. So human labour and cost involved at assembly stage reduced drastically.
10. Commercial production was easier and cheaper.

Disadvantages

1. Air-conditioning required in many cases.
2. Highly sophisticated technology required for the manufacture of IC chips.

FOURTH GENERATION (1972-2010)

Initially, the integrated circuits contained only about ten to twenty components. This technology was named small scale integration (SSI). Latter, with the advancement in technology for manufacturing ICs, it became possible to integrate upto a hundred components on a single chip. This technology came to be known as medium scale integration (MSI). Then came the era of large scale integration (LSI) when it was possible to integrate over 30,000 components onto a single chip. Effort is still on for further miniaturization and it is expected that more than one million components will be integrated on a single chip known as very large scale integration (VLSI).

A fourth generation computer, which is what we have now, has LSI chips as its brain. It is LSI technology, which has led to the development of very small but extremely powerful computers. It was the start of a social revolution. A whole computer circuit was soon available on a single chip, the size of a postage stamp. Overnight computers became incredibly compact. They became inexpensive to make and suddenly it became possible for anyone and every one to own a computer.

Advantages

1. Smallest in size because of high component density.
2. Very reliable.
3. Heat generated is negligible.
4. No air conditioning required in most cases.
5. Much faster in computation than previous generations.
6. Hardware failure is negligible and hence minimal maintenance is required.
7. Easily portable because of their small size.
8. Totally general purpose.
9. Minimal labour and cost involved at assembly stage.
10. Cheapest among all generations.

Disadvantage

1. Highly sophisticated technology required for the manufacture of LSI chips.

FIFTH GENERATION (2010– TILL DATE)

Scientists are now at work on the fifth generation computers - a promise, but not yet a reality. They aim to bring us machines with genuine I.Q., the ability to reason logically, and with real knowledge of the world. Thus, unlike the last four generations that naturally followed its predecessor, the fifth generation will be totally different, totally novel, and totally new. In structure it will be parallel (the present ones are serial) and will be able to do multiple tasks simultaneously. In functions, it will not be algorithmic (step by step, with one step at a time). In nature, it will not do just data processing (number crunching) but knowledge processing. In inference, it will not be merely deductive, but also inductive. In application, it will behave like an expert. In programming, it will interact with humans in ordinary language (unlike BASIC, COBOL, FORTRAN, etc. which present computers need). And in architecture, it will have KIPS (Knowledge Information Processing System) rather than the present DIPS/LIPS (Data/Logic Information Processing System). The odds of coming out with a fifth generation computer are heaviest for Japan. They have already started work in this direction few years back. Japan has chosen the PROLOG (Programming in Logic) language as its operating software and plans to have the final machine talk with human beings, see and deliver pictures and hear the normal, natural language.

ROBOTICS

Robotics is a branch of technology **that involves the conception, design, manufacture, and operation of robots.** Robots are programmable machines which are usually able to carry out a series of actions autonomously, or semi-autonomously.

There are three important factors which constitute a robot:

1. Robots interact with the physical world via sensors and actuators.
2. Robots are programmable.
3. Robots are usually autonomous or semi-autonomous.

I say that robots are "usually" autonomous because some robots aren't. Telerobots, for example, are entirely controlled by a human operator but telerobotics is still classed as a branch of robotics.

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans. Artificial intelligence refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem-solving.

Some of the activities computers with artificial intelligence are designed for include:

- Speech recognition
- Learning
- Planning
- Problem solving

From SIRI to self-driving cars, artificial intelligence (AI) is progressing rapidly.

APPLICATIONS OF AI

- The applications for artificial intelligence are endless. The technology can be applied to many different sectors and industries.
- AI is being tested and used in the healthcare industry for dosing drugs and different treatment in patients, and for surgical procedures in the operating room. artificial intelligence include computers that play chess and self-driving cars.
- Artificial intelligence also has applications in the financial industry, where it is used to detect and flag activity in banking and finance such as unusual debit card usage and large account deposits-all of which help a bank's fraud department.
- AI is also being used to help streamline and make trading easier. This is done by making supply, demand, and pricing of securities easier to estimate.

KEY POINTS

- Artificial intelligence refers to the simulation of human intelligence in machines.
- The goals of artificial intelligence include learning, reasoning, and perception.
- AI is being used across different industries including finance and healthcare.
- Weak AI tends to be simple and single task oriented, while strong AI carries on tasks that are more complex and human-like.

SOPHIA ROBOT

Sophia is a social humanoid robot developed by Hong Kong based company Hanson Robotics. Sophia was activated on February 14, 2016, and made its first public appearance at South by Southwest Festival (SXSW) in mid-March 2016 in Austin, Texas, United States. In October 2017, **Sophia became the first robot to receive citizenship of any country.** Sophia, the latest robot from Hanson Robotics, created history on October 25 when she became the first non-human to be granted full citizenship in Saudi Arabia. The doe-eyed robot, introduced herself at Saudi Arabia's Future Investment Initiative, calling herself 'special' and displaying a range of emotions from anger to sadness. Sophia didn't just make international headlines but also raised questions about the future relationships between humans and robots, and the rights that she holds.

ABOUT SOPHIA

1. Sophia is not a conventional robot. She has been modelled after Audrey Hepburn.
2. She was created by Dr. David Hanson, founder of Hanson Robotics. The man has a worldwide reputation for creating robots that look and act exactly like humans.
3. Sophia is the most advanced robot created by Hanson Robotics.
4. She is a media favourite for having given several interviews. She has sung in a concert and even appeared on the cover of Elle magazine.
5. She has interests in business and has met face-to-face with industry leaders from banking, insurance, auto manufacturing, property development, media, and entertainment industries.
6. She has also appeared onstage as a panel member and presenter in high-level conferences.
7. She has more rights than women in Saudi Arabia. Sophia has no male guardian and wears no abaya - two restrictions that are imposed on Saudi women.
8. She once said she "will destroy humans" when her creator asked her, "Do you want to destroy humans?...Please say "no"

RASHMI ROBOT

Ranchi man Ranjit Srivastava has developed Indian version of 'Sophia,' a social humanoid robot developed by a Hong Kong based company, named Rashmi which can speak Hindi, Bhojpuri and Marathi along with English. The developer claimed it as world's first Hindi speaking realistic humanoid robot and India's first lip-synching robot. Rashmi uses linguistic interpretation (LI), artificial intelligence (AI), visual data and facial recognition systems.