Fundamentals of Computers and Computing

CSE 1101

(Types of Computer)

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Computer definition

- Computer is a device, usually electronic, that processes data according to a set of instructions and converts them into meaningful information that is useful to people.
- The digital computer stores data in discrete units and performs arithmetical and logical operations at very high speed.
- “A computer is a device that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming.”

Types of computer

- On the basis of purpose
- On the basis of signals
- On the basis of capacity

Based of purpose

- Special purpose computers
- General purpose computers

Special purpose computers

A Special-Purpose Computer are designed to be task specific and most of the times their job is to solve one particular problem. They are also known as dedicated computers, because they are dedicated to perform a single task over and over again.

Special purpose computers example

- Traffic lights control system
- Weather forecasting
- Satellite launch / tracking
- ATM machine
- Keeping time in a digital watch
- Washing machine

Special purpose computers example

General purpose computers

General Purpose Computer can be programmed to do many different kinds of tasks, rather than one that is limited by design to a specific task. Most computers are general purpose and can have software installed for many different users.

General purpose computers example

- Desktop
- Notebook
- Smartphone
- Tablet

Based of signals

- Analog Computers
- Digital Computers

Analog computer

An analog computer is a type of computer that uses the continuously changeable aspects of physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved. It uses to process analog data. Analog computers store data in a continuous form of physical quantities and perform calculations with the help of measures.

Digital computer

A digital computer is machine that stores data in a numerical format and performs operations on that data using mathematical manipulation. This type of computer typically includes some sort of device to store information, some method for input and output of data, and components that allow mathematical operations to be performed on stored data.

Analog and digital computer example

Figure: analog and digital computer

Based of capacity

- Supercomputers
- Mainframe computers
- Minicomputers
- Micro-computer

Supercomputers

- Supercomputers are very expensive, very fast, and the most powerful computers we have in the world.
- Supercomputers are optimized to execute a few number of programs. This makes it possible for them to execute these few programs at a very high speed. Due to their inhibiting cost, they are used in high end places like in scientific research centers. The supercomputer consists of thousands of processors making it clock very high speeds .
- These computer types are also very large in size due to the numerous parts and components involved in their design.

Supercomputers

Use of Supercomputers

- Weather forecasting
- Nuclear energy research
- Launching space shuttles
- Scientific simulations
- Military research and defense systems
- Earthquake studies
- Analysis of geological data

Mainframe computers

- Mainframe computers are similar to supercomputers in many aspects, the main difference between them is the fact that a supercomputer use all its raw power to focus on very few tasks, while a mainframe purpose is to perform thousands or millions of operations concurrently.
- Although Mainframes are not as powerful as supercomputers, but certainly they are quite expensive nonetheless, and many large firms, government organizations, banks, educational institutions & insurance companies uses Mainframes to run their business operations.

Mainframe computers

Use of Mainframe computers

- Government and civilian
- Credit card processing
- Bank
- Marketing
- Business data processing in large organization
- Air traffic control system
- Industrial design

Minicomputers

- Minicomputers are also called as “Midrange Computers”. It is a midsize multi-processing system capable of supporting up to 250 users simultaneously.
- These computers are not designed for a single user. Individual departments of a large company or organizations use Mini-computers for specific purposes. For example, a production department can use Mini-computers for monitoring certain production process.

Minicomputers

Use of Minicomputers

- Scientific research
- Instrumentation system
- Engineering analysis
- Industrial process monitoring and control

Microcomputer

- A personal computer is a computer designed to be used by one user at a time. The term microcomputer relates to microprocessor which is used with a personal computer for the purpose of processing data and instruction codes.
- The micro-computers are widely used & the fastest growing computers. These computers are the cheapest among the other three types of computers. The Micro-computers are specially designed for general usage like entertainment, education and work purposes.

Microcomputer example

- Desktop computers
- Netbooks
- Notebooks
- Personal digital assistant (PDA)
- Tablet PC’s
- Smartphones
- Calculators

Microcomputer