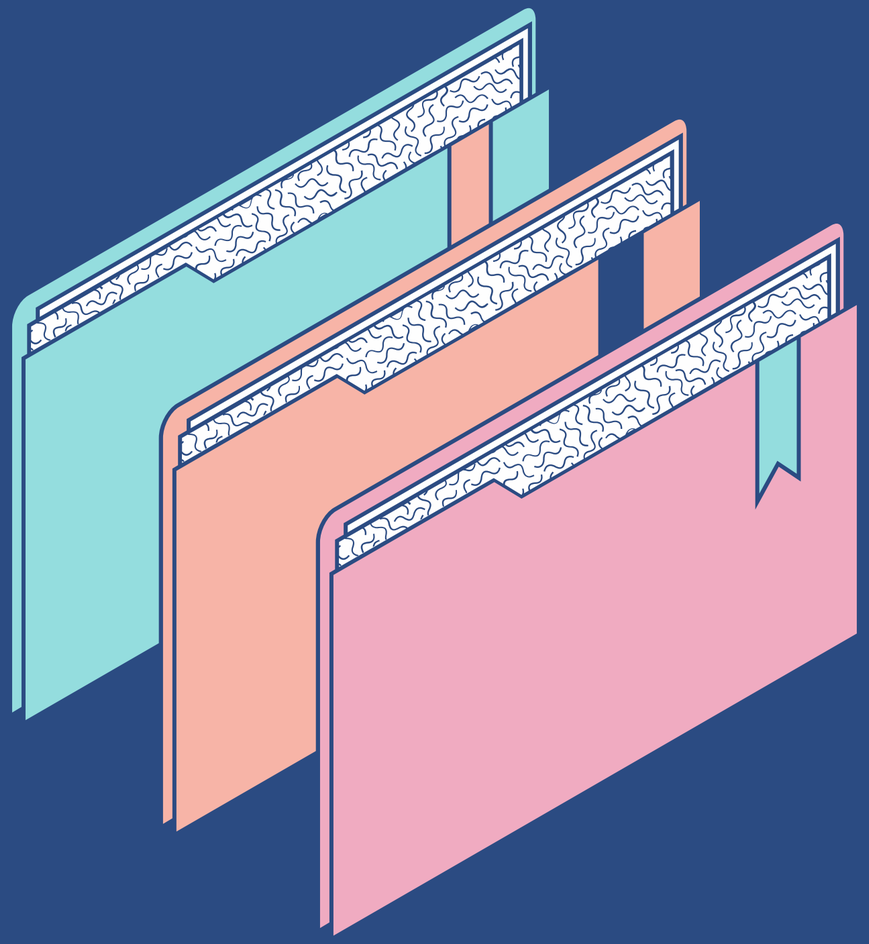
Classification of Computers

Instructor: Jhun Brian M. Andam



Discussion Outline

- Review of computer organization, components, and evolution.
- Classification of Computers.

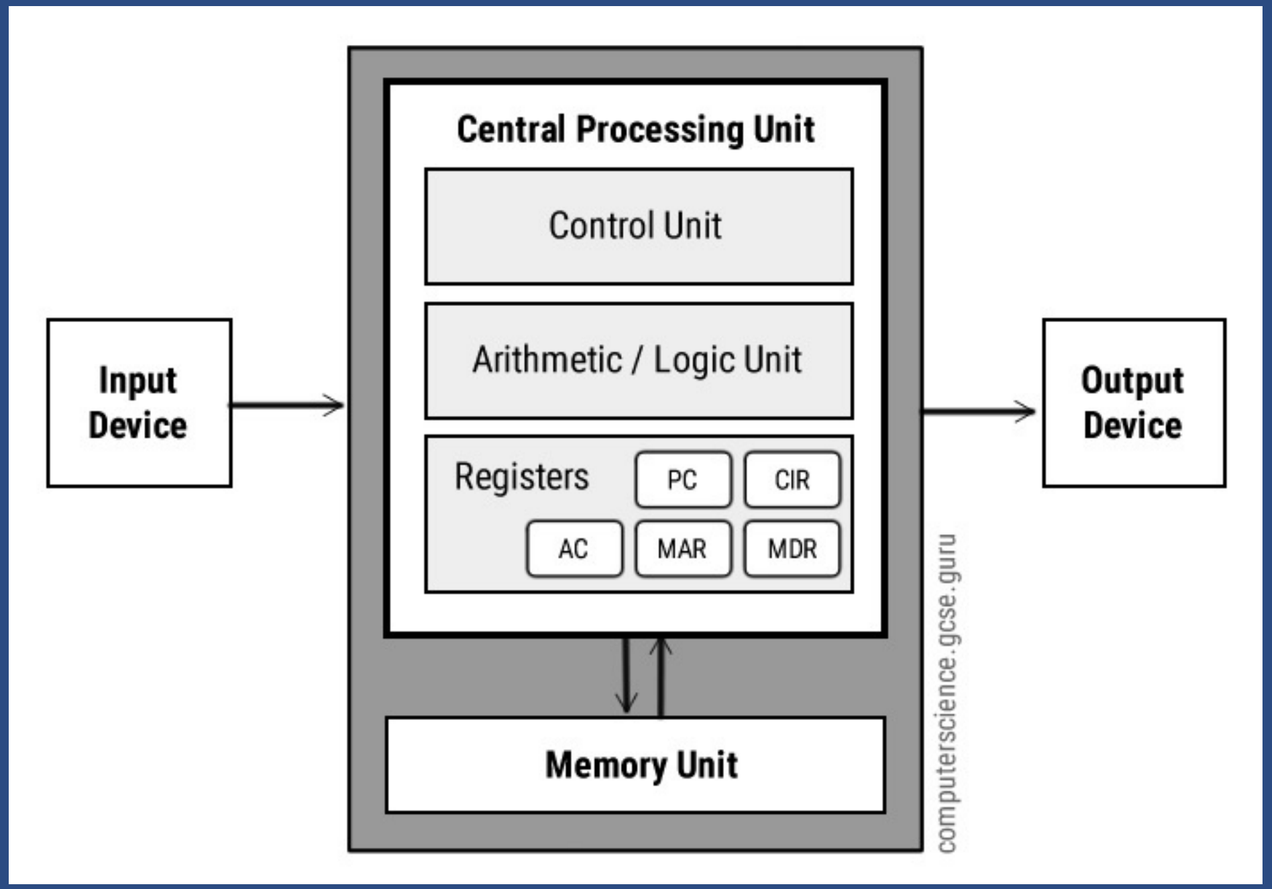
What is Computer Organization?

Distinguishing Characteristics and Purposes of Computing Machines

What is the gap between the desired behavior and electronic devices?

Evolution of Computers

The Von Neumann Architecture


Central Processing Unit
Control Unit
Arithmetic / Logic Unit
Registers
PC
CIR
AC
MAR
MDR
Input Device
Output Device
Memory Unit
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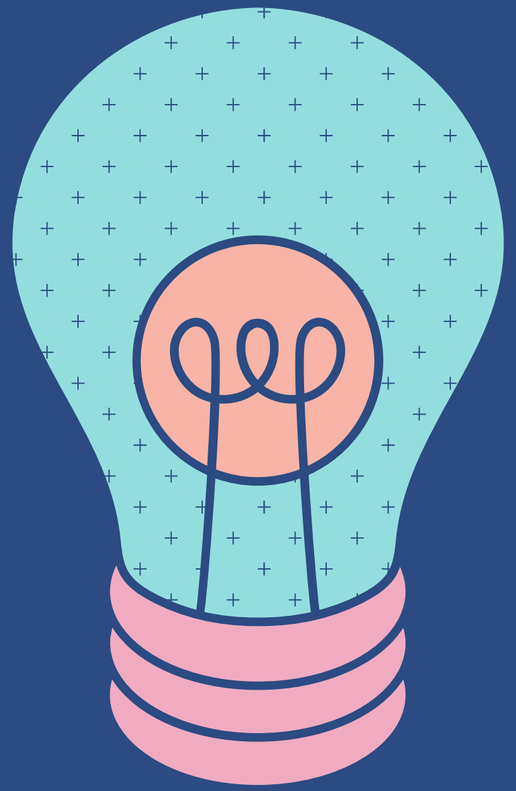
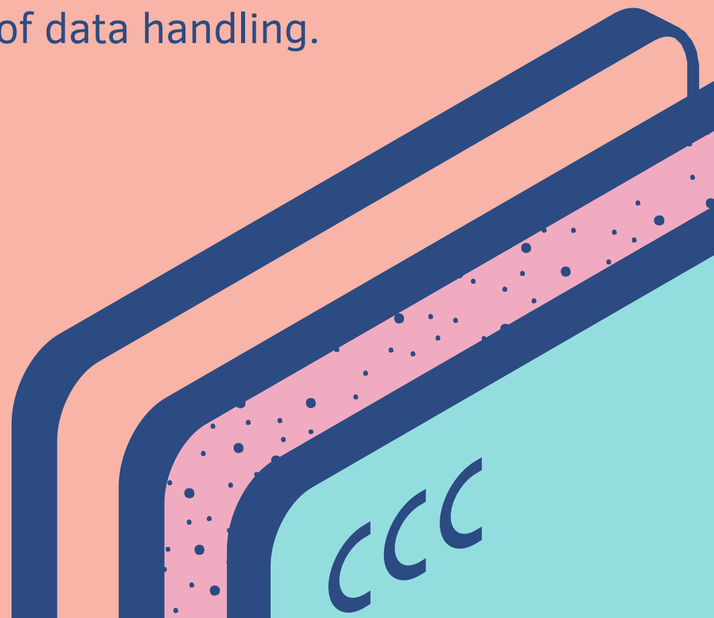


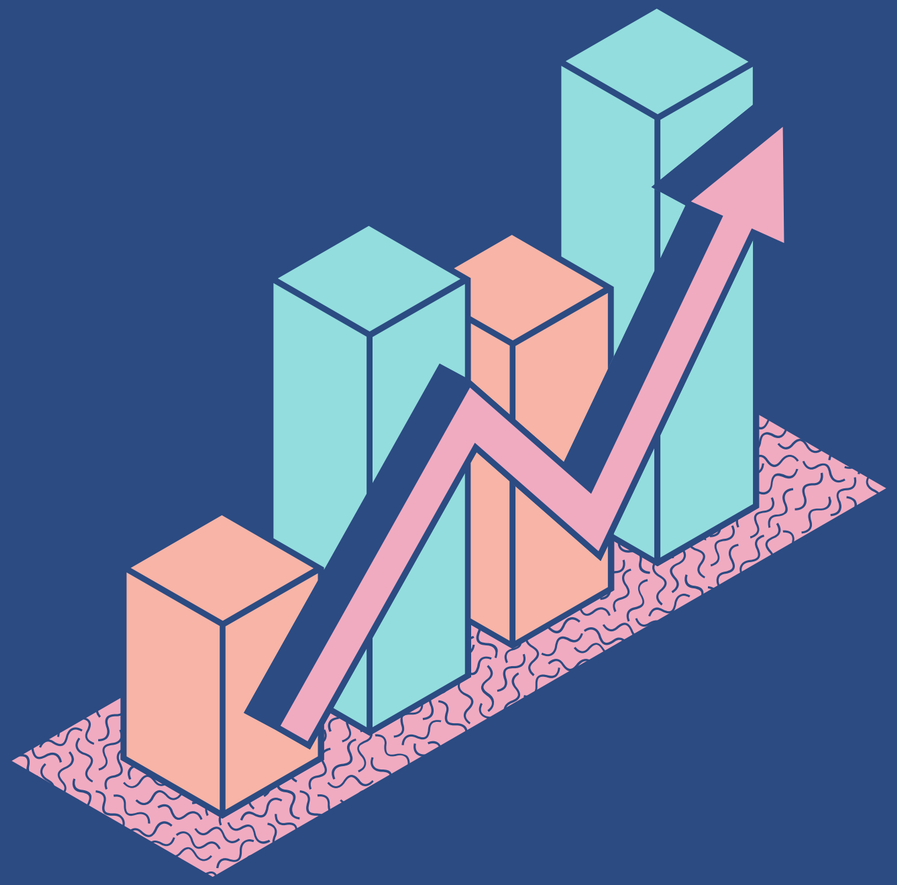
Classification of Computing Machines

The computer systems can be classified on the following basis:

1. On the basis of size.
2. On the basis of functionality.
3. On the basis of data handling.



Classification by SIZE



SUPERCOMPUTER

National Oceanic and Atmospheric Organization (NOAA) supercomputers.

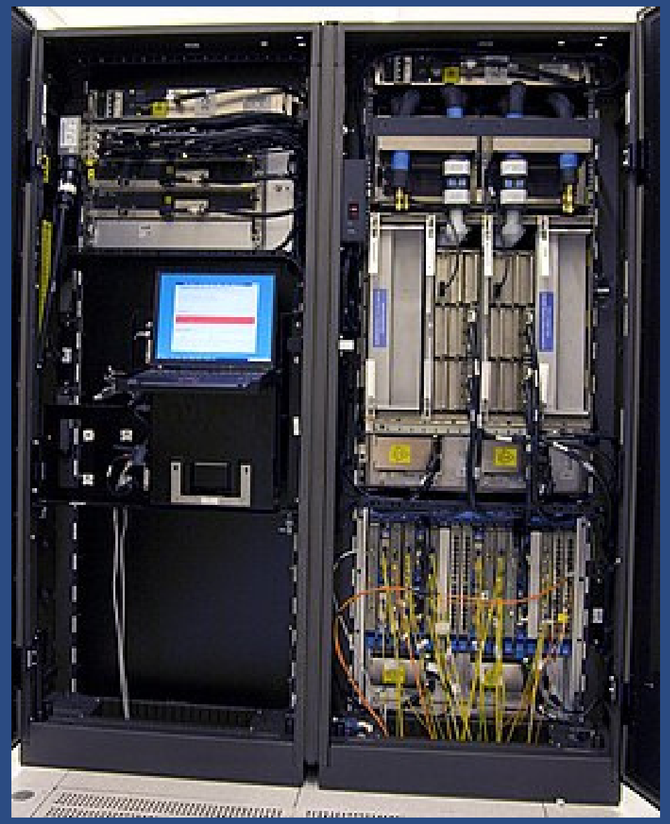
The super computers are the most high performing system. A supercomputer is a computer with a high level of performance compared to a general-purpose computer. The actual Performance of a supercomputer is measured in FLOPS instead of MIPS.

SUPERCOMPUTER

National Aeronautics and Space Administration (NASA) Supercomputers

Supercomputers actually play an important role in the field of computation, and are used for intensive computation tasks in various fields, including quantum mechanics, weather forecasting, climate research, oil and gas exploration, molecular modeling, and physical simulations. and also Throughout the history, supercomputers have been essential in the field of the cryptanalysis.
eg: PARAM, jaguar, roadrunner.

MAINFRAME



Inside an IBM Z9 Mainframe System

These are commonly called as big iron, they are usually used by big organizations for bulk data processing such as statistics, census data processing, transaction processing and are widely used as the servers as these systems has a higher processing capability as compared to the other classes of computers, most of these mainframe architectures were established in 1960s, the research and development worked continuously over the years and the mainframes of today are far more better than the earlier ones, in size, capacity and efficiency.

MINI COMPUTERS

Digital Equipment Corporation (DEC) PDP-8 Minicomputer

These computers came into the market in mid 1960s and were sold at a much cheaper price than the main frames, they were actually designed for control, instrumentation, human interaction, and communication switching as distinct from calculation and record keeping, later they became very popular for personal uses with evolution.

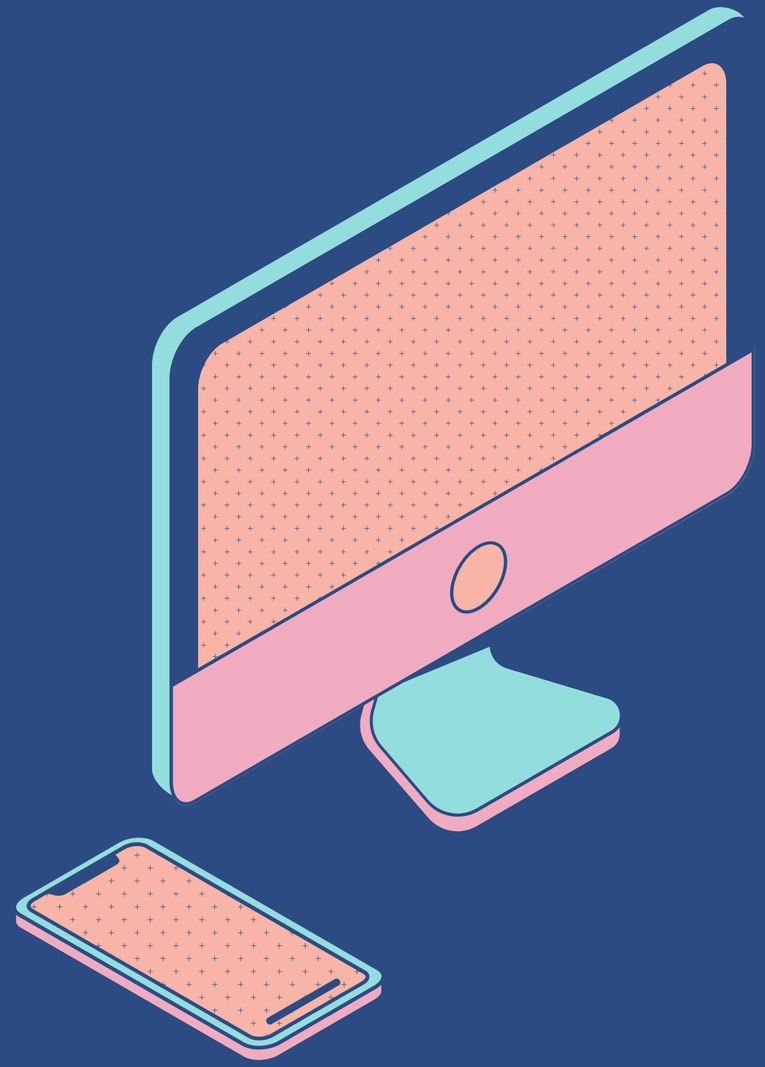
Early Minicomputers were NOT "general purpose", in that they were designed for a specific role like process control or accounting. On these machines, programming was generally carried out in their custom machine language, or even hard-coded into a plugboard, although some used a form of BASIC.

MICRO COMPUTERS

Three microcomputer systems frequently associated with the first wave of commercially successful 8-bit home computers:
The Commodore PET 2001, the Apple II, and the TRS-80 Model 1

A microcomputer is a small, relatively inexpensive computer with a microprocessor as its CPU. It includes a microprocessor, memory, and minimal I/O circuitry mounted on a single printed circuit board.The previous to these computers, mainframes and minicomputers, were comparatively much larger, hard to maintain and more expensive. They actually formed the foundation for present day microcomputers and smart gadgets that we use in day to day life.

Classification by **FUNCTIONALITY**



SERVERS

WikiMedia Servers

In computing, a server is a piece of computer hardware or software (computer program) that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model. Servers can provide various functionalities, often called "services", such as sharing data or resources among multiple clients or performing computations for a client.

Servers are nothing but dedicated computers which are set-up to offer some services to the clients. They are named depending on the type of service they offered. Eg: security server, database server.

WORKSTATION

A workstation is a special computer designed for technical or scientific applications. Intended primarily to be used by a single user, they are commonly connected to a local area network and run multi-user operating systems.

INFORMATION APPLIANCES

Smartwatch

They are the portable devices which are designed to perform a limited set of tasks like basic calculations, playing multimedia, browsing internet etc. They are generally referred as the mobile devices. They have very limited memory and flexibility and generally run on “as-is” basis.

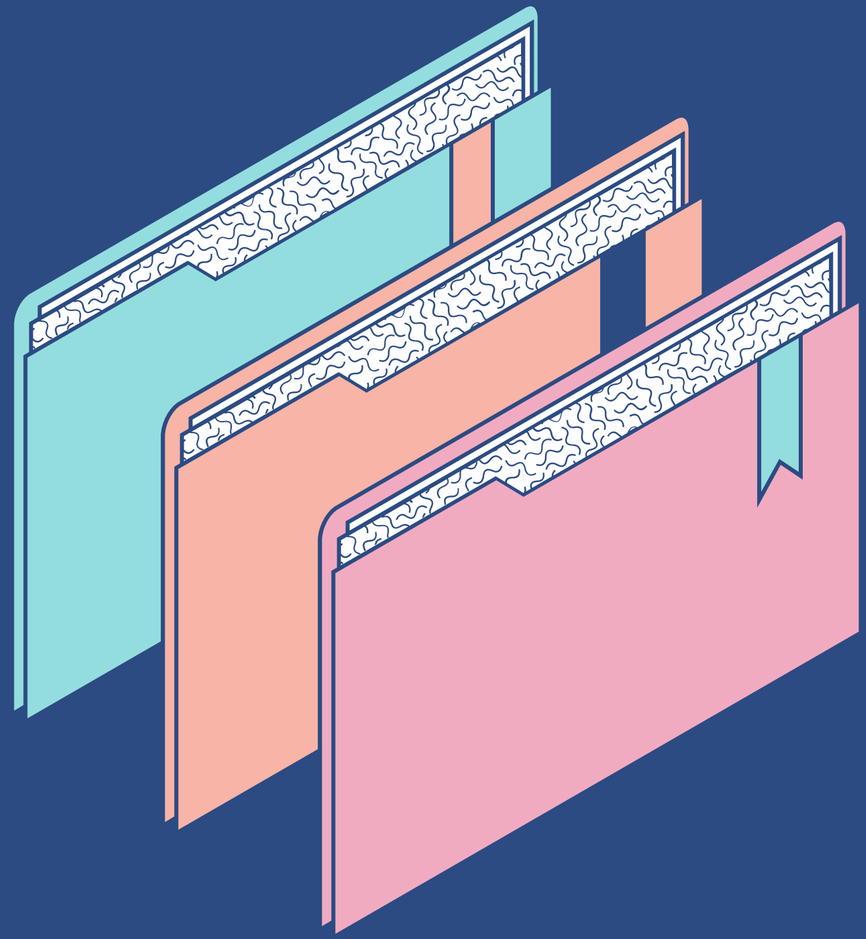
Typical examples are smartphones and personal digital assistants (PDAs). Information appliances partially overlap in definition with, or are sometimes referred to as, smart devices, embedded systems, mobile devices or wireless devices.

EMBEDDED COMPUTERS

Automated Teller Machine

They are the computing devices which are used in other machines to serve limited set of requirements. They follow instructions from the non-volatile memory and they are not required to execute reboot or reset. The processing units used in such device work to those basic requirements only and are different from the ones that are used in personal computers- better known as workstations.

Classification by DATA HANDLING

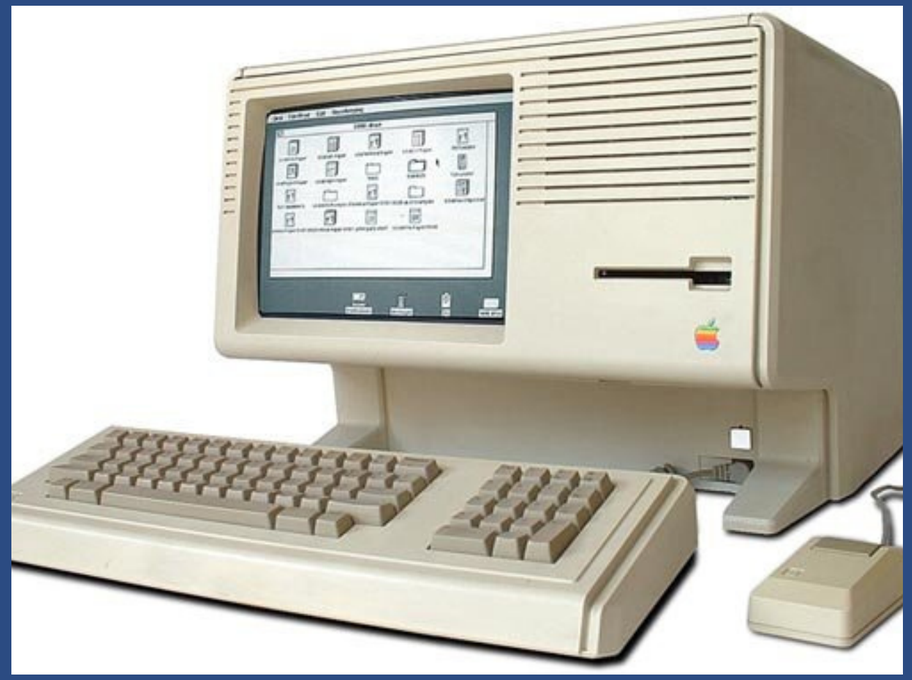


ANALOG

Analog Computer

An analog computer is a form of computer that uses the continuously-changeable aspects of physical fact such as electrical, mechanical, or hydraulic quantities to model the problem being solved. Any thing that is variable with respect to time and continuous can be claimed as analog just like an analog clock measures time by means of the distance traveled for the spokes of the clock around the circular dial.

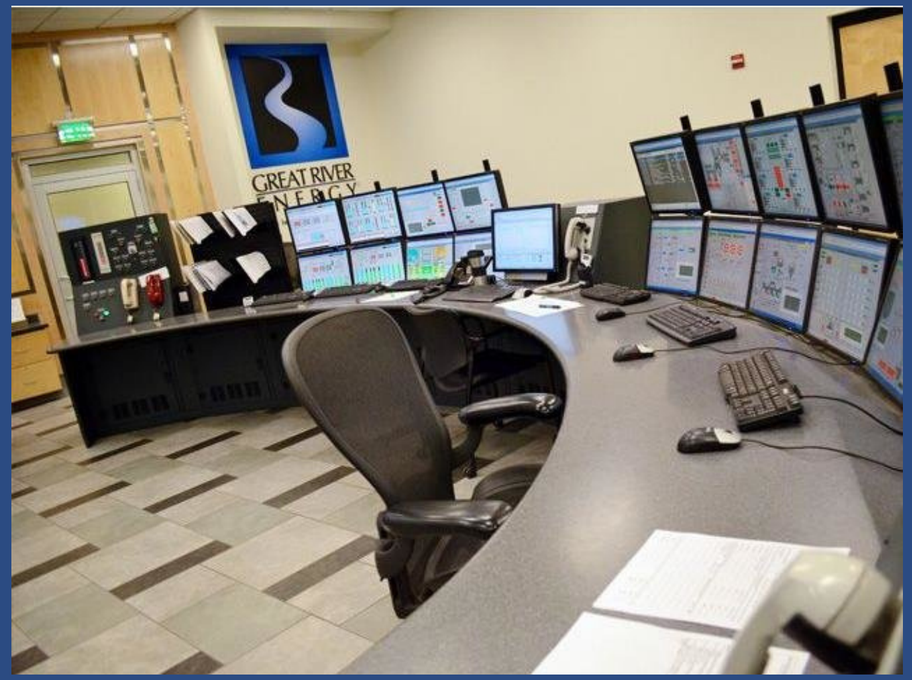
DIGITAL



Apple Lisa Computer (1983)

A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system of “0” and “1”, “Computer capable of solving problems by processing information expressed in discrete form. from manipulation of the combinations of the binary digits, it can perform mathematical calculations, organize and analyze data, control industrial and other processes, and simulate dynamic systems such as global weather patterns.

HYBRID



Powerplant control system

A computer that processes both analog and digital data, Hybrid computer is a digital computer that accepts analog signals, converts them to digital and processes them in digital form.

Do you have any questions?

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