

BS IT 1 2024 - 2025

# COMP TALK: COMPUTER HARDWARE AND SOFTWARE

COMPARATIVE STUDY ON THE DIFFERENT TYPES OF COMPUTERS AND THEIR USES

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# COMPUTERS

*(device for processing, storing, and displaying information)*



Originally referring to a person who performed calculations, the term "computer" is today nearly always used to describe automated technological devices. The design, components, and purposes of contemporary digital electronic computers are the main topics of this article's first section. The history of computers is covered in the second section. See computer science for information on computer theory, software, and architecture.

Computers carry a heavy impact on nowadays' institutions and is a significant tool in today's modern age.

WHAT ARE THE  
TYPES OF  
COMPUTERS?







## Analog computers

Analog computers use continuous physical magnitudes, like voltages, to represent information. Initially, they used mechanical components, but after World War II, voltages became the standard. By the 1960s, digital computers largely replaced them, though analog and hybrid digital-analog systems remained in use for tasks like aircraft and spaceflight simulation.

## Digital computers

In contrast to analog computers, digital computers represent information in discrete form, usually as sequences of 0s and 1s (binary digits, or bits). The modern era of digital computers began in the late 1930s and early 1940s in the U.S., Britain, and Germany. Early devices used switches controlled by electromagnets (relays), with programs stored on punched paper tape or cards, and limited internal data storage.





## Minicomputers

Minicomputers, introduced in the mid-1960s, were small, inexpensive systems used by single departments or small groups within organizations. Typically dedicated to specific tasks, they had limited computational power but were highly compatible with laboratory and industrial devices for data collection and input.

## Microcomputers

A microcomputer is a small computer built around a microprocessor chip. Unlike early minicomputers, which used transistors, microcomputers integrated thousands or millions of transistors on a single chip. The first microprocessor, the Intel 4004, was introduced in 1971, originally for a Japanese calculator. In 1975, the Altair, the first personal computer, used the Intel 8080 microprocessor. Early microcomputers, like minicomputers, had limited storage and data-handling capabilities, but these improved as storage technology and processing power advanced.







## Supercomputers

Supercomputers have traditionally been the most potent computers of the day. Historically, their use has been restricted to high-priority calculations for government-sponsored research, like weather modeling and nuclear simulations, and they have been exceedingly costly.

## Mainframe computers



Mainframes, created by companies like Unisys and IBM in the 1950s and '60s, were large, expensive computers used by major corporations and government labs. These powerful systems were leased rather than sold, with the IBM 1401 renting for \$8,000 per month in 1959. Known for their large storage, fast components, and reliability, mainframes were designed to handle vital tasks. They were operated by specialized systems programmers, while other users submitted batch jobs to be processed one at a time. Mainframes became essential for organizations due to their ability to manage critical operations.

WHAT ARE THE  
CORRESPONDING SPECS  
OF THE COMPUTERS?





# COMPARATIVE TABLE #1




Type	Name/Brand	CPU	Memory	Processing Speed	Calculating Power	Working Principle	Energy Consumption	Field of Use
Supercomputer	Fugaku	Fujitsu A64FX	163 PB/s memory bandwidth	442 PFLOPS	0.54 ExaFLOPS (FP64)	Parallel processing for scientific simulations	28 MW	Climate modeling, AI researchWikipedia AnandTechTom's Hardware
Mainframe Computer	IBM Z15	IBM z15 Integrated Processor	16 TB	12.5 GHz	Handles millions of transactions per second	Batch and transaction processing	Low per transaction	Banking, financial services
Minicomputer	PDP-11	16-bit CPU	128 KB	~2 MHz	Basic scientific and industrial control	Time-sharing and interactive operation	Moderate	Process control, small-scale computation
Server	Dell PowerEdge	Intel Xeon Scalable	Up to 12 TB	Depends on configuration	Scalable for networked services	Centralized processing for network tasks	Varies	Web hosting, database management
Workstation	HP Z4 G5	Intel Core i9 or Xeon	Up to 1 TB	~5 GHz	High performance for design applications	Independent processing for graphical and technical tasks	Moderate	CAD, video editing, simulations
Microcomputer	Apple MacBook Pro	Apple M2 Max	Up to 96 GB	3.7 GHz	Consumer-level computational tasks	Single-task processing for personal use	Low	General use, content creation



WHAT ARE THE USAGE  
OF EACH TYPE OF  
COMPUTERS?






# COMPARATIVE TABLE #2

Type of Computer	Sample Image	Description	Usage
Supercomputer		Extremely high-performance systems designed for large-scale computations and simulations	Climate modeling, AI, research
Mainframe Computer		Centralized, high-capacity systems optimized for transaction processing and large databases	Banking, enterprise applications
Mini Computer		Mid-range systems used for specific applications in industries or labs	Process control, automation



# COMPARATIVE TABLE #2

Type of Computer	Sample Image	Description	Usage
Server		Systems that manage network resources and handle client requests	Web hosting, databases
Workstation		High-performance personal computers for intensive tasks	CAD, video editing, simulations
Micro Computer		General-purpose, consumer-level computers	Personal computing, education

COMPARE AND  
CONTRAST THE  
COMPUTERS!





# COMPARATIVE TABLE #3

Attribute	Minicomputer	Microcomputer	Workstation	Server
Processing Speed	~2-5 MHz	~3-4 GHz	~5 GHz	Scalable based on configuration
Memory Capacity	Up to 128 KB or more	2 GB to 32 GB	16 GB to 512 GB	Up to 12 TB
Power Consumption	Moderate	Low	Moderate to high	Varies based on size/configuration
Usage	Industrial control, specific scientific tasks	Personal computing, education	Professional use (design, graphics, CAD)	Handling client requests, network resources



# COMPARISON

**Minicomputers:** Older technology primarily used for industrial and laboratory tasks, where computational demands are limited.

**Micro Computers:** Modern personal systems designed for general-purpose use, ideal for lightweight applications like office productivity and browsing.

**Workstations:** Powerhouses for individual users performing resource-heavy tasks such as 3D modeling, video editing, or software development.

**Servers:** Backbone systems for managing and distributing resources across networks, supporting multiple users and tasks simultaneously.





# CONTRAST

Minicomputers, with their older technology, focus on specific industrial or laboratory tasks with limited computational demands, making them specialized but less versatile. Microcomputers, on the other hand, are modern and flexible, designed for everyday tasks like browsing and office work, prioritizing affordability and ease of use. Workstations contrast sharply by delivering high performance tailored to resource-intensive tasks such as 3D modeling and video editing, catering to professionals needing advanced capabilities. Servers, distinct from all three, prioritize scalability and reliability, acting as the backbone of networks to manage multiple users and systems simultaneously. These differences illustrate their unique roles, scaling from specialized use to general, professional, and enterprise-level applications

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