

Comparative Study on Different Types of Computers

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Introduction to Computing**

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Introduction

Computers are differentiated into 4 main classifications, namely: Supercomputers, Mainframe Computers, Mini Computers, and Micro Computers, which are also known as Personal Computers (mangala, 2025), while servers and workstations are different types of computers that have their own functions mostly seen in workplaces. The following tables identify, discuss, and analyze the differences of the types of computers, and its specifications.

Discussion

Table 1. Specifications of Types of Computers

Types of Computers	Inventor & Invention (Brand)	Memory	Processing Speed	Energy Consumption	Field of Use
Supercomputers	Seymour Cray (Cray-1)	9.2 Petabytes (Pb)	100 Peta - Floating Point Operations Per Second (FLOPS)	(Depends on model of supercomputer) Measured in Megawatts	High - calculation fields, such as scientific or engineering fields, scientific research and simulations, and artificial intelligence
Mainframe Computers	Howard Aiken (Harvard Mark 1, or the IBM Automatic Sequence Controlled Calculator)	600,000 Bytes of Ram and above	Up to 100 Million Instructions Per Second (MIPS)	12,000 to 18,000 transactions per Kilowatt-Hour	Massive daily transactions (i.e. Banks)
Mini Computers	Bill Pentz (Sac State 8008)	1 Gigabyte (Gb) up to 128 Gb	10 to 30 MIPS	500 to 1000 Watts	Business management, automation, data processing, scientific research, and multi-user purposes
Micro Computers	François Gernelle (Micral N)	16 Kilobytes	500 kilohertz	(Depends on model of microcomputer) Measured in Watts	Personal use, such as academic studies or research, entertainment, and accessibility to online applications.

Table 1 discusses the specifications of supercomputers, mainframe computers, mini computers, and micro computers, specifically, it analyzes the computers' first prototype or built as an invention and the inventor, memory, processing speed, energy consumption, and its

applications or its field of use. This allows for easy understanding and comparison of the specifications of the four main types of computers.

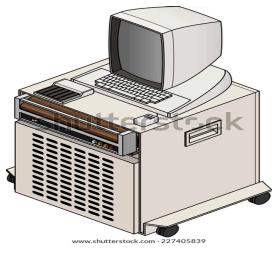
As per Hosch and L (2025), the supercomputer is the fastest and most powerful type of computer, where its field of use is emphasized towards scientific and engineering applications, such as complex mathematical models and simulations. Furthermore, being the fastest computer, its processing speed reaches at about 100 P-FLOPS or Peta–Floating Point Operations Per Second and an allocated memory of 9.2 Petabytes. Its energy consumption depends on the severity of the tasks done, with most supercomputers having more than 10+ Megawatts as their total energy consumption. (*How Do Supercomputers Work? Key Features and Examples*, 2025).

As stated by GeeksforGeeks (2025), the mainframe computers are used and known for handling vast amounts of server data, and for massive amounts of transactional inputs, this comes with the fact that mainframe computers feature a processing speed of up to 100 Million Instructions Per Second (MIPS). Furthermore, mainframe computers usually have 32 Gigabytes up to 40 Terabytes of random access memory, but in the Harvard Mark 1 it features 600,000 bytes of ram (Simon, n.d.). Subsequently, mainframe computers are usually measured per thousands of instructions, where in general mainframe computers may consume kilowatt-hour per 12,000 to 18,000 transactions (Vippala, 2025).

Whereas, the mini computer is used for the purpose of connecting devices into the same network and is usually meant for fields such as business management, industrial automation, data processing and education, while it features a processing speed of 10 up to 30 MIPS (GeekforGeeks, 2025), and is also referred to as small or midsize servers (Wang, 2020). With its memory size at around 1 Gb up to 128 and above Gb depending on the tasks to be done (*How Much RAM Do You Really Need for Servers and VPS in 2025?*, n.d.), with about 500 to 1000 Watts of energy assuming that the server is under normal operations, otherwise it could consume up to 2000 watts (*How Much Power Does a Server Use?*, n.d.).

Lastly, the micro computer is the smallest and technically the most portable type of computer compared to the rest, it is used for daily operations such as running applications, educational purposes, research, entertainment, and portability, where the Micral N or the intel 8008 featured 16 kilobytes of memory at only 500 kilohertz processing speed (Dad, 2010). Though the power consumption of the Micral N was not specifically stated, most modern micro computers typically run on 200 Watts up to 1000 Watts depending on the hardware of the personal computer.

Table 2. Examples of Types of Computers

Types of Computers	Sample Image	Description & Usage
Supercomputers		Extremely high - performance computer for exceedingly high computations in engineering or scientific fields, which is also used for demanding mathematical simulations.
Mainframe Computers		Slightly less powerful than the supercomputer, but takes in massive amounts of data for transactional processing.
Servers		A computer that is designed for computing, storing, and managing data, devices and systems over a network.
Workstations		A single-user computer made for the purpose of professional works related to graphics rendering, scientific research, video editing, and three-dimensional modeling. Subsequently, it also uses a dedicated graphics card unit with ample memory and advanced processors.
Mini Computers		Mini computers are mid-sized computers that are smaller than workstations and are usually bigger than micro computers. Mini computers are useful for education, office desktops, automation, business management, and scientific research. It is also commonly used for the intention of multiple users.

Micro Computers (Personal Computers)		A small compact device such as smartphones, tablets, laptops, and personal computers (PC) used for entertainment, academic purposes, automation, and easy access to applications.
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In table 2, it discusses the description of the following types of computers: supercomputers, mainframe computers, servers, workstations, mini computers, and micro computers. The table also analyzes its real-life applications, or its usage.

Supercomputers are designed to tackle most heavy computational tasks and can process massive amounts of data at incredible speeds (*What Is a Supercomputer and How It Differs From Cloud Computing*, 2023), where it is also known as the most powerful type of computer compared to the other classified types of computers, an example of its usage would be found at weather forecasts. It also features a really huge physical body that may encompass an entire room for its entirety to be placed perfectly fit.

Subsequently, mainframe computers are for massive transactional operations. Simply put, mainframe computers are huge data servers that are designed to process massive amounts of transactions from multiple users at a time, with a high level of security and reliability, mostly used for big technological companies and organizations (IBM, 2024). It features a set of computers similar but slightly smaller to that of a supercomputer, and is set inside huge rectangular cases.

Servers on the other hand, handle complex server processes such as managing multiple user queries, hosting websites, shareable drives for network devices, and database transaction management (*Complete Guide to Servers, Types, and Features | Spiceworks*, 2025). They are placed in rectangular cases and are bigger than workstations, but smaller than mainframe computers.

And foremost, the workstation is built for the purpose of single-user professional work, featuring a dedicated build made for graphics-demanding tasks, such as video editing, three dimensional modeling, graphics rendering, and scientific research. It is built the same way a normal office desktop would look like, but is usually more powerful than the normal office desktop, with a dedicated graphics card unit for graphics-related tasks (*How Does a Workstation Differ From Desktop Computers?*, 2023).

Next is the Mini Computer, which emphasizes on tasks including industrial automation, scientific research, and business management, where oftentimes also focuses on medium-scale applications rather than heavy computational tasks. It requires less space than the traditional desktop, and is useful for space efficiency (*What Is a Minicomputer? Uses, Features, and How It Differs From Mainframes*, 2023).

Consequently, the micro-computer, also known as the personal computer, is the smallest type of computer but has everything a computer needs. It is also designed to be used one person at a time. It includes a single integrated semiconductor chip that contains its Central Processing Unit (CPU), as well as its ram. It also features input and output devices, interconnected through its motherboard. Its form can either be that of a notebook (laptop), a handheld computer (smartphone or tablet), or the desktop computer itself (Wright & Shea, 2024).

Comparison and Contrast

Table 3. Comparison of 4 Types of Computers

Types of Computers	Processing Speed	Memory Capacity	Power Consumption
Server	10 to 30 MIPS	1 Gb to 128 Gb or above	200 - 1,500 Watts
Workstation	1.6 Gigahertz (GHz) to 3.8 GHz or higher	Up to 6 Terabytes (Tb)	300 - 1,000 Watts
Mini Computer	10 to 30 MIPS	1 Gb to 128 Gb or above	200 - 1,000 Watts
Micro Computer	1 GHz to 3.5 GHz and above (depending on applications)	4 Gb to 64 Gb	20 - 600 Watts

Computers have different distinct processing speeds, memory capacity, and power consumption needed for the computer to run, with this, a comparison would make it easier to understand and identify the key contrasting differences between servers, workstations, mini computers, and micro computers.

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