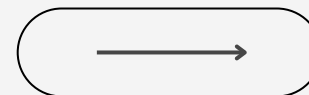


PRORTFOLIO # 6
A Comparative Study

DATE
11/19/2024



DIFFERENT TYPES OF COMPUTERS

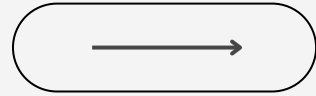


BS INFORMATION TECHNOLOGY
CIS 1102

PRESENTED BY
mizzi pomoy

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Overview



01 A **supercomputer** is a computer that performs at or near the highest operational rate for computers (Lutkevich, n.d.).

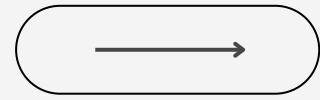
02 A **mainframe** is a powerful computer that connects to multiple end clients so that users can access apps concurrently (BasuMallick, 2023).

03 A **minicomputer** is a small general-purpose computer that uses one or more processors to complete work (Beal, 2022).

04 A **server** is a computing system that processes client requests made over a network (Kanade, 2023).

05 **Workstations** are high-performance computers designed to handle demanding workflows (Gerencer, 2024).

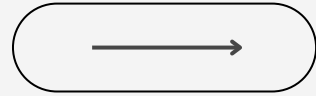
06 A **microcomputer** refers to a smaller and more affordable computer system (Ferguson & Hebels, 2023).



What is a Supercomputer?

A supercomputer is defined as an extremely powerful computing device that processes data at speeds measured in floating-point operations per second (FLOPS) to perform complex calculations and simulations, usually in the field of research, artificial intelligence, and big data computing (BasuMallick, 2022).

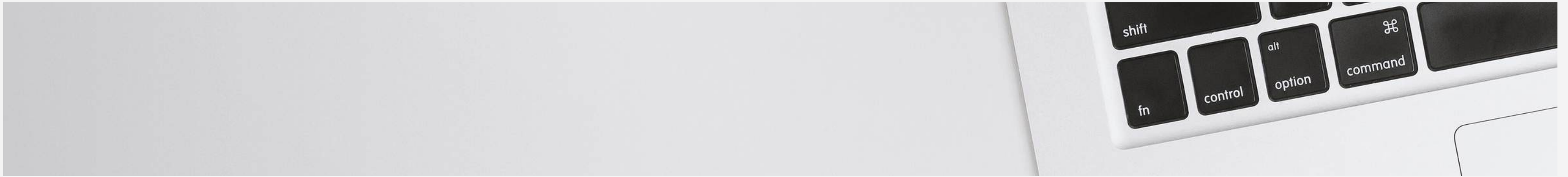




Usage of Supercomputer

Supercomputers are commonly used for making predictions with advanced modeling and simulations. This can be applied to climate research, weather forecasting, genomic sequencing, space exploration, aviation engineering and more (Becher, 2024).





SUPERCOMPUTER

Advantages

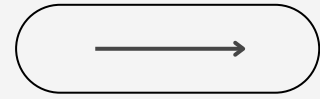
- These machines are capable of performing millions of operations per second and are often used in scientific research, engineering, and manufacturing.
- Supercomputers are able to perform these tasks so quickly, they can predict weather patterns, design buildings, and create advanced weapons systems (Basharat, 2022).

Disadvantages

- Supercomputers are not portable
- Expensive
- Occupy a lot of space
- Maintenance
- Heat Release
- Required more Electricity
- Noise

- Basharat, 2022

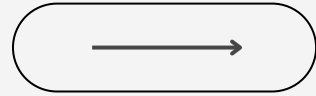




What is a Mainframe Computer?

A mainframe is defined as a large, powerful computer typically used for complex calculations and data processing tasks. It can connect to multiple end clients simultaneously so that several users can access different applications and processes running on the mainframe (BasuMallick, 2023).





Usage of Mainframe Computer

Mainframe computers are commonly used to process financial transactions, manage digital healthcare records, support government services and monitor supply chain data, among other applications (Becher, 2024).





MAINFRAME COMPUTER

Advantages

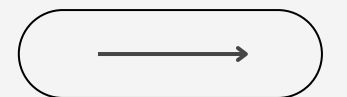
- High Computing Power
- Scalability
- Virtualization System
- Reliability
- Protection
- Flexible-Customization

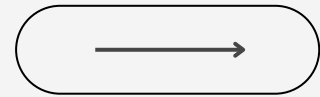
- Gupta, 2023

Disadvantages

- Installation
- Cost
- Physical Size
- Maintenance
- Resource Requirement
- Environmental Restrictions

- Roomi, 2021

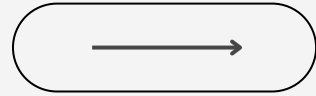




What is a Mini Computer?

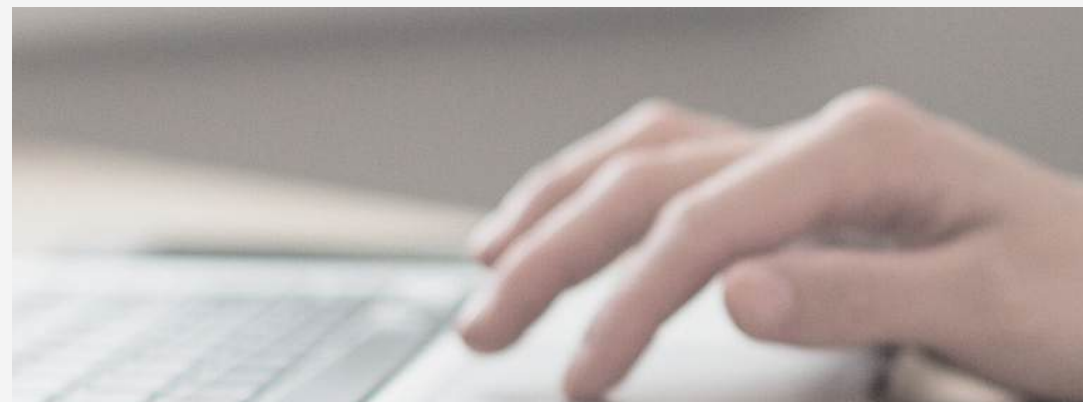
A minicomputer is a type of computer that possesses most of the features and capabilities of a large computer but is smaller in physical size. Minicomputers are mainly used as small or mid-range servers operating business and scientific applications (Rouse, 2017).





Usage of Mini Computer

Mini computers can be used for a variety of purposes, including as media centers for streaming video and audio content, as gaming devices, for home automation and IoT applications, as servers for small businesses, and as portable workstations for professionals who need to work on the go (Singh, 2022).





MINI COMPUTER

Advantages

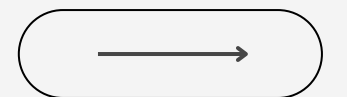
- Cost-Effective
- Space-Saving
- Energy Efficient
- Flexibility and Portability
- Adequate for Specific Apps
- User-Friendly
- Network Connectivity

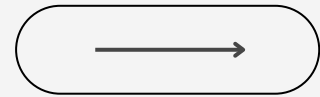
- Singh, 2022

Disadvantages

- Limited Processing Power
- Limited Scalability
- Limited Storage Capacity
- Less Redundancy and Fault Tolerance
- Fewer Expansion Options
- Potential for Overheating
- Reduced Performance in Multi-User Scenarios

- Singh, 2022

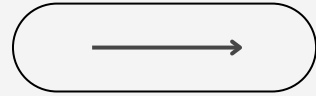




What is a Server?

A server is a powerful machine designed to compute, store, and manage data, devices, and systems over a network. This sophisticated computer system provides resources to networking units to render specialized services such as displaying web pages and sending or receiving emails, among others (Kanade, 2023).





Usage of Server

Servers are used to store data, including documents, images, and videos. They provide a centralized location for data storage, making it easy for users to access their data from anywhere. Servers also provide communication services, cloud computing, and virtualization (Mohindroo, 2023).





SERVER

Advantages

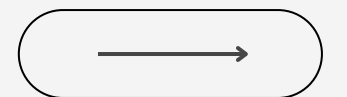
- Scalability
- High Processing Power
- Reliability
- Better Collaboration
- Cost Savings
- Safeguard from cyberattacks

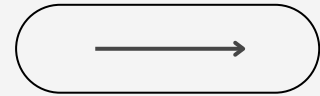
- Kanade, 2023

Disadvantages

- It costs money to purchase the server hardware and software and components to make it work.
- Physical space may also be a constraint to having an on-site server.

- Mesel, 2020

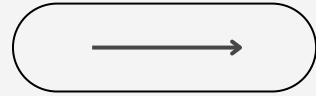




What is a Workstation?

A workstation represents a high-performance computer, specifically designed for handling technical or scientific applications. Unlike regular personal computers, workstations possess superior processing capabilities, making them suitable for tasks that require high computational power (Ballejos, 2024).





Usage of Workstation

Workstations handle large computational tasks that require extra processing power. It has advanced capabilities to run sophisticated software and applications, including graphics, data processing, and imaging (Indeed Editorial Team, 2024).





WORKSTATION

Advantages

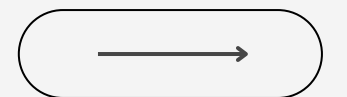
- High Performance
- Single User
- Used in the entertainment and media sector
- Reliability
- Large Memory
- Multiple Processors Support

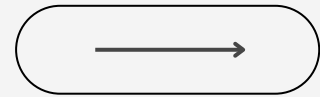
- Rehman, n.d.

Disadvantages

- Portability
- Expensive
- High Power Usage

- Rehman, n.d.

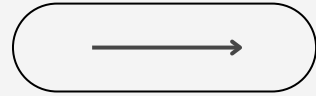




What is a Micro Computer?

A microcomputer draws its name from the microprocessor, the key component that drives its operations. It is a complete computer on a smaller scale, designed for use by individuals (Ballejos, 2024).





Usage of Micro Computer

Micro computers are used for data and word processing, electronic spreadsheets, professional presentation and graphics programs, communications, and database management systems, along with bookkeeping, inventory management, communication, medical record-keeping, financial transactions, and auditing (Shea, n.d.).





MICRO COMPUTER

Advantages

- Affordable
- Energy Efficient
- Portable
- Increased Productivity

- Aggarwal, 2023

Disadvantages

- No Protection Power
- Low Performance
- Low Storage Capacity

- Aggarwal, 2023



COMPARISON TABLE

Types of Computer	Name/Brand	Build	CPU	Memory	Processing Speed	Calculating Power	Working Principle	Energy Consumption	Field of Use
SUPERCOMPUTER	<ul style="list-style-type: none">IBMControl Data Corporation (CDC)Thinking Machines Corporation	<ul style="list-style-type: none">Early supercomputers were large room-sized machinesModern supercomputers can range from refrigerator-sized to warehouse-sized installationsSome use distributed architectures spanning multiple physical locations	<ul style="list-style-type: none">Multiple processors - often thousands or even millions of coresCustom-designed chips optimized for performanceVector processing capabilitiesHigh clock speeds (often measured in GHz)	<ul style="list-style-type: none">Billions or trillions of bytes of RAMLarge disk storage arraysUse distributed memory architectures	<ul style="list-style-type: none">Current fastest supercomputers exceed 1 exaFLOP (1 billion billion calculations per second)Measured in petaFLOPS (quadrillion calculations per second) for most systems	<ul style="list-style-type: none">Used for scientific simulations, weather modeling, cryptography, etc.Capable of solving complex mathematical models and physical simulations	<ul style="list-style-type: none">Multiple processors work together on different parts of a problem simultaneouslyData distributed across nodes for parallel computationUse message passing interfaces for inter-node communication	<ul style="list-style-type: none">Can draw hundreds of megawatts or moreRequire advanced cooling systems (liquid immersion, air conditioning)Generate significant heat that needs to be dissipated	<ul style="list-style-type: none">Weather forecasting and climate modelingScientific research (physics, chemistry, biology)Engineering simulationsCryptanalysis and cryptographyOil/gas explorationMedical research and drug discoveryNuclear weapons simulation

COMPARISON TABLE

TYPES OF COMPUTER	NAME/BRAND	BUILD	CPU	MEMORY	PROCESSING SPEED	CALCULATING POWER	WORKING PRINCIPLE	ENERGY CONSUMPTION	FIELD OF USE
MAINFRAME COMPUTER	<ul style="list-style-type: none">IBMControl Data Corporation (CDC)Thinking Machines Corporation	<ul style="list-style-type: none">Can range from refrigerator-sized to larger installationsModern mainframes are much smaller than historical "Big Iron" machinesCan fit in a 19-inch rack in data centers	<ul style="list-style-type: none">Two processors: Primary processor and System Assistance Processor (SAP)SAP handles data transfer between processorsEach CPU can contain up to 7-10 specially designed cores for increased throughputCustom-designed chips optimized for performance	<ul style="list-style-type: none">Extremely high storage capacityCan store vast quantities of data and interpret it according to user specificationsProvides accurate findings with zero data inaccuracies	<ul style="list-style-type: none">Designed for high-volume input and output (I/O)Emphasizes throughput computingCan handle massive databases and files (gigabytes to terabytes in size)	<ul style="list-style-type: none">Can execute up to 1 trillion daily online transactionsHigh processing power for complex calculations and data processing tasks	<ul style="list-style-type: none">Acts as a data warehouse orchestration systemHelps enforce authentication and access permissionsAllocates processor time and resources efficientlySupports multiple operating systems on a single machine	<ul style="list-style-type: none">High power consumptionRequires advanced cooling systems (liquid immersion, air conditioning)Generates significant heat that needs to be dissipated	<ul style="list-style-type: none">Mission-critical applications in large enterprisesBulk data processing for tasks like censuses, industry statistics, ERP, and large transaction processingFinancial institutions, government agencies, healthcare providers, insurance companies, utilities, and administrative bodies

COMPARISON TABLE

Types of Computer	Name/Brand	Build	CPU	Memory	Processing Speed	Calculating Power	Working Principle	Energy Consumption	Field of Use
MINI COMPUTER	<ul style="list-style-type: none">Digital Equipment Corporation (DEC) PDP-8Data General NovaHoneywell 316	<ul style="list-style-type: none">Smaller than mainframes, typically taking up one or a few 19-inch rack cabinetsMuch smaller than historical "Big Iron" machinesCould fit in a standard chassis and use common devices	<ul style="list-style-type: none">Initially 12-bit and 18-bit systems, later moving to 16-bit and then 32-bit architecturesCustom-designed chips optimized for performance	<ul style="list-style-type: none">Typically had thousands of words of memoryUsed core memory technology initially, later moving to semiconductor memory	<ul style="list-style-type: none">Designed for control, instrumentation, human interaction, and communication switchingLess powerful than mainframes or supercomputers but more capable than personal computers	<ul style="list-style-type: none">Capable of running programs in higher-level languages like Fortran or BASICCould handle scientific and engineering computations, business transactions, file handling, and database management	<ul style="list-style-type: none">Used parallel processing techniquesEmphasized throughput computing rather than raw processing powerSupported multi-user, multitasking operating systems (e.g., VMS, Unix)	<ul style="list-style-type: none">Generally lower power consumption compared to mainframesRequired less cooling due to smaller size	<ul style="list-style-type: none">Scientific researchEngineering computationsBusiness transaction processingFile handlingDatabase managementProcess control systemsManufacturing process controlTelephone switching systemsLaboratory equipment controlComputer-aided design (CAD) industry

COMPARISON TABLE

TYPES OF COMPUTER	NAME/BRAND	BUILD	CPU	MEMORY	PROCESSING SPEED	CALCULATING POWER	WORKING PRINCIPLE	ENERGY CONSUMPTION	FIELD OF USE
SERVER	<ul style="list-style-type: none">IBM Power SystemsDell PowerEdgeHP ProLiant	<ul style="list-style-type: none">Can range from small appliances to large rack-mounted systemsNetwork appliances are often smaller than common desktop computersModern servers can be blade servers or traditional rack-mounted designs	<ul style="list-style-type: none">High-performance processors optimized for server workloadsMulti-core processing is common (often 8+ cores per socket)Custom-designed chips for improved reliability and efficiency	<ul style="list-style-type: none">Large amounts of RAM (often 64GB or more)Fast memory speeds to handle high throughput	<ul style="list-style-type: none">Designed for high-throughput computing rather than raw processing powerEmphasizes reliability and consistency over peak performance	<ul style="list-style-type: none">Measured in transactions per second or requests per secondCan handle millions of concurrent connections	<ul style="list-style-type: none">Acts as a central resource provider for clients on the networkManages requests from clients and delivers requested data or servicesOften runs specialized server operating systems	<ul style="list-style-type: none">Can vary widely depending on size and workloadMore efficient than desktop computers due to specialized hardware design	<ul style="list-style-type: none">Web hosting and content deliveryEmail servicesFile storage and managementDatabase managementApplication hostingCloud computing infrastructureEnterprise resource planning (ERP) systemsNetwork management and monitoring

COMPARISON TABLE

Types of Computer	Name/Brand	Build	CPU	Memory	Processing Speed	Calculating Power	Working Principle	Energy Consumption	Field of Use
Workstations	<ul style="list-style-type: none">Sun MicrosystemsSilicon GraphicsApollo Computer	<ul style="list-style-type: none">Desktop form factor, often larger than typical personal computersCan range from compact towers to full-size desktop casesMay include specialized cooling systems for high-performance components	<ul style="list-style-type: none">Historically used custom-designed chipsCurrently use high-performance versions of mainstreamMulti-core processing is commonClock speeds can reach 4+ GHz	<ul style="list-style-type: none">Large amounts of RAM (often 64GB or more)Fast memory speeds to handle high-performance workloads	<ul style="list-style-type: none">Designed for high-performance computing tasksEmphasizes raw processing power and specialized capabilitiesCan handle complex tasks like 3D rendering, video editing, and scientific simulations	<ul style="list-style-type: none">Measured in FLOPSCan range from tens of thousands to millions of FLOPS	<ul style="list-style-type: none">Optimized for single-user operation with high-performance capabilitiesOften run specialized operating systems or enterprise versions of mainstream OSesFeature advanced graphics capabilities for visualization and manipulation of complex data	<ul style="list-style-type: none">Higher energy consumption compared to average desktop computersMay require more powerful cooling systems due to high-performance components	<ul style="list-style-type: none">Computer-aided design (CAD)Scientific simulations and researchVideo editing and post-production3D modeling and animationMedical imaging and diagnosticsEngineering and architectural visualizationSoftware development and testingFinancial modeling and analysis

COMPARISON TABLE

TYPES OF COMPUTER	NAME/BRAND	BUILD	CPU	MEMORY	PROCESSING SPEED	CALCULATING POWER	WORKING PRINCIPLE	ENERGY CONSUMPTION	FIELD OF USE
MICRO COMPUTER	<ul style="list-style-type: none">Altair 8800Apple IIIBM PC	<ul style="list-style-type: none">Designed to fit on or under a deskMuch smaller than mainframes or minicomputersCan range from compact towers to all-in-one designs	<ul style="list-style-type: none">Uses a single integrated microprocessor chipEarly models often had limited capabilities (e.g., Intel 8080, Zilog Z80)Modern CPUs are high-performance versions of mainstream processors	<ul style="list-style-type: none">Typically starts with 256KB RAMCurrent models offer gigabytes of RAMOften include various storage options (hard drives, SSDs, optical drives)	<ul style="list-style-type: none">Varies widely depending on model and ageEarly models were quite slow compared to modern standardsModern microcomputers (laptops, desktops) offer high processing speeds	<ul style="list-style-type: none">Measured in FLOPS or MIPS unitsVaries greatly depending on model and ageModern models can handle complex tasks efficiently	<ul style="list-style-type: none">Optimized for single-user operationRuns operating systems designed for personal use (e.g., Windows, macOS)Emphasizes ease of use and versatility over raw processing power	<ul style="list-style-type: none">Generally lower than servers or workstationsCan vary significantly depending on model and usage	<ul style="list-style-type: none">Home computing and personal productivityGamingGeneral-purpose office workEducationHobbyist projectsBasic scientific calculations and simulations

COMPARISON TABLE

TYPES OF COMPUTER	PROCESSING SPEED	MEMORY CAPACITY	POWER CONSUMPTION	USAGE
MINI COMPUTER	<ul style="list-style-type: none">Moderate processing speed, suitable for control, instrumentation, and communication tasks.	<ul style="list-style-type: none">Thousands of words of memory; transitioned to semiconductor memory.	<ul style="list-style-type: none">Lower than mainframes; less cooling needed.	<ul style="list-style-type: none">Used as media centers, gaming devices, servers for small businesses, and portable workstations.
MICRO COMPUTER	<ul style="list-style-type: none">Varies widely; modern models offer high speeds, while earlier ones were slower.	<ul style="list-style-type: none">Starts with 256KB RAM; modern models provide gigabytes of RAM and advanced storage options.	<ul style="list-style-type: none">Generally low but varies by model and usage.	<ul style="list-style-type: none">Ideal for data processing, graphics, communication, financial tasks, and everyday personal and professional use.
WORKSTATION	<ul style="list-style-type: none">High-performance computing for tasks like 3D rendering, video editing, and scientific simulations.	<ul style="list-style-type: none">Large memory (64GB+); optimized for demanding tasks.	<ul style="list-style-type: none">High energy consumption; requires powerful cooling.	<ul style="list-style-type: none">Used for sophisticated software and advanced applications in design, graphics, and research.
SERVER	<ul style="list-style-type: none">High-throughput computing with a focus on reliability and consistency rather than raw speed.	<ul style="list-style-type: none">Large RAM capacity (64GB+); high-speed memory.	<ul style="list-style-type: none">Varies by size and workload; efficient hardware design.	<ul style="list-style-type: none">Centralized data storage, communication services, cloud computing, and virtualization for organizations.

AN ANALYSIS TO INFORMATION SYSTEMS

Computers come in all shapes and sizes, and each type is built for a specific purpose. Supercomputers, for example, are the giants of the computing world. They're fast and powerful, designed to handle complex tasks like weather forecasting, simulations, and scientific research. It's impressive how they can process trillions of calculations per second, but they're not practical for everyday use. They consume a ton of energy and are expensive to maintain, so they're mainly found in research labs or government projects.

Mainframe computers are also powerful but in a different way. They're more about handling tons of data and running multiple tasks at once. They're like the reliable workhorses of big organizations, managing things like banking systems and airline reservations. They might not be as fast as supercomputers, but they're great for stability and processing large-scale transactions. Mainframes are huge and expensive, though, so they're not something an average person would ever need.

AN ANALYSIS TO INFORMATION SYSTEMS (cont'd)

Mini computers, on the other hand, are a bit smaller and more affordable. They were once popular for medium-sized businesses but have kind of faded out with modern advancements. Still, they're useful for specific roles, like controlling equipment or as servers in smaller setups. They're not as powerful as mainframes, but they get the job done for tasks that don't need massive computing power.

Servers are crucial in today's digital world. They might not look exciting, but they're the backbone of the internet and many organizations. Servers store and manage data, handle requests, and make sure websites, apps, and databases run smoothly. They're reliable, efficient, and designed to work 24/7. While they're not built for personal use, their role in keeping everything connected is huge.

AN ANALYSIS TO INFORMATION SYSTEMS (cont'd)

Workstations are like the overachievers among personal computers. They're meant for high-performance tasks like 3D modeling, video editing, and scientific simulations. They're more powerful than regular microcomputers but not as massive as servers or mainframes. Workstations are perfect for professionals who need that extra boost in performance, but they're also more expensive and consume more energy.

Microcomputers are the most common type of computer, and they're what most people use daily. These include desktops, laptops, and even tablets. They're not as powerful as workstations or servers, but they're versatile and user-friendly. Whether it's for work, gaming, or browsing the internet, microcomputers strike a balance between performance and affordability.

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