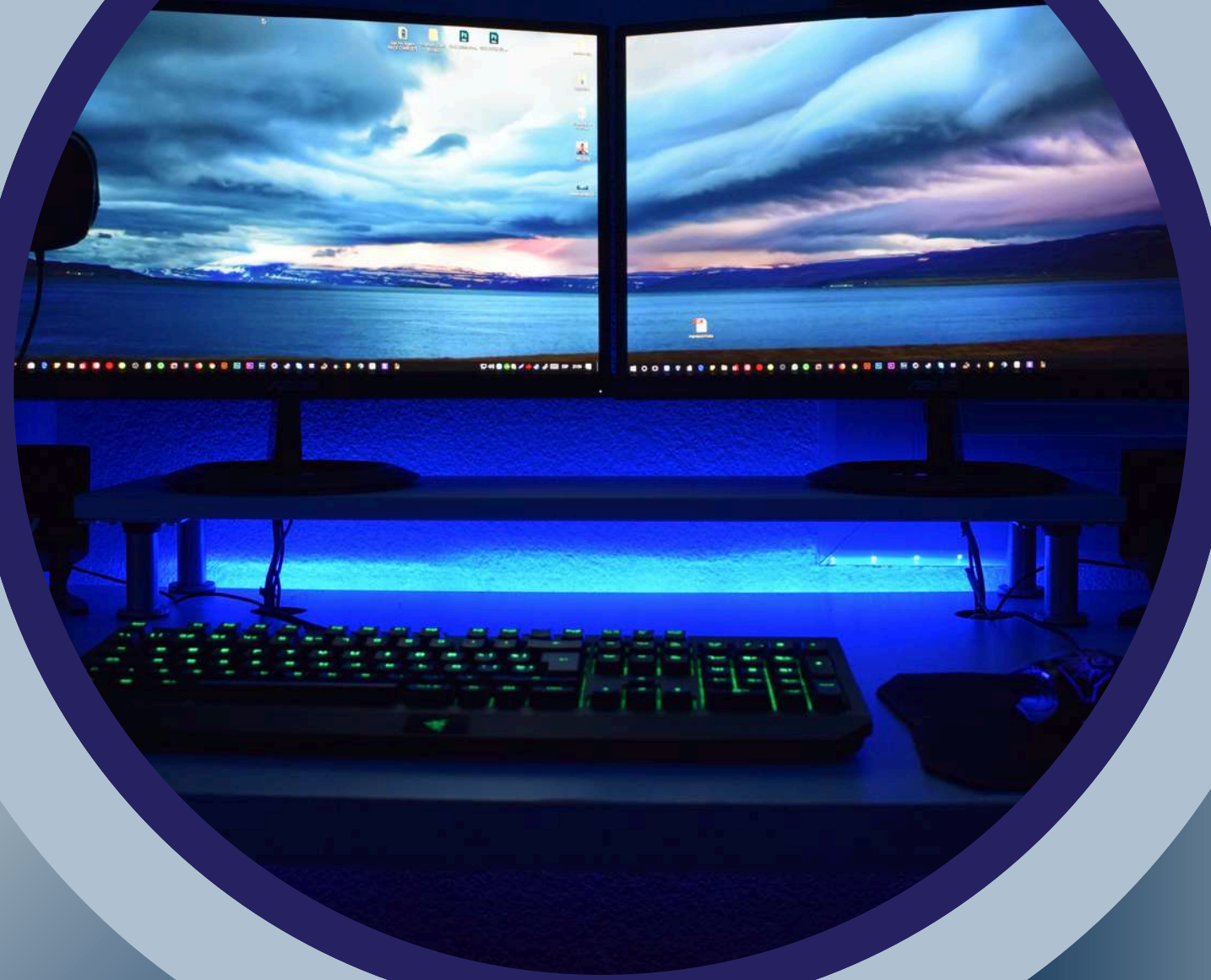


# DIFFERENT TYPES OF COMPUTERS

A COMPARITIVE STUDY

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# INTRODUCTION

A computer is an inline-performing electronic system used to analyze, store, and produce data and information, it is widely used in many facets of life including school, work, and leisure. In the past decades, various forms of computers have been developed based on certain requirements and usage.





# DISCUSSION

This study looks at fixed station computers such as the desktop, portable such as the laptops and notebooks, mobile such as the tablets and stationary such as servers and their appropriate uses according to their features and performance. Therefore, this seeks to inform the various roles in which computers are used in modern life based on their strengths and limitations as well as improvements made in their usage.







# TYPES OF COMPUTERS





# SUPERCOMPUTER

# SUPERCOMPUTER

## name/brand

ATOS, BullSequana XH3000

## build

A hybrid computing platform for the Max Planck Society containing AMD EPYC CPUs and Instinct accelerators.

## CPU

It supports SiPearl Rhea1 processor and amd epyc

## Memory

Supports high-speed DDR5 memory, offering significantly improved bandwidth over DDR4.

# SUPERCOMPUTER

## processing speed

Delivers petascale to exascale performance, leveraging CPUs and NVIDIA GPUs (e.g., H100) for high-speed computation.

## working principle

Modular, scalable design with high-speed interconnects (InfiniBand, NVLink) and advanced cooling for energy-efficient, parallel computation.

## calculating power

High TFLOPs to PFLOPs performance, ideal for parallel and large-scale workloads.

## energy consumption

Direct Liquid Cooling reduces power use while maintaining high performance.

# SUPERCOMPUTER

## field of use

It is used for AI/ML deep learning and interference, research and simulations.





# MAINFRAME COMPUTERS

# MAINFRAME COMPUTERS

## name/brand

IBM

## build

Built with a variety of hardware components, including processors, memory, and storage all for the purpose to process critical data

## CPU

Telum. The latest generation of the Z-series CPU that mainframes are built on is called Telum.

## Memory

Mainframes can have up to 40 TB of error-correcting RAM.



# MAINFRAME COMPUTERS

## processing speed

Specialized for high I/O and transactional speed, with sub-millisecond response times and billions of transactions per second.

## working principle

It contains parallel processing that leverages simultaneous multithreading and workload isolation, security through its cryptographic hardware that ensures robust, real time data encryption and resilience for 24/7 availability with minimal downtime.

## calculating power

High computational throughput tailored for mixed workloads, including batch processing, online transactions, and AI inferencing.

## energy consumption

Energy-efficient design for large-scale data centers, using advanced cooling systems and high-density architecture to minimize power use per transaction.

# MAINFRAME COMPUTERS

## field of use

It is used for banking & finances, healthcare, retail, telecommunications and governmental affairs.





# MINI COMPUTERS

# MINI COMPUTERS

## name/brand

APPLE Mac Mini

## build

Compact desktop computer with a 5x5-inch footprint, redesigned around Apple Silicon for performance and energy efficiency

## CPU

Apple M4 chip (10-core CPU + GPU) or M4 Pro chip (14-core CPU + 20-core GPU)

## Memory

Starts at 16GB, upgradeable up to 64GB with the M4 Pro



# MINI COMPUTERS

## processing speed

The M4 delivers up to 1.8x faster CPU performance and 2.2x faster GPU performance than previous M1 models.

## working principle

It combines the power of the CPU, GPU, and neural engine for optimized and quality performance as well as energy efficiency. It also ensures seamless hardware-software synergy with the apple silicon integration.

## calculating power

Neural engine with enhanced machine learning capabilities for AI, with performance scaling for multimedia, development, and analytical workloads.

## energy consumption

It has industry leading energy efficiency with carbon neutral certification which reduces greenhouse gasses.

# MINI COMPUTERS

## field of use

It is used for video editing, music production, gaming, software developing, business/professional tasks, and the such.





# SERVER

# SERVER

## name/brand

Dell PowerEdge R760 Server

## build

The R760 is a 2U rack server designed with robust chassis options supporting a variety of configurations. It features hot-swappable power supplies, fan redundancy, and compatibility with various drive types and sizes.

## CPU

Supports up to 2 x Intel Xeon Scalable Platinum 8452Y processors, each offering 36 cores and running at a base frequency of 2.0 GHz.

## Memory

Equipped with up to 1TB DDR5 ECC memory (4800MT/s), expandable to a maximum of 8TB.

# SERVER

## processing speed

Depends on the CPU configuration. With 36 cores per processor and high memory bandwidth, the system is optimized for demanding workloads.

## working principle

Operates as a central node in data centers, handling compute, storage, and network management. It supports virtualization and scalable applications through efficient hardware utilization and management tools like iDRAC and OpenManage.

## calculating power

Exceptional parallel processing capabilities, with up to 72 cores across two processors. This makes it suitable for compute-intensive applications like virtualization, database management, and AI workloads.

## energy consumption

Offers efficient energy management with power supply options. Advanced thermal design and power monitoring tools ensure optimized energy usage.



# SERVER

## field of use

It is made specifically for enterprise data centers, cloud infrastructure, and database hosting.



# WORKSTATIONS



# WORKSTATIONS

## name/brand

Falcon Northwest Talon (2024, Threadripper Pro)

## build

High-quality mid-tower workstation with custom-machined chassis, magnetic hinged side panels, and sleek design focused on professional performance.

## CPU

AMD Ryzen Threadripper Pro 7985WX with up to 64 cores; supports other configurations like Intel Xeon W and AMD Ryzen processors.

## Memory

Up to 768GB ECC DDR5 RAM for Threadripper Pro configurations.

# WORKSTATIONS

## processing speed

Exceptional multi-threaded performance, particularly with AMD's Precision Boost Overdrive.

## working principle

Built for multitasking-intensive workloads, leveraging liquid cooling and high-core-count processors for sustained peak performance.

## calculating power

Optimized for high-demand tasks such as 3D rendering, video editing, and AI modeling; benchmark tests like Cinebench and SPECviewperf confirm top-tier performance.

## energy consumption

Requires substantial power, supported by a 1600W Platinum-rated modular power supply.



# WORKSTATIONS

## field of use

Made ideally for professional content creators, engineers, data scientists, and demanding computational workloads in fields like 3D design, AI, and scientific research.



# MICRO COMPUTERS

# MICRO COMPUTERS

## name/brand

Raspberry PI 4

## build

Compact single-board microcomputer designed for versatility; features a robust circuit board with integrated interfaces for connectivity and multimedia

## CPU

Broadcom BCM2711, quad-core Cortex-A72 (64-bit ARMv8) processor, running at 1.5 GHz.

## Memory

Available options include 1GB, 2GB, 4GB, or 8GB LPDDR4 SDRAM, depending on the model.



# MICRO COMPUTERS

## processing speed

Comparable to entry-level x86 desktop systems; supports smooth 4K video playback and multitasking.

## calculating power

Efficient for general-purpose computing, software development, multimedia tasks, and lightweight AI applications. Equipped with hardware-accelerated H.265 video decoding for high-efficiency video coding.

## working principle

Operates on ARMv8 architecture; designed to run Linux-based operating systems like Raspberry Pi OS or other compatible distros. Utilizes GPIO headers and USB ports to interface with peripherals and external hardware.

## energy consumption

Requires 5V DC, typically through a USB-C connection. Draws a maximum of 3A depending on the configuration and attached peripherals

# MICRO COMPUTERS

## field of use

Ideal for education, software development, light desktop computing, and IoT projects. Usually used in robotics and electronics.





# EXAMPLES



# SUPERCOMPUTER

They are general-purpose computers that function at the highest operational rate or peak performance for computers. Processing power is the main difference between supercomputers and general-purpose computer systems.

## USAGE:

It is commonly used for making predictions with advanced modeling and simulation. These can be but not limited to climate, research, weather forecasting, genomic sequencing, space exploration and aviation engineering.



# MAINFRAME COMPUTERS

They refer to large computers capable of rapidly processing massive amounts of data at high speeds. Mainframe computers by definition are computers that have a lot of memory and processors, so they can do billions of transactions and simple calculations in real time.

## USAGE:

It is used for bulk data processing for tasks such as censuses, industry and consumer statistics, enterprise resource planning and large-scale transaction processing.





# MINI COMPUTERS

They are smaller and less powerful than supercomputers but more powerful than personal computers. They are designed to handle a large volume of data.

## USAGE:

It 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





# SERVER

They are computer programs or devices that provide services, data, or applications to other computers, known as clients. Servers can be physical machines, virtual machines, or software. They are responsible for processing client requests and facilitating communication and resource sharing among networked devices.

## USAGE:

It is used to share data as well as to share resources and distribute work.



# WORKSTATIONS

They are high performance computers that are specifically configured to meet the most demanding technical computing requirements

## USAGE:

They are used to handle demanding workflows such as data science, 3D design, video editing, and engineering



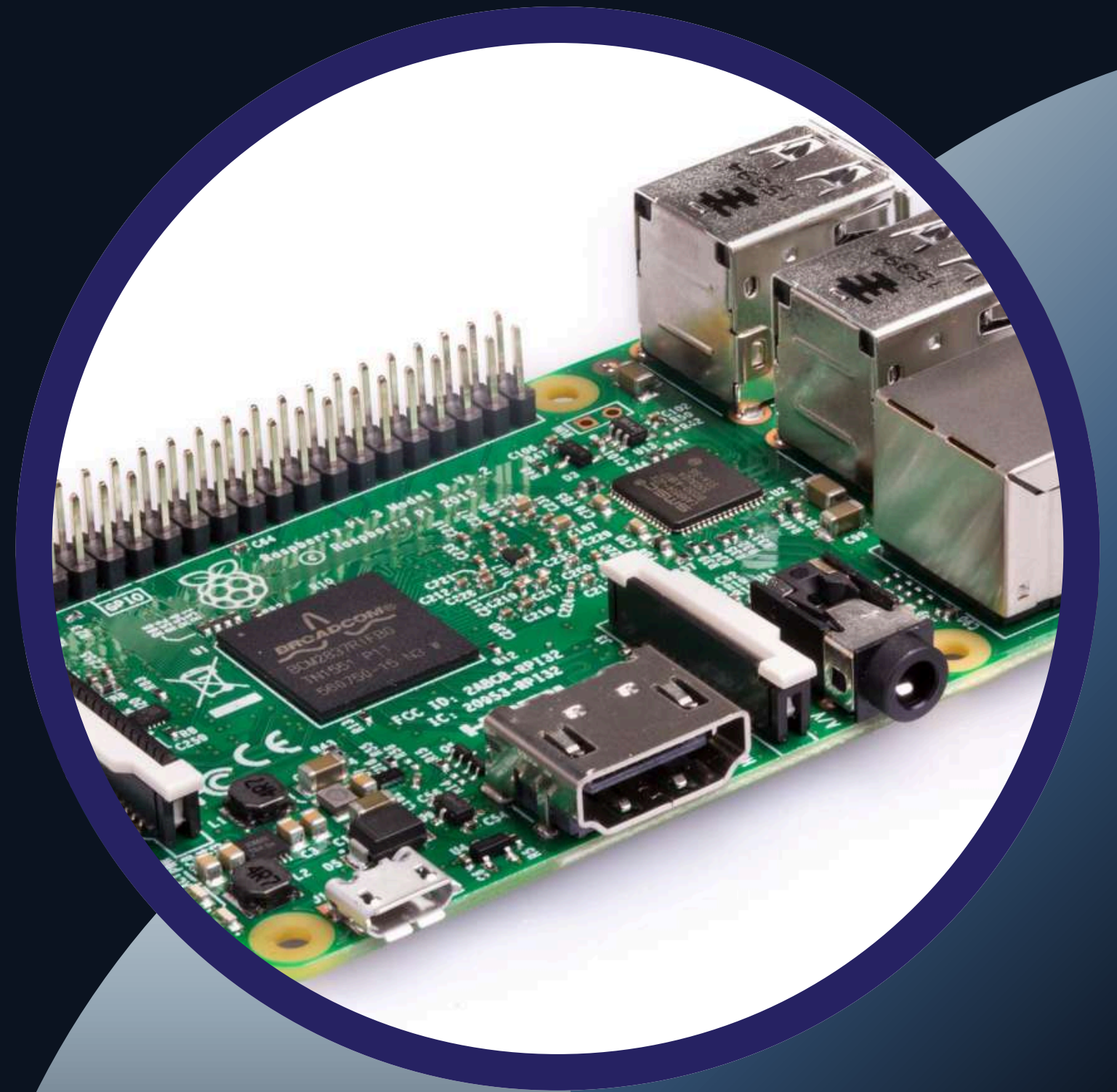


# MICRO COMPUTERS

It is a small electronic device with a microprocessor as its central processing unit (CPU)

## USAGE:

They are used for but not limited to the following: word processing, spreadsheets, gaming, communication and collaboration, research, specialty software, and more.







# COMPARE AND CONTRAST

# MINI COMPUTER

## **processing speed**

Moderate

## **memory capacity**

Moderate

## **power consumption**

Low

## **minimum**

Low-end tasks

## **usage**

Office work, multimedia, light gaming

# MICRO COMPUTER

## **processing speed**

Low - Moderate

## **memory capacity**

Low - Moderate

## **power consumption**

Very low

## **minimum**

Basic operations (web browsing, email)

## **usage**

Basic tasks, home use



# WORKSTATION

## **processing speed**

High

## **memory capacity**

High

## **power consumption**

Moderate - High

## **minimum**

Entry-level professional tasks

## **usage**

Professional or personal use

# SERVER

## **processing speed**

Very High

## **memory capacity**

Very High

## **power consumption**

High

## **minimum**

Small-scale server applications

## **usage**

Enterprise applications, data centers, web hosting

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# THANK YOU

