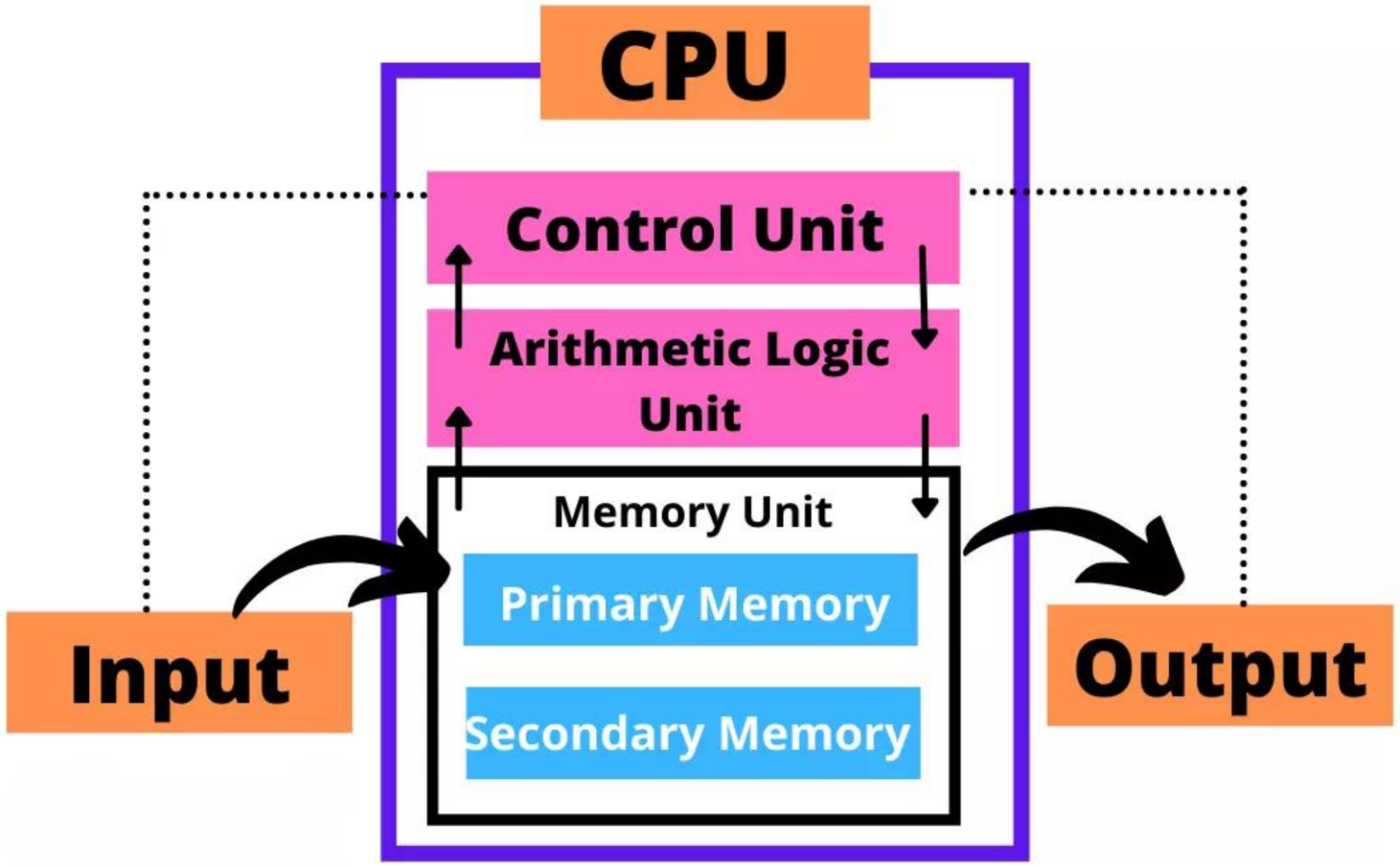
DAY 2

INTRODUCTION TO COMPUTERS

A computer is a programmable electronic device that processes data and performs various tasks through a combination of hardware and software components. Computers have become an integral part of modern life and come in various forms, including personal computers, laptops, servers, supercomputers, and even smaller devices like smartphones and tablets.

KEY COMPONENTS

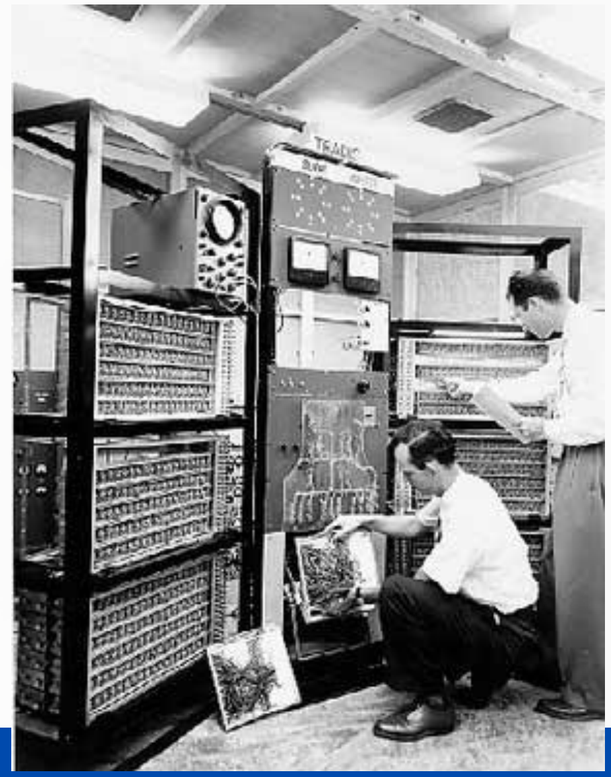
Hardware
Software
Central Processing Unit (CPU)
Memory (RAM)
Storage Devices
Input and Output
Operating System
Operating System
Networking
Software Applications
Data Processing



The evolution of computers can be divided into several generations, each marked by significant advancements in technology. Here's an overview of the major computer generations and the types of computers associated with them:

GENERATIONS OF COMPUTERS

First Generation (1940s-1950s): Vacuum Tube Computers
Second Generation (1950s-1960s): Transistor Computers
Third Generation (1960s-1970s): Integrated Circuit Computers
Fourth Generation (1970s-Present): Microprocessor-Based Computers
Fifth Generation (Present and Beyond): Advanced Microprocessors and AI



TYPES OF COMPUTERS

Mainframes
Large, powerful computers designed for handling massive data processing and serving multiple users concurrently.

Minicomputers
Smaller than mainframes but still capable of multi-user operation. They were often used for scientific and engineering tasks.

Personal Computers (PCs)
These include desktop and laptop computers designed for individual users. PCs are versatile and used for various purposes, from work to entertainment.

Workstations
High-performance computers optimized for tasks like 3D modeling, scientific simulations, and engineering design.

TYPES OF COMPUTERS

Servers
Computers designed to provide services to other computers over a network. They handle tasks like web hosting, email, and database management.

Supercomputers
Extremely powerful computers used for complex scientific and engineering calculations. They are found in research institutions and government agencies.

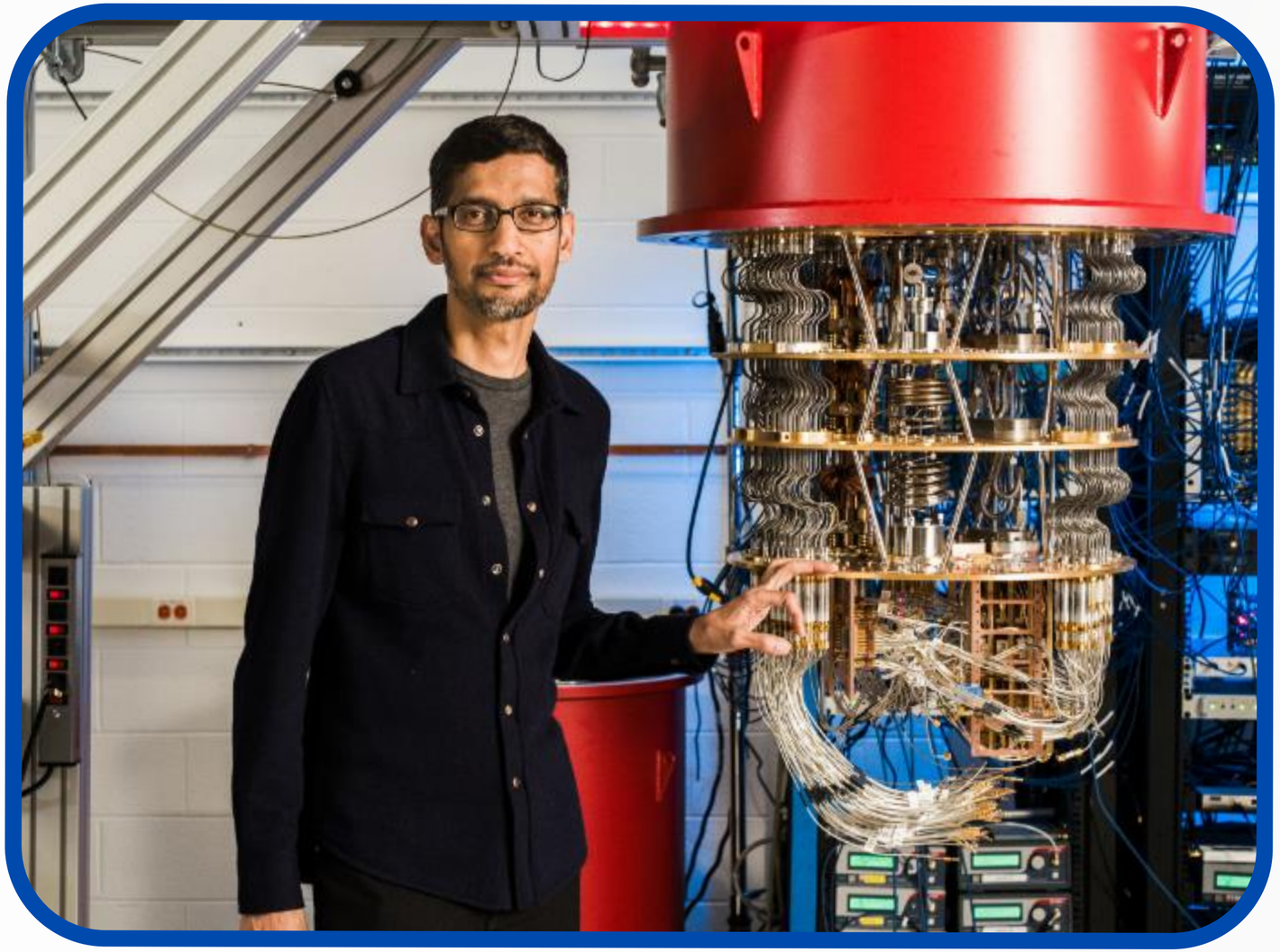
Embedded Computers
Small, specialized computers integrated into other devices (e.g., cars, appliances, IoT devices) to control specific functions.

Mobile Devices
Includes smartphones and tablets, which are compact, highly portable computers used for communication, browsing, and app-based tasks.

Quantum Computers

In the experimental stage, quantum computers leverage the principles of quantum mechanics for exponentially faster computations, particularly suited for specific scientific problems and cryptography.

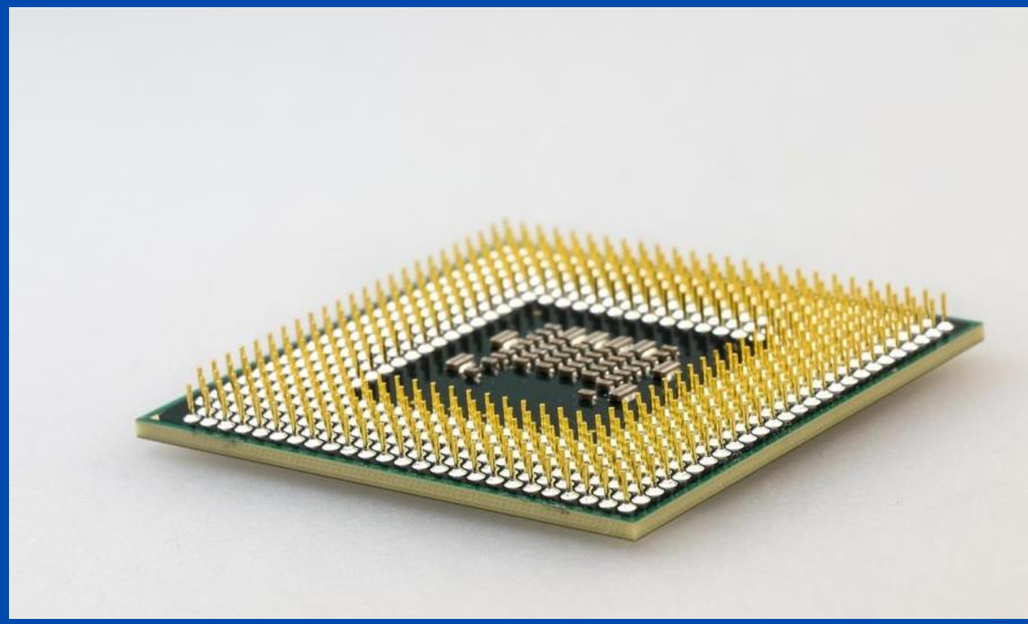
1000 TIMES FASTER
THAN A NORMAL COMPUTER



CPU, MEMORY, STORAGE DEVICES, AND PERIPHERALS

CPU (Central Processing Unit)

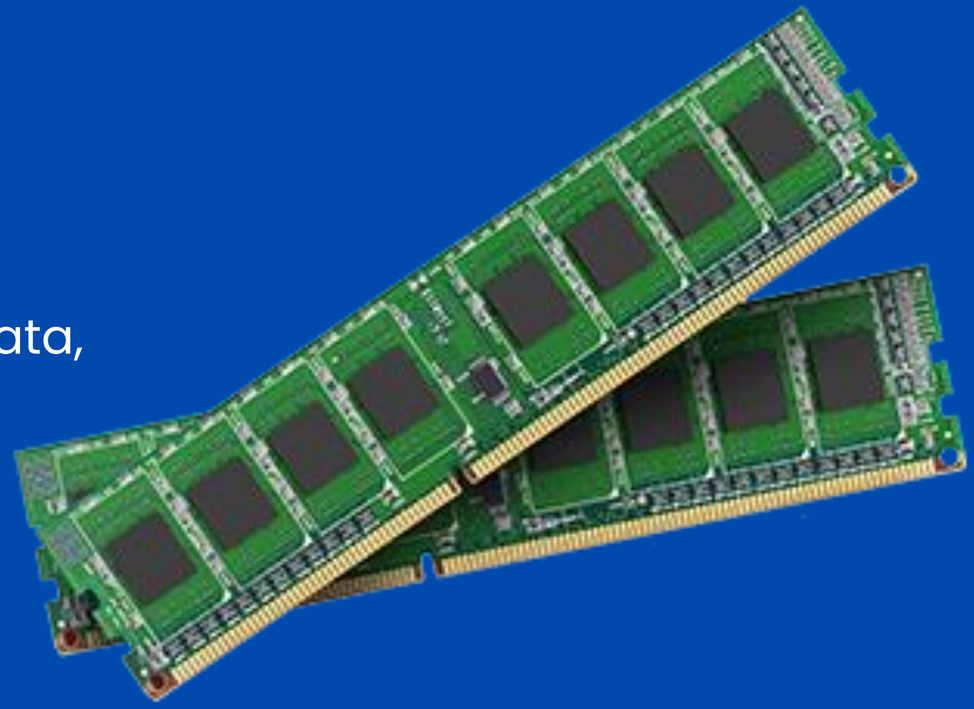
- The CPU is often considered the "brain" of the computer.
- It is responsible for executing instructions and performing calculations for various tasks.
- The CPU interprets and processes data fetched from memory and controls the execution of software programs.
- CPUs come in various types, such as multi-core processors, which can handle multiple tasks simultaneously, and different architectures (e.g., x86, ARM).



CPU, MEMORY, STORAGE DEVICES, AND PERIPHERALS

RAM

- RAM is temporary, high-speed storage used to store data and programs that are currently in use.
- It allows the CPU to quickly access and manipulate data, significantly speeding up computer operations.
- Data in RAM is volatile, meaning it is lost when the computer is powered off or restarted.



RAM VS ROM

RAM

RAM is volatile memory, meaning its contents are erased when the computer is powered off or restarted. It is temporary storage. Data stored in RAM is constantly changing as the computer runs programs and processes tasks.

ROM

OM is non-volatile memory, meaning its contents are retained even when the computer is powered off or restarted. Data stored in ROM is permanent and cannot be easily altered.

BIOS (Basic Input/Output System): Used to boot the computer and initialize hardware components

Firmware: Embedded software in devices like game consoles, smartphones, and embedded systems

CD-ROM and DVD-ROM: Optical discs that store data in a read-only format.

CPU, MEMORY, STORAGE DEVICES, AND PERIPHERALS

STORAGE DEVICES

- Storage devices are used for long-term data storage and program installation.

- Common types of storage devices include:
- Hard Disk Drives (HDDs): Use spinning disks to store data magnetically. Slower than SSDs but provide larger storage capacities.

- Solid-State Drives (SSDs): Use flash memory for data storage. Faster and more durable than HDDs but typically come with a higher cost per gigabyte.

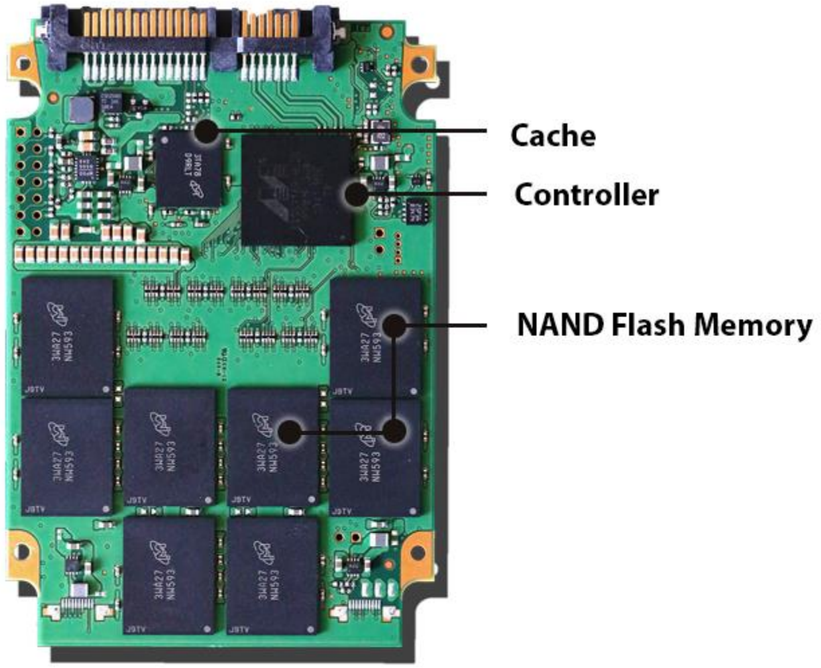
- External Drives: Devices like USB flash drives, external HDDs, and external SSDs provide portable and additional storage options.

- Optical Drives: CD, DVD, and Blu-ray drives are used to read and write optical discs.

HDD
3.5″

Shock resistant up to 55g (operating)
Shock resistant up to 350g (non-operating)

SSD
2.5″



Shock resistant up to 1500g
(operating and non-operating)

CPU, MEMORY, STORAGE DEVICES, AND PERIPHERALS

Peripherals

- Peripherals are devices that connect to the computer to provide additional functionality or allow user interaction. Common examples include:
- **Keyboards**: Input devices used for typing and sending commands to the computer.
- Mice and Trackpads: Pointing devices used for cursor control and interaction with graphical user interfaces.
- **Monitors**: Display devices that show visual output from the computer.
- **Printers**: Output devices that produce physical copies of documents or images.
- **Scanners**: Input devices used to convert physical documents or images into digital format.
- **Webcams**: Cameras used for video conferencing and capturing images and video.
- **Speakers and Headphones**: Audio output devices for playing sound.
- **External Hard Drives**: Additional storage devices that connect externally via USB or other interfaces.
- **Network Adapters**: Enable wired or wireless network connectivity.

SYSTEM SOFTWARE

System Software:

- Purpose: System software acts as an intermediary between the hardware and application software. It manages and controls the hardware components, enabling communication and coordination between hardware and software.
- Examples: Common examples of system software include operating systems (e.g., Windows, macOS, Linux), device drivers (software that allows hardware devices to communicate with the operating system), and utility programs (e.g., antivirus software, disk management tools, and system maintenance utilities).
- Function:
  - Operating System (OS): The primary system software, the operating system, manages resources such as CPU, memory, storage, and input/output devices. It provides essential services like process management, memory management, file system management, and user interface.
  - Device Drivers: These are software modules that facilitate communication between the OS and specific hardware devices (e.g., printer drivers, graphics card drivers).
  - Utility Programs: Utilities help users manage and maintain their computer systems, including tasks like disk cleanup, data backup, and system optimization.

APPLICATION SOFTWARE

- Purpose: Application software, also known as apps or programs, is designed for specific tasks or applications that meet user needs. It allows users to perform various functions and tasks, such as word processing, spreadsheet calculations, web browsing, gaming, and more.

- Examples: Application software encompasses a wide range of programs, including word processors (e.g., Microsoft Word), spreadsheet software (e.g., Microsoft Excel), web browsers (e.g., Google Chrome), multimedia players (e.g., VLC), video games, graphic design software (e.g., Adobe Photoshop), and productivity apps (e.g., email clients, project management tools).

- Function: Application software is task-oriented and designed to perform specific functions or processes. Users interact directly with application software to complete tasks, create content, or achieve specific goals. Each application software serves a particular purpose and often includes user-friendly interfaces tailored to the task it addresses.