VS

HARD DISK
DRIVE (HDD)

SOLID STATE
DRIVE (SSD)

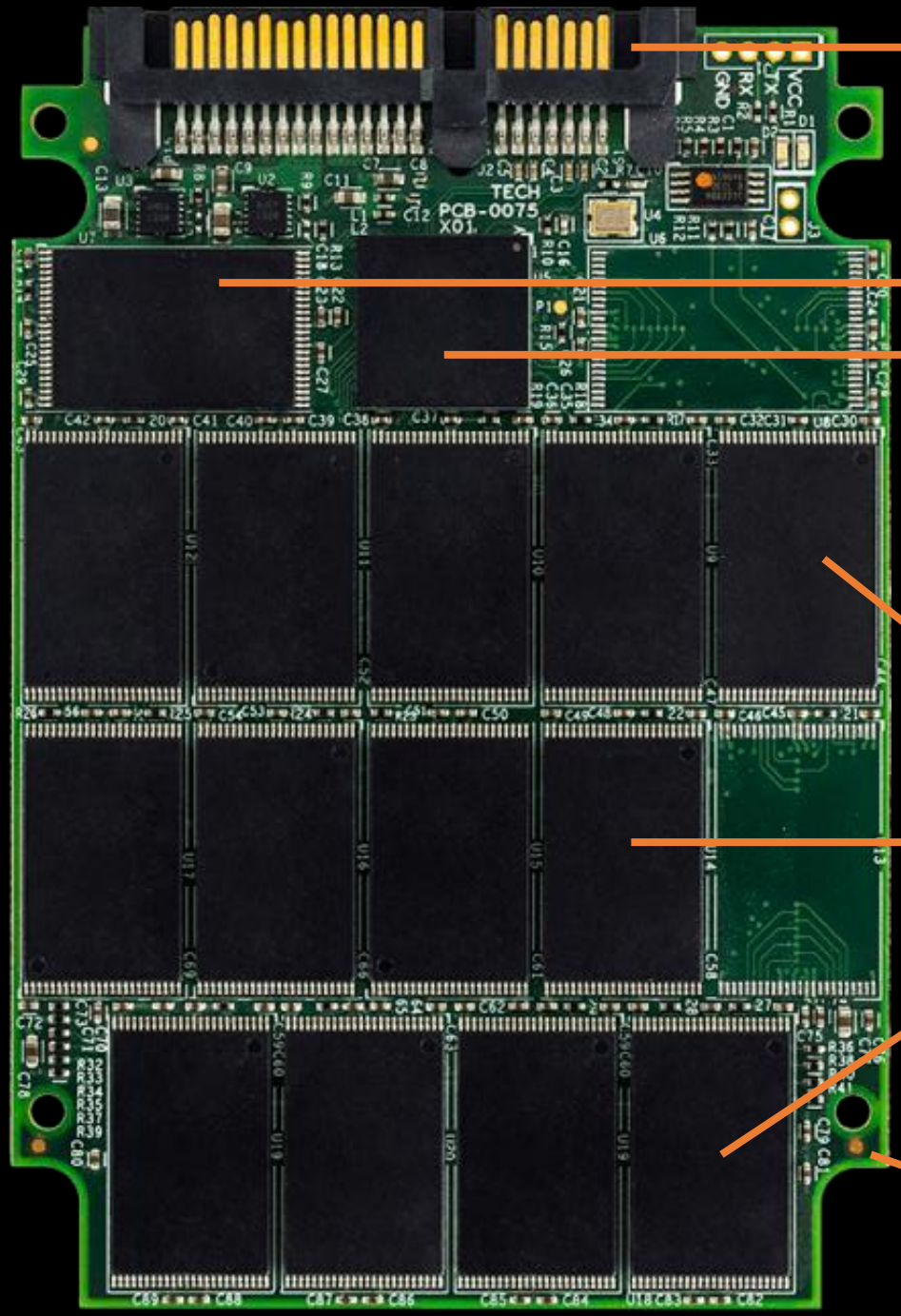
HARD DISK DRIVE (HDD)

3.5” HDD


PLATTERS
SPINDLE
R/W HEAD
ACTUATOR ARM
ACTUATOR AXIS
ACTUATOR

SOLID STATE DRIVE (SSD)

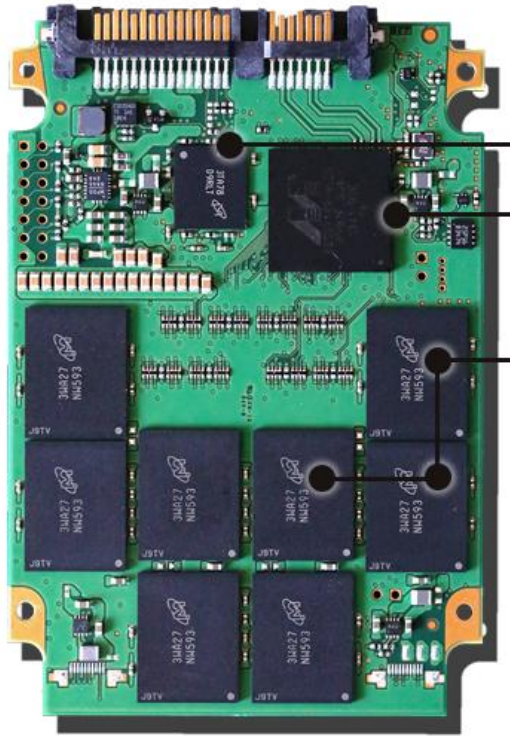
2.5” SSD


CONNECTION INTERFACE
CACHE
CONTROLLER
NAND FLASH MEMORY
PRINTED CIRCUIT BOARD (PCB)

HDD
3.5”


Platters
Spindle
R/W Head
Actuator Arm
Actuator Axis
Actuator

SSD
2.5”


Cache
Controller
NAND Flash Memory

TYPES OF SSD

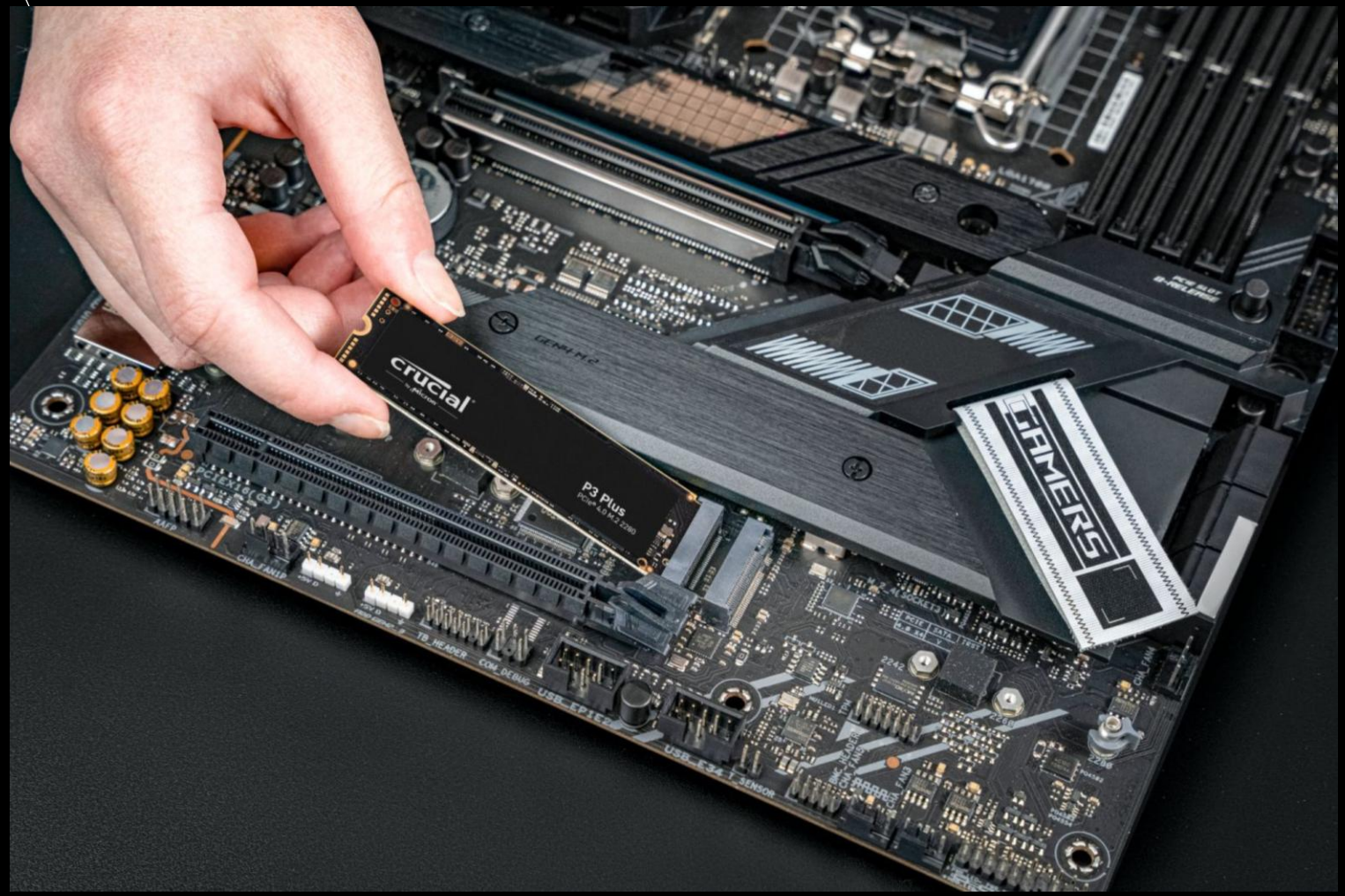
2.5” SSD

MSATA SSD

HALF MSATA SSD

TYPES OF SSD

M.2 SSD



TYPES OF SSD

U.2 SSD

HDD VS SSD

Feature	HDD (Hard Disk Drive)	SSD (Solid State Drive)
Speed	Slower (because of moving parts)	Much faster (no moving parts)
Durability	Prone to shock and vibration damage	Very durable; resistant to shock
Noise	Audible spinning and clicking sounds	Completely silent
Power Consumption	Higher (spinning needs more energy)	Lower (more energy-efficient)
Cost	Cheaper per GB	More expensive per GB
Storage Capacity	Typically larger (up to 16TB or more)	Usually smaller (common sizes up to 4TB)
Lifespan	Mechanical wear over time	Limited by read/write cycles but very reliable
Weight	Heavier	Lighter
Usage	Best for backups, large media storage	Best for OS, applications, and gaming
Boot Times	Slower (takes several seconds)	Much faster (just a few seconds)

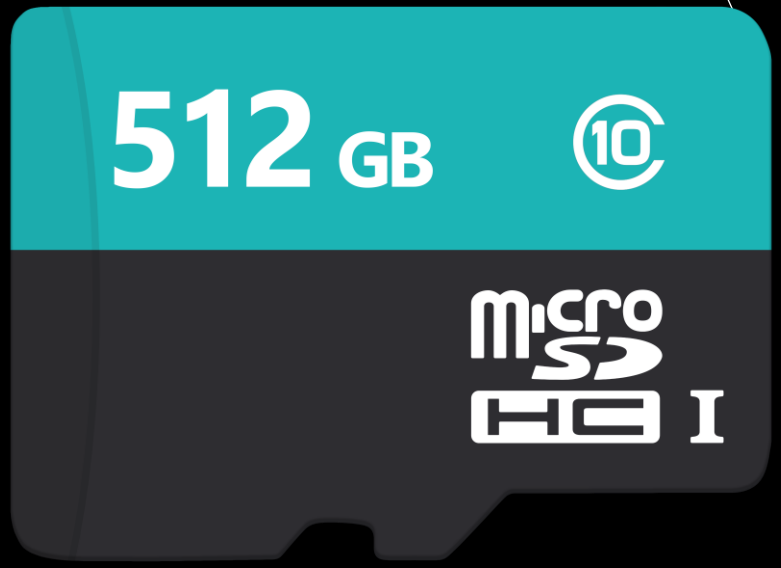
FLASH DRIVE AND MEMORY CARD

TYPES OF FLASH DRIVES AND MEMORY CARDS

USB FLASH DRIVE

SD CARD

TYPES OF FLASH DRIVES AND MEMORY CARDS



MICRO SD CARD

CF CARD

📁 File Systems:

FAT32

- *Old but very compatible* (works on almost any device: Windows, Mac, cameras).
- Max file size: **4 GB**.

exFAT

- Designed for flash storage.
- Supports *large files* (>4 GB).
- Compatible with modern Windows, macOS, Android devices.

NTFS

- Windows' default file system.
- Supports large files, permissions, encryption.
- Not always fully writable on macOS without special drivers.

ext4

- Used mainly in Linux systems.

Data Transfer Speeds:

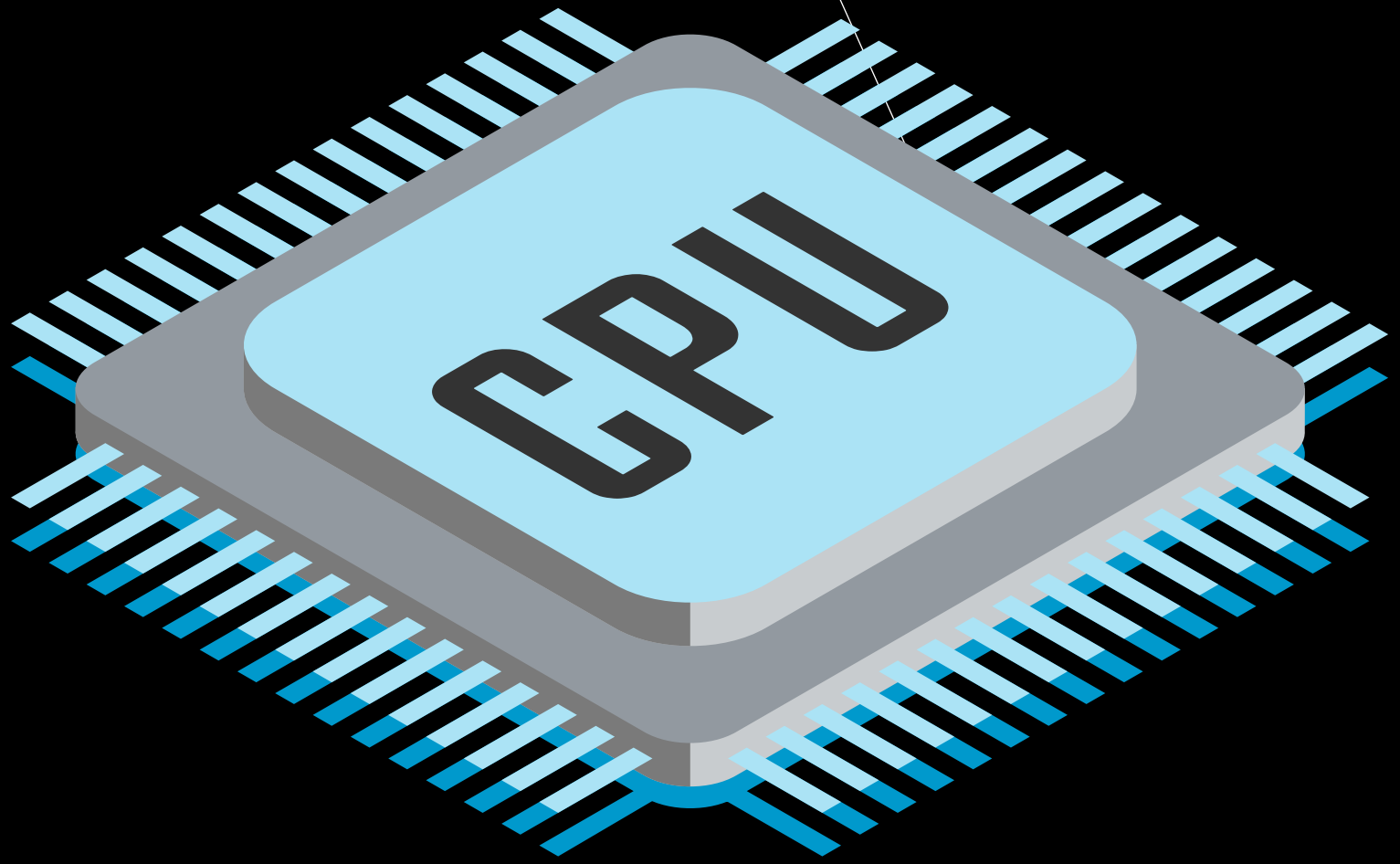
- **USB 2.0** (up to 60 MB/s) → Older and slower.
- **USB 3.0 / 3.1** (up to 500 MB/s or more) → Faster transfer, has a blue plastic piece inside the connector.
- **USB 3.2, USB4** (modern) → Super high speeds (up to 2,000 MB/s or more for NVMe USB drives).
- **SD Card Speed Classes**:
  - *Class 2, 4, 6, 10*: Numbers show minimum write speeds (e.g., Class 10 = 10 MB/s).
  - *UHS-I, UHS-II, UHS-III*: Faster buses.
  - *V30, V60, V90*: For video recording (30MB/s, 60MB/s, etc.).

🛠Maintenance:

- Avoid filling up completely — always leave 10–20% free space to avoid slowdowns.
- Keep away from heat, water, or physical bending.
- Update firmware (rare but available for some USB drives).
- Use virus protection: Flash drives can spread malware when used in multiple computers.

Data Recovery:

- **If a flash drive/memory card is corrupted:**
  - *Software tools like Recuva, PhotoRec, EaseUS can try to recover deleted files.*
  - *Professional data recovery services exist but can be expensive.*
  - *Early signs of failure: Random disconnects, files becoming corrupted, slow reading.*



CENTRAL PROCESSING UNIT (CPU)

What is a CPU?

The CPU, which stands for Central Processing Unit, is essentially the brain of a computer. It's the component that carries out the instructions given by various programs.

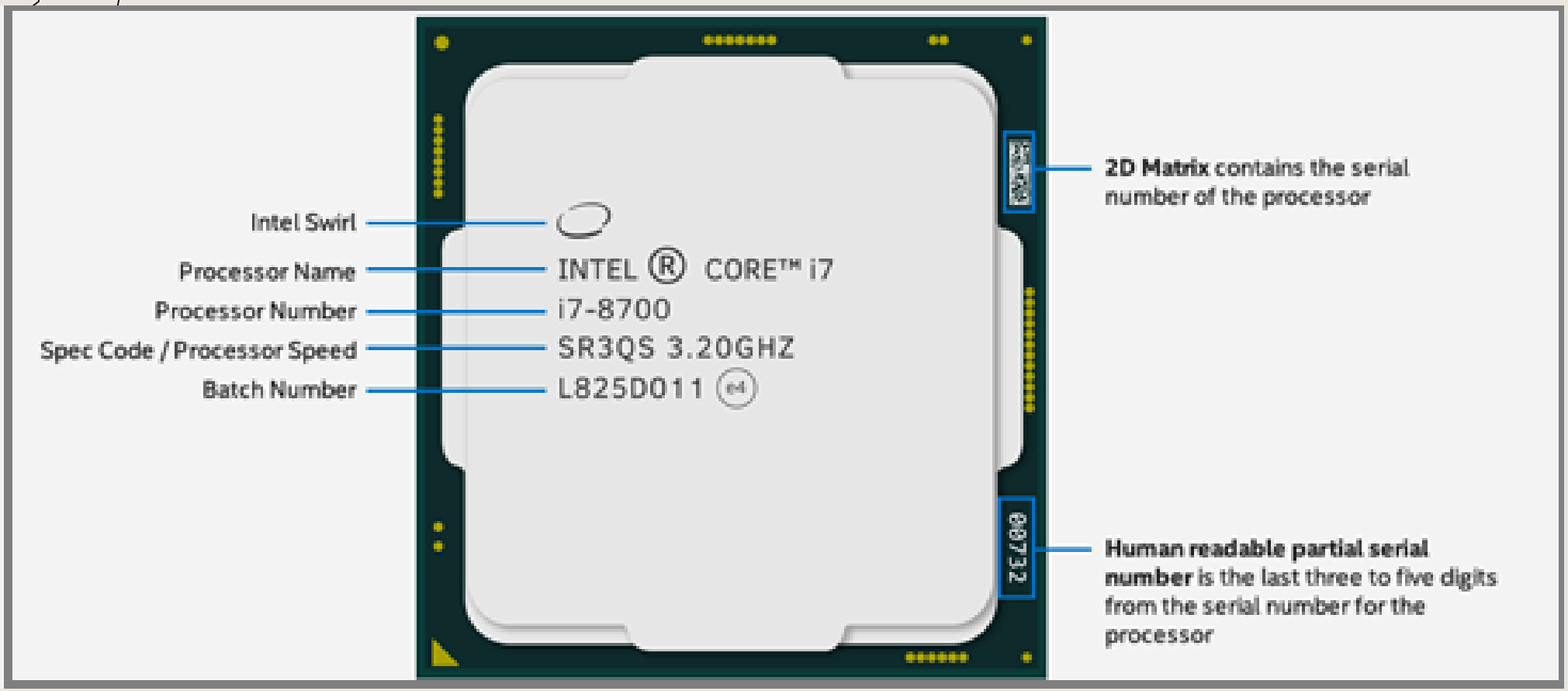
What does a CPU do?

The Fetch-Decode-Execute Cycle:

1. **Fetch:** The CPU retrieves instructions from the computer's memory (RAM) one by one.

2. **Decode:** The control unit, acting like the conductor interpreting the sheet music, deciphers the retrieved instruction.

3. **Execute:** The ALU (Arithmetic Logic Unit), the workhorse of the CPU, executes the decoded instruction.


Intel Swirl
Processor Name
Processor Number
Spec Code / Processor Speed
Batch Number
INTEL ® CORE™ i7
i7-8700
SR3QS 3.20GHZ
L825D011
2D Matrix contains the serial number of the processor
Human readable partial serial number is the last three to five digits from the serial number for the processor

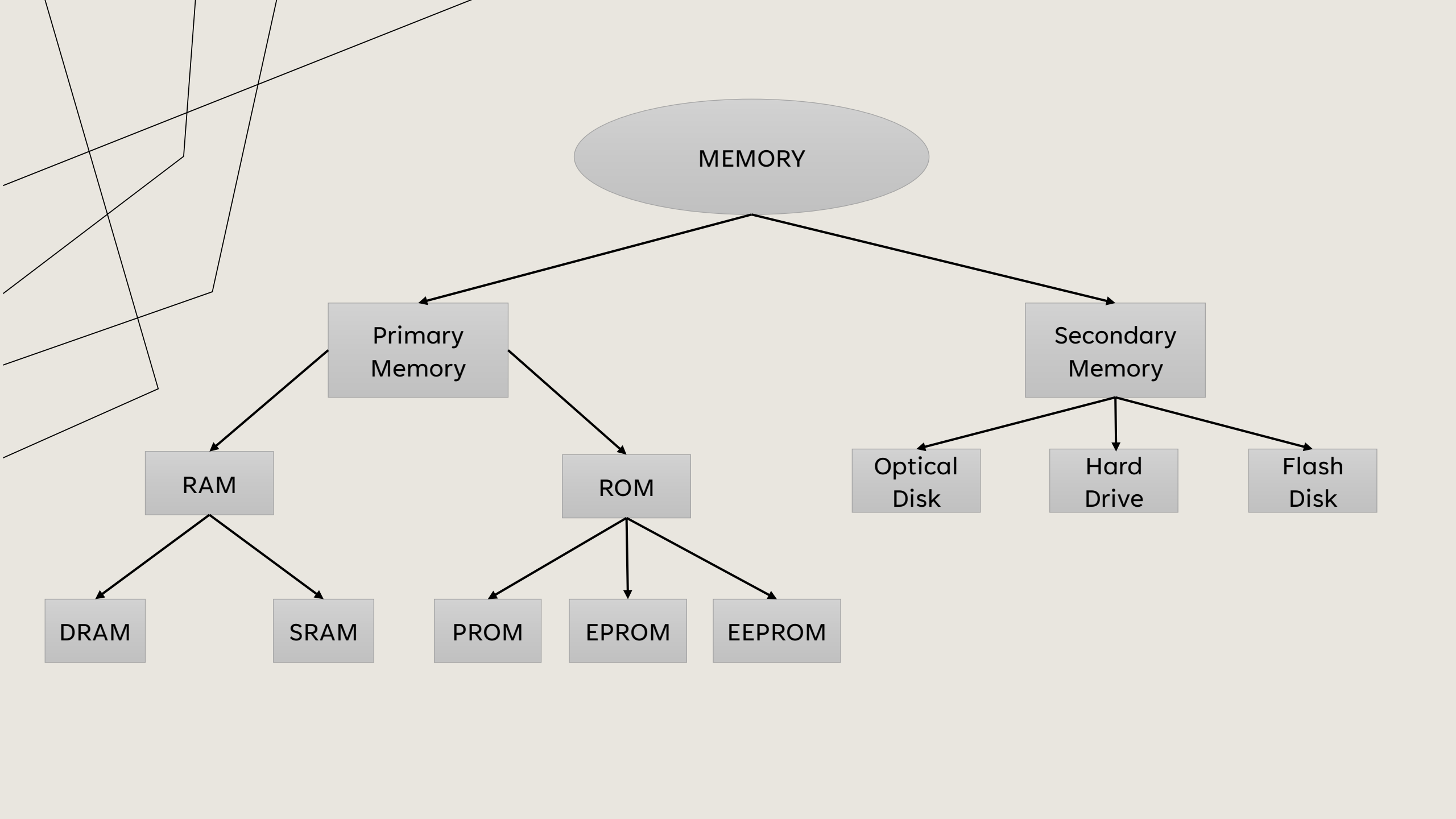
Letter	Description
K	Unlocked multiplier for overclocking
HK	Unlocked multiplier for overclocking (high-performance mobile)
H	High-performance graphics (laptops)
HQ	High-performance graphics & Quad-Core (laptops)
U	Ultra-low power consumption (laptops)
Y	Extremely low power consumption (laptops/tablets)
X (AMD)	Higher clocked variant (better performance)
G (AMD)	Integrated graphics

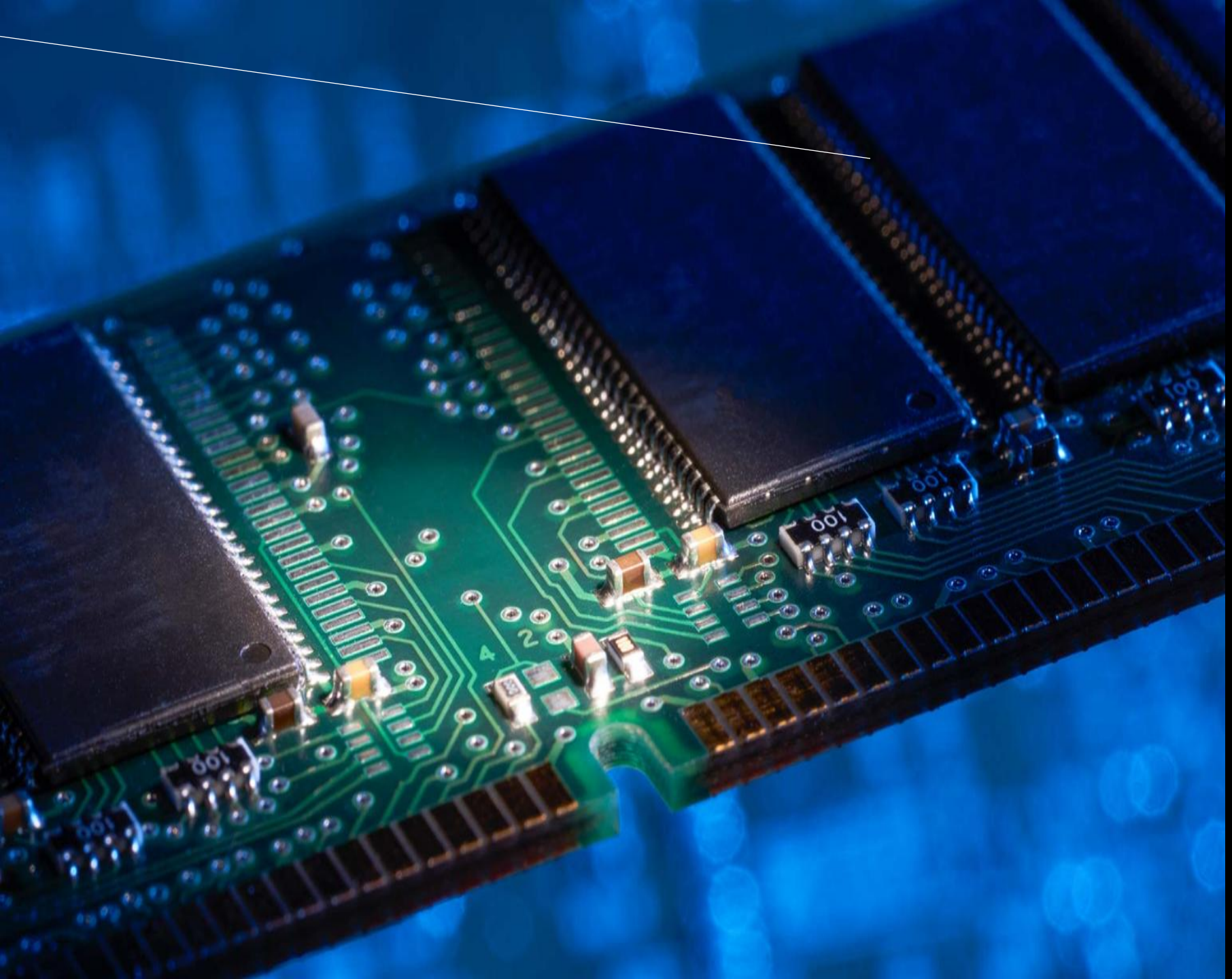
CPU Heatsink

Active Heatsink

Passive Heatsink

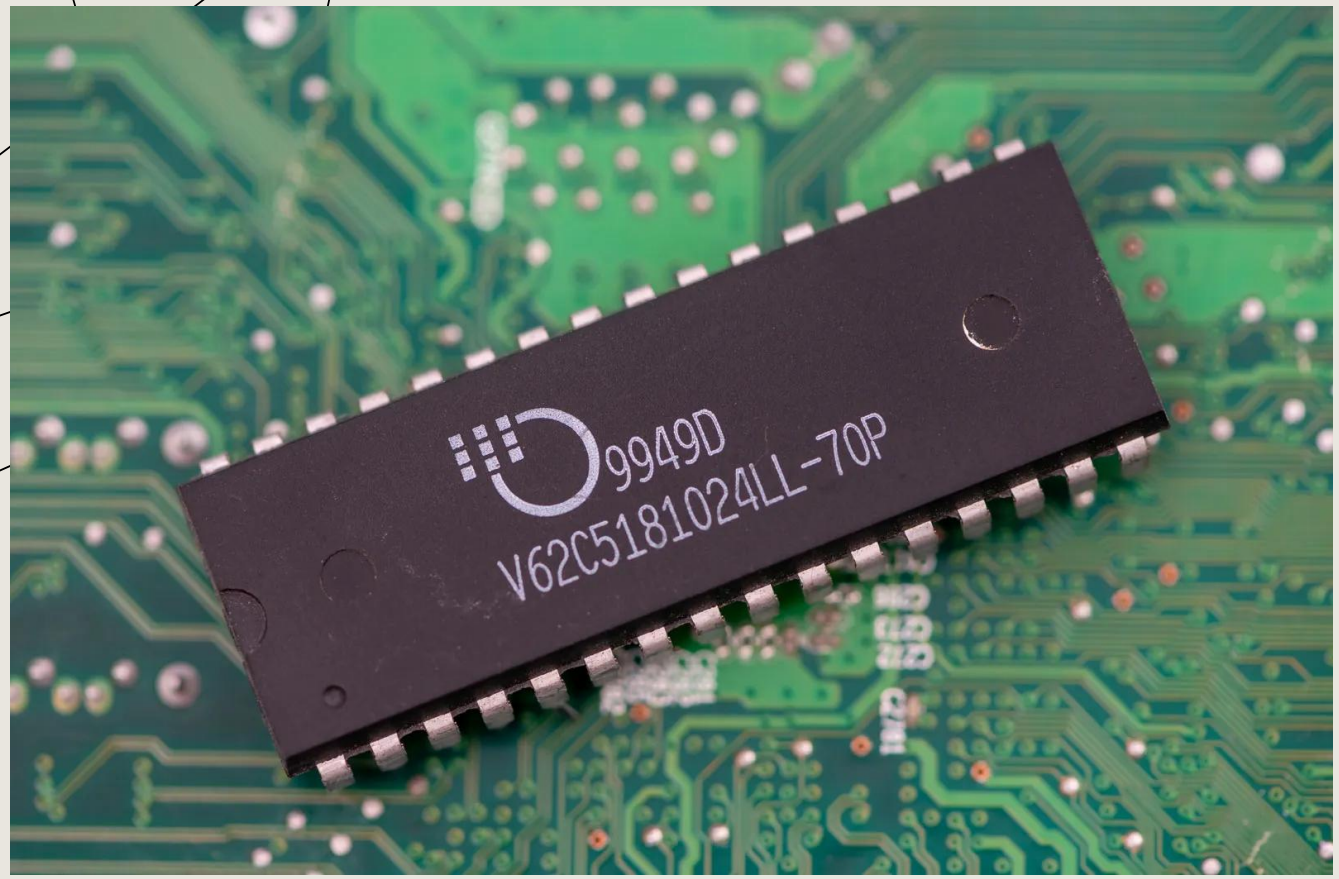
MEMORY OF A COMPUTER

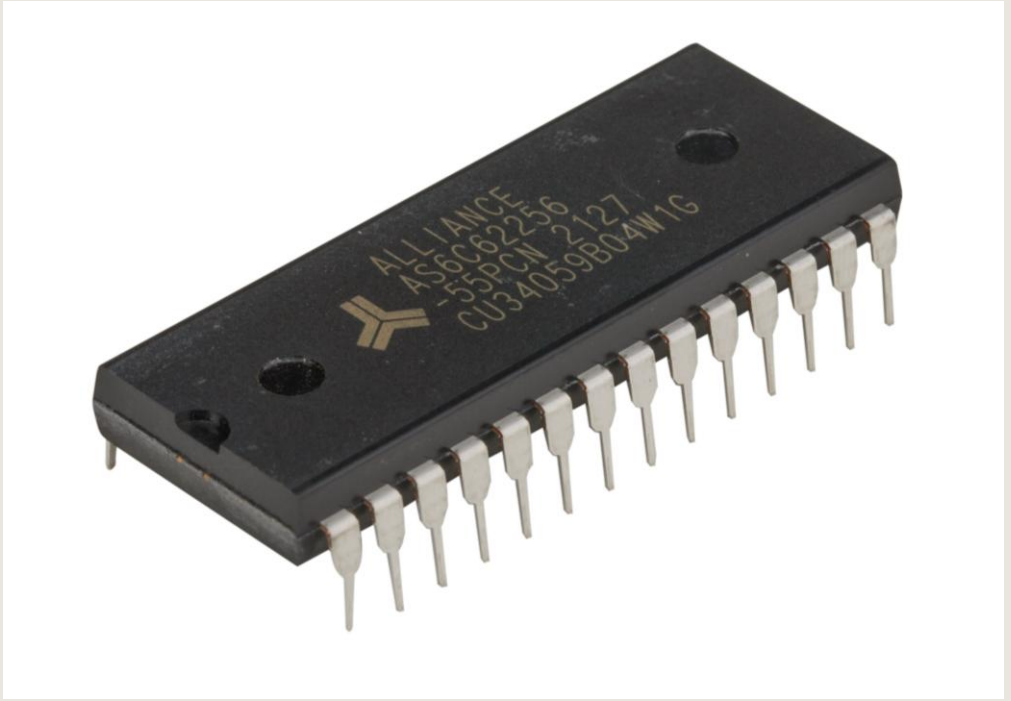

MEMORY
Primary Memory
Secondary Memory
RAM
ROM
Optical Disk
Hard Drive
Flash Disk
DRAM
SRAM
PROM
EPROM
EEPROM



RANDOM ACCESS MEMORY (RAM)

Static Random Access Memory (SRAM)

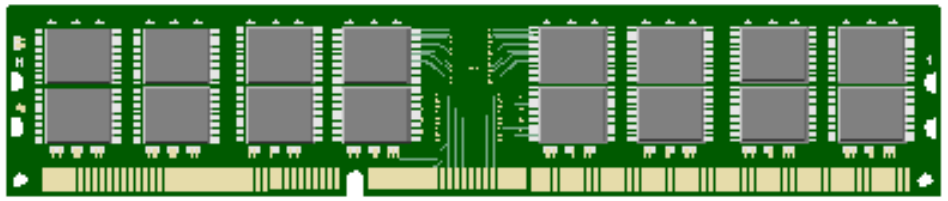




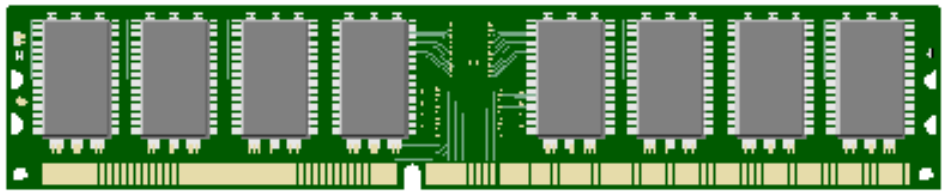
DYNAMIC RANDOM ACCESS MEMORY

DIMM MODULES

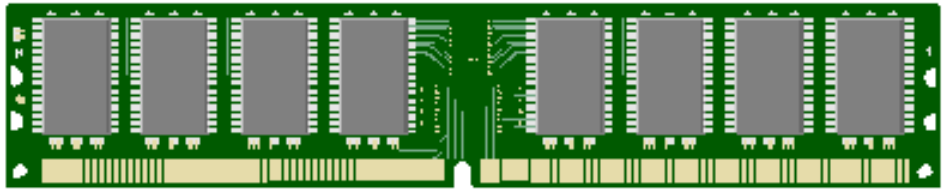
DDR4 - 284-pin DIMM



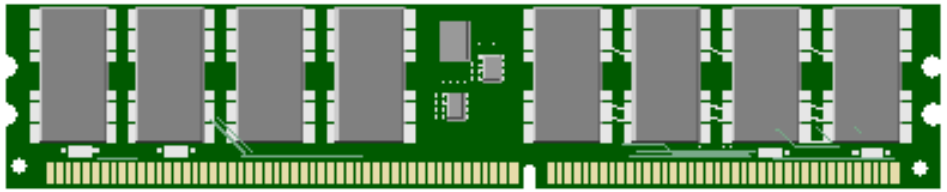
DDR3 - 240-pin DIMM



DDR2- 240-pin DIMM

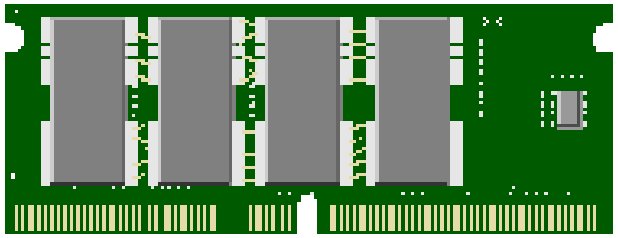


DDR - 184-pin DIMM

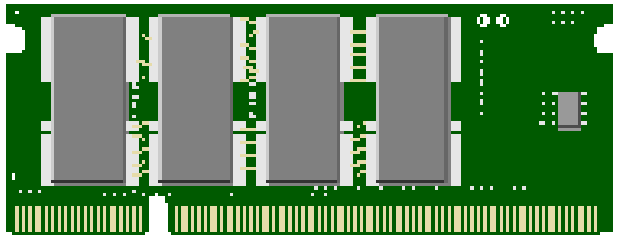


SODIMM MODULES

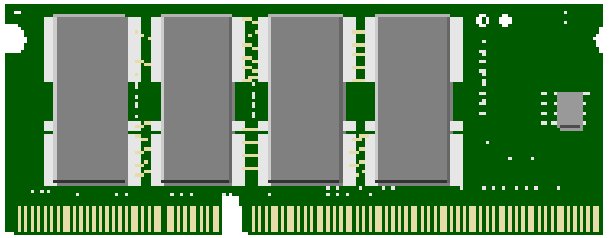
DDR4 - 256-pin SODIMM



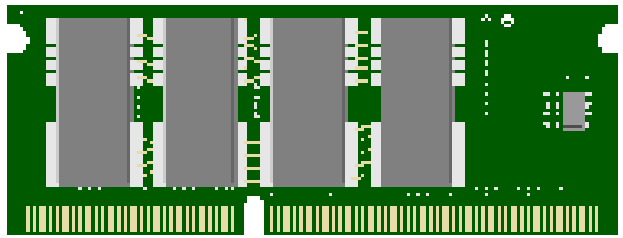
DDR and DDR2 - 200-pin SODIMM



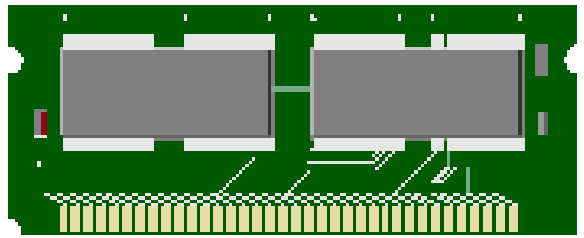
DDR3 - 204-pin SODIMM



SDRAM, FPM, EDO - 144-pin SODIMM



FPM, EDO - 72-pin SODIMM




MALWARE

Types of Malware

RANSOMWARE

Ransomware is a type of malware that hold your data captive and demands payment to release the data back to you.

SPYWARE

Installed on your computer without your knowledge, spyware is designed to track your browsing habits and internet activity

ADWARE

A common adware program might redirect a user's browser searches to look-alike web pages that contain other product promotions.

WORM

Worms spread over computer networks by exploiting operating system vulnerabilities.

TROJAN HORSE

Trojan Horse, “Trojan”, enters your system disguised as a normal, harmless file or program to trick users into downloading and installing malware.

BOTNET

A botnet (short for “robot network”) is a network of compromised computers or devices, called bots, that are infected with malware and controlled remotely by a cybercriminal known as a bot herder.

Types of Malware

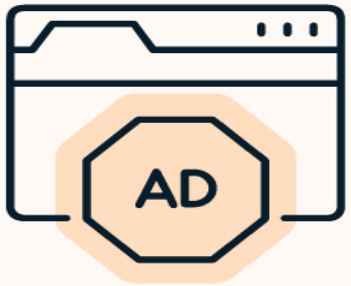
RANSOMWARE

Blackmails you

SPYWARE

Steals your data

ADWARE



Spams you with ads

WORMS

Spread
across computers

TROJANS

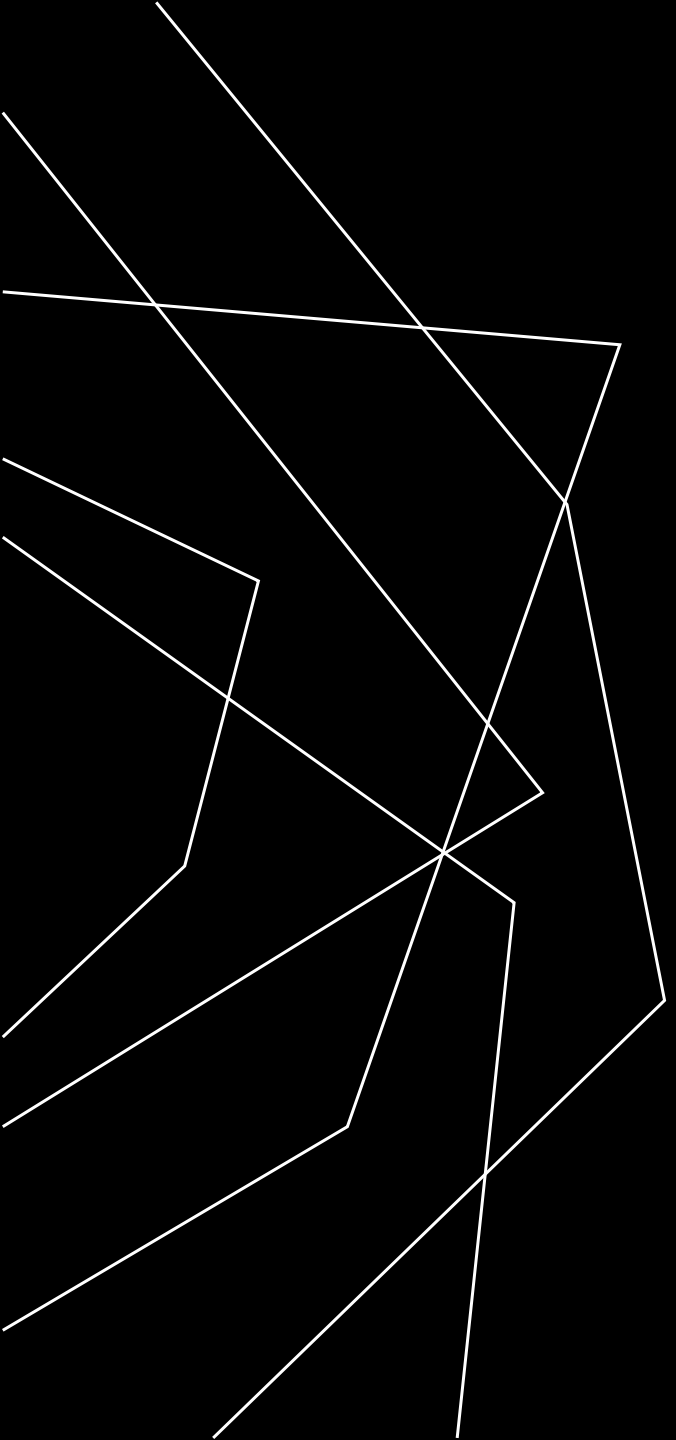
Sneak malware
onto your PC

BOTNETS

Turn your PC
into a zombie

Prepare the following materials that will be used for the Practical #4

1. Flash drive at least 8GB
2. ISO File of Windows 10/11
3. Rufus utility software



THANK YOU