JRS CODING SCHOOL

HOW COMPUTERS WORK

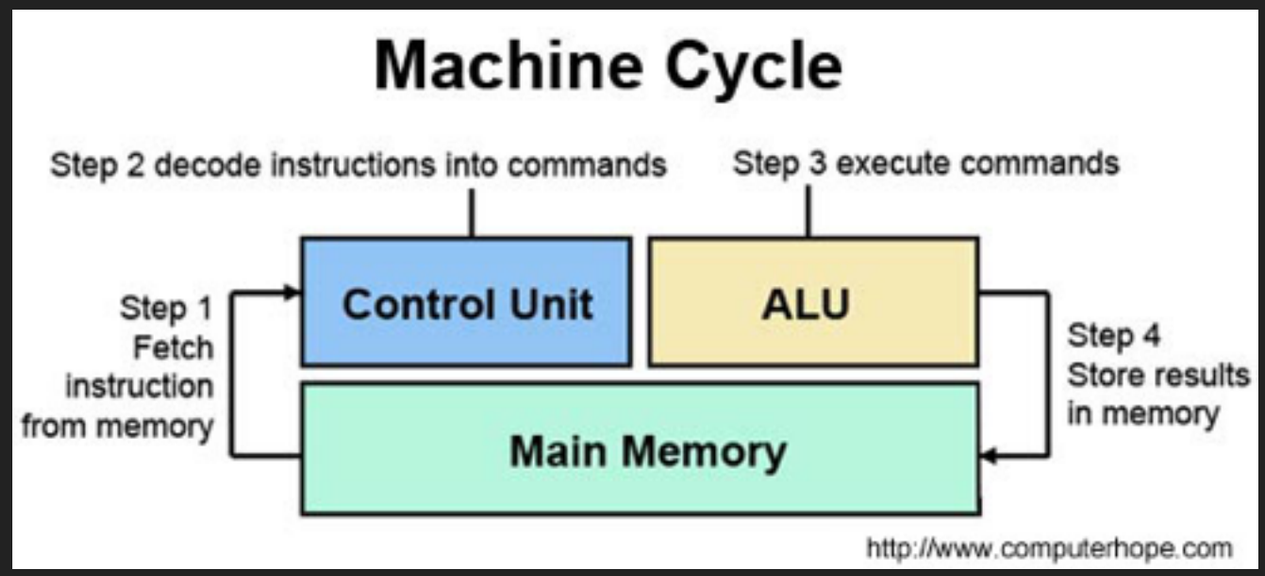
CENTRAL PROCESSING UNIT

CPU

A CPU HAS TWO PARTS: CONTROL UNIT AND ALU

- The CPU is the control center for the computer
- Set of electronic circuitry that executes stored program instructions.

- A CPU has two parts: Control Unit and Arithmetic/Logic Unit (ALU)
- Control unit is the orchestra leader that communications with memory and the ALU to carry our the stored program instructions.



THE ARITHMETIC/LOGIC UNIT

- Contains the electronic circuitry that executes all arithmetic and logical operations.
- Two types of operations:
  - Arithmetic: Addition /Subtraction/Multiplication/Division
  - Logical: Comparisons of numbers/letters
    - Six logical comparisons: Equal to, less than, greater than, less than or equal to, greater than or equal to, and not equal
    - Computer takes action based on results of comparisons

TYPE OF COMPARISONS WITH JAVASCRIPT

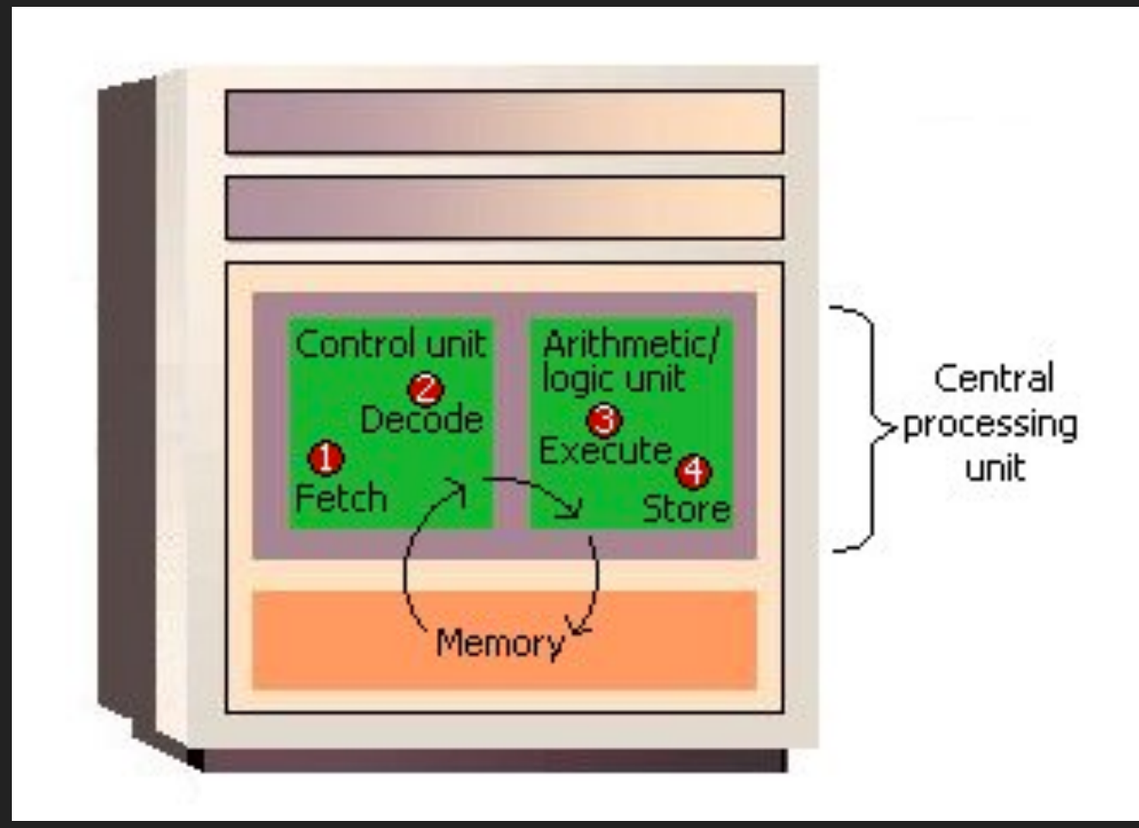
- === Strict equal returns true if the operands are equal and of the same type
- == equal returns true if the operands are true
- !== Strict not equal
- != returns true if the operands are not equal.
- > Greater than operator (>) returns true if the left operand is greater than the right operand.
- >= Greater than or equal operator
- < Less than operator
- <= Less than or equal operator

PRIMARY STORAGE, PRIMARY MEMORY, MAIN STORAGE, INTERNAL STORAGE, MAIN MEMORY, AND RAM

MEMORY

MEMORY

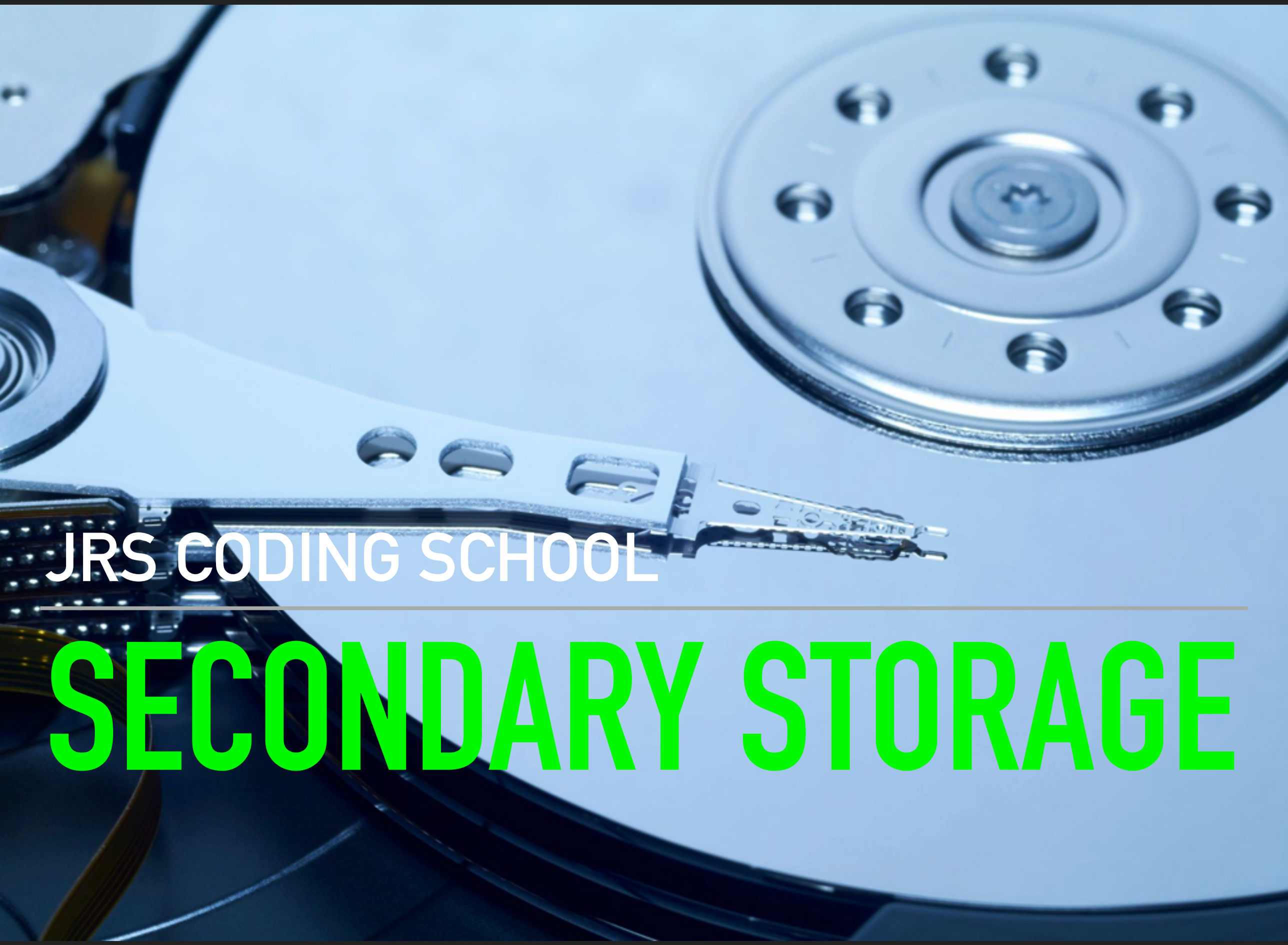
- Holds data and instructions for processing.
- Very fast access to data and instructions.
- Memory only store items while the computer is turned on.
- The CPU's control unit puts instructions and data into memory.
- The CPU's control unit pulls instructions an data to the ALU where decisions and arithmetic operations are performed.



MEMORY VS. HARD DRIVE

- Characteristics of storage.
- Memory is fast, expensive, and temporary.
- A hard drive is slow compared to memory, but inexpensive and permanent.

Storage	Speed	Capacity	Cost	Permanent
RAM	Fast	Low	High	No
Hard Disk	Moderate	High	Low	Yes



JRS CODING SCHOOL

SECONDARY STORAGE

WHY SECONDARY STORAGE IS NECESSARY

- Store software and data on a semi permanent basis including programs, configuration files, documents, music files, movie files, and more.
- Memory / primary storage can be used only temporarily.
- Memory is limited in size.
- Your programs and data will disappear from memory when you turn off the computer.
- When you want to access a file or run a program, the computer needs to load it from the hard disk and into memory.
- Secondary storage is storage separate from the computer
- You can share data with others.

HOW HARD DRIVES WORK

- A hard disk is a metal platter coated with magnetic oxide that can be magnetized to represent data.
- Data is represented using a magnetic spot as a “1” and an absence of a spot as “0”.
- A hard drive stores data on a series of spinning magnetic disks, called platters. There’s an actuator arm with read/write heads attached to it. This arm positions the read-write heads over the correct area of the drive to read or write information.
- The hard disk is the bottleneck; no matter how fast everything else is, you can only operate as fast as your hard disk.

SOLID STATE DRIVES (SSD)

- A solid-state drive uses a type of memory called “flash memory,” which is similar to RAM. However, unlike RAM, which clears whenever the computer powers down, SSD memory remains even when it loses power.
- Flash memory is not as fast as RAM but since it has no moving parts it is MUCH faster than a hard disk drive (HDD).
- SSD is more expensive than HDD.