

main memory vs secondary memory, where are variables stored, which is ram

Here's a detailed explanation of **main memory vs secondary memory**, where variables (var) are stored, and which of these is RAM:

Main Memory vs Secondary Memory

Feature	Main Memory (Primary Memory)	Secondary Memory (Storage)
Also called	Primary memory, internal memory	External memory, auxiliary memory
Examples	RAM (Random Access Memory), ROM	Hard Disk, SSD, USB drive, CD/DVD
Volatility	Volatile (RAM loses data when off)	Non-volatile (retains data when off)
Purpose	Stores data/programs CPU is working on	Long-term data storage
Access Speed	Very fast, directly by CPU	Slower, not directly accessed by CPU
Cost	More expensive per GB	Cheaper per GB
Capacity	Smaller (e.g., 16–64 GB)	Larger (e.g., 256GB–several TB)
Data Lifetime	Temporary (RAM), or permanent (ROM)	Permanent until deleted

- **Main memory** (primary) is used for data and instructions the CPU is actively working with; it's crucial for execution speed and immediate tasks.
- **Secondary memory** is for the permanent storage of files, programs, and data not currently in use^{[1] [2] [3] [4]}.

Which is RAM?

- **RAM** (*Random Access Memory*) is the **main memory** of your computer. It's volatile, meaning it loses all contents when the power is turned off.
- Both RAM and ROM are considered types of main (primary) memory, but RAM is the primary workspace for active data/instructions^{[1] [5] [4] [6]}.

Where Are Variables (var) Stored?

- In programming languages (like JavaScript and most others), variables are stored in **main memory (RAM)** while your program is running.
- Any variable you create—like `var a = 5;` in JS or C—lives in RAM during execution. The computer assigns it a specific memory address in RAM^{[7] [8] [9]}.
- When you run a program, the operating system loads the code and the variables ("named locations in main memory") into RAM so the CPU can access and change them quickly.

In Summary

- **Main memory** = RAM (plus ROM); it's fast and stores data the CPU is currently using.
- **Secondary memory** = permanent storage like HDD/SSD for files and programs.
- **Variables** (`var`, `let`, `const`, or equivalents in other languages) are stored in **RAM** during execution, so they are quickly accessible and modifiable as your code runs.
- When you power off the computer, **RAM is cleared**, and variables disappear unless their data is saved to secondary storage.

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1. <https://www.geeksforgeeks.org/operating-systems/difference-between-primary-and-secondary-memory/>
2. <https://takeuforward.org/operating-system/difference-between-main-memory-and-secondary-memory/>
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