2.2.1 differentiate between primary (main) memory and secondary memory;

Here's a comparison between primary (main) memory and secondary memory:

Feature	Primary (Main) Memory	Secondary Memory
Definition	The main memory used by the CPU to store data and instructions temporarily while a computer is in use.	Long-term storage used to retain data and programs when the computer is powered off.
Volatility	Volatile; loses data when power is turned off.	Non-volatile; retains data even when power is off.
Speed	Fast access speed (e.g., RAM); allows for quick read and write operations.	Slower access speed compared to primary memory (e.g., HDD, SSD).
Capacity	Generally smaller in size (e.g., GBs) compared to secondary memory.	Typically larger in size (e.g., TBs) to store more data.
Examples	Random Access Memory (RAM), Cache Memory.	Hard Disk Drives (HDD), Solid State Drives (SSD), USB drives, CDs.
Purpose	Temporarily holds data and instructions for active tasks, enabling quick access for the CPU.	Provides long-term data storage for applications, files, and system data that are not in active use.
Cost	More expensive per unit of storage.	Generally cheaper per unit of storage.

Key Differences:

1. **Volatility**:
   - **Primary Memory**: Volatile; data is lost when the system is powered off.
   - **Secondary Memory**: Non-volatile; data remains intact without power.
2. **Speed**:
   - **Primary Memory**: Faster, enabling quick data access for running applications.
   - **Secondary Memory**: Slower, as it is used for long-term storage rather than immediate access.
3. **Capacity**:
   - **Primary Memory**: Smaller, designed to hold only the data currently in use.
   - **Secondary Memory**: Larger, used to store extensive amounts of data and programs.

Summary:

- **Primary memory** (like RAM) is crucial for the immediate operation of the computer, providing fast access to active data. In contrast, **secondary memory** (like hard drives and SSDs) serves as long-term storage, retaining data even when the computer is turned off. Both types of memory are essential for overall system performance and functionality.