# Introduction to Storage Management

## Persistence

Welcome to a new lecture. In this lecture, we will be discussing about the third pillar of the Operating System, which is Persistence. In simple terms, persistence is a firm continuance of a task, in spite of challenges. For Operating Systems, to persist data and information, in spite of computer crashes and  power outages is an interesting and challenging problem to solve.

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**Crux of this Section**

We know that our data remains intact even after our system crashed abruptly. So, what are mechanisms used by OS to store data persistently.

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## Flow of Lecture

In this lecture, we will learn about:

1. Why main memory cannot be used to persist the data of a computer system?
2. Details about different secondary storage devices that store data persistently.
3. Understanding Hard Disk Drive and how OS abstracts its usage with the help of File System, Files and Directories.
4. How and what are the different ways in which disk space is allocated?
5. Seek time is the time taken to locate data on disk. In the last section, we will learn different algorithms to minimize seek time.

Now that we have comprehended the flow and objectives of the lectures, so, we are ready to move into the lecture. However, before moving on to lecture videos, let us understand why a new level of memory was needed for storing data persistently.

## Limited Size of Main Memory

In the previous lectures, we have seen that programs have to be loaded to main memory for execution. Though main memory has direct access with CPU, we have seen that size of the main memory is limited. We hope that you must be aware of the size of the main memory in your computer system. Generally, the size of main memory is 2 GB, 4 GB, 8 GB and sometimes even 16 GB.

However, the main memory size seem sufficient enough, but the size will look small, if we try to accommodate whole applications permanently in the computer system. The second reason why main memory cannot be used for storing data persistently is the volatile nature of it. The data remains on the main memory till the computer system is powered on.

Hence, we conclude that the main memory is too small to accommodate all the data and programs permanently.

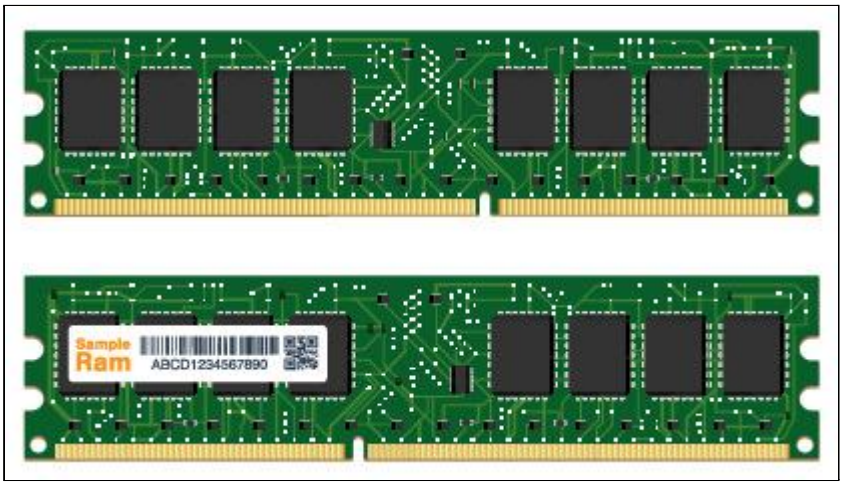


Figure 1 Image of Main Memory (RAM)

## Need for Permanent Storage

So, in this case, the computer system must provide secondary storage to back up main memory. Now, the question arises what are the kinds of secondary storage devices that are available to us. We have two kinds of permanent storage devices:

1. Detachable storage devices such as Pen Drives, External Hard Disks, CDs and DVDs.
2. Non-detachable storage devices such as hard disk drive (HDD) and Solid State Drive (SSD)

In this lecture, we will focus on the storage devices which are non detachable and come preloaded into the computer system. Let's discuss them in the following video.