**Problem Statement 8**

**Designing a simulator on Linux to implement the functionality of FIFO, LRU, and OPTIMAL page replacement algorithms.**

In an operating system, memory management is a crucial topic. It provides ways to dynamically control and coordinate computer memory. Memory management allows allocating a portion of memory when requested by a program. It also automatically deallocates memory from a program when it is no longer used by a program.

There are various techniques used in memory management. One such method is paging. In paging, page replacement algorithms play an important role and decide which page to keep in the main memory when a new page comes in.

**Why is there a need for page replacement?**

Page replacement is needed in the operating systems that use virtual memory using Demand Paging. As we know that in Demand paging, only a set of pages of a process is loaded into the memory. This is done so that we can have more processes in the memory at the same time

Page replacement algorithms like FIFO are used when there is a new page request, and there is not enough space in the main memory to allocate the new page. First-in, first-out (FIFO) algorithm has a simple approach to this problem. We keep track of all the pages by using a queue in the main memory.

FIFO Page replacement algorithms suffer from Belady's anomaly: Belady's anomaly states that it is possible to have more page faults when increasing the number of page frames.