Assignment

What do you mean by paging? Discuss in detail about structure of page tables with appropriate examples

Paging is a memory allocation technique used by operating systems to manage the storage of processes or program in memory. It allows for the user to divide physical memory into blocks called pages while logical memory into blocks called page frames.

Structure of page tables

Page table is determined by hardware and OS

Virtual address which is page index and page offset

Page table entries

Page table hierarchy

The term thrashing in operating systems

Thrashing refers to a situation where the system spends a significant amount of time and resources continuously swapping pages between RAM and the disk resulting in poor performance.

It occurs when the system is overloaded with more processes than it can handle with the available physical memory.

Use an example to explain the purpose of system calls

They allow user level processes to access privileged system resources.

Example when writing a program in a high level language like python. To perform this operation your program needs to interact with the operating system through system calls by

1. Opening a file.
2. Reading data.
3. Manipulation data.
4. Writing data.
5. Closing the file

Discuss the concept of Virtual memory

It is a concept that enables a computer to use more memory than it has physically available. It is achieved by dividing memory into small pieces called pages and shifting them between the main memory RAM and the hard disk storage as needed.

Separation of user logical memory from physical memory.

Only part of the program that needs to be in a memory for execution.

Logical address space can therefore be much larger than physical address space.

Allow address spaces to be shared by several processes.

Allow for efficient process creation.

Discuss the concept of File management

File management is the process of organizing files and folders in a structured manner that enables easy storage, retrieval, and manipulation of data. It involves various tasks such as creating, storing, organizing, deleting, and sharing files.

Explain the following as used in the OS

Multi programming

It is a technique used in an operating system that allows a computer to run multiple programs simultaneously. The idea is to maximize the use CPU and keep it busy all the time.

Multi-processing

It is a technique used in an operating system that allows a computer to use multiprocessors or CPUs to execute different tasks or programs simultaneously. The idea is to divide the workload of a computer among multiple CPUs.

Multi-tasking

It is a technique used in an operating system that enables a computer to run multiple tasks or programs at the same time. The idea is to perform multiple tasks simultaneously.

Swapping

It is a technique used by operation systems to manage memory when the available physical memory is insufficient to hold all programs and data are currently being used by the computer.