THREADS

what are threads

Threads are lightweight processes that share the same memory and resources of a process. Threads allow an application to perform multiple tasks concurrently within a single process. Each thread can execute independently and communicate with other threads within the same process, making it possible to achieve parallelism and improve performance in a multi-tasking environment. Threads can be either implemented at the user level (user-level threads) or by the operating system kernel (kernel-level threads).

what are different types of threads

There are two main types of threads:

1. User-level threads (ULTs): ULTs are created and managed by a thread library at the user level, without kernel support. The kernel is unaware of the existence of ULTs and schedules them as if they were single-threaded processes. ULTs offer a higher degree of control over thread management to the programmer and are typically faster to create and manage than kernel threads.
2. Kernel-level threads (KLTs): KLTs are created and managed by the operating system kernel. The kernel is aware of the existence of KLTs and schedules them directly, allowing for true parallelism. KLTs are generally more efficient than ULTs because they are managed by the kernel and can take advantage of features like multiprocessing and hardware interrupts.

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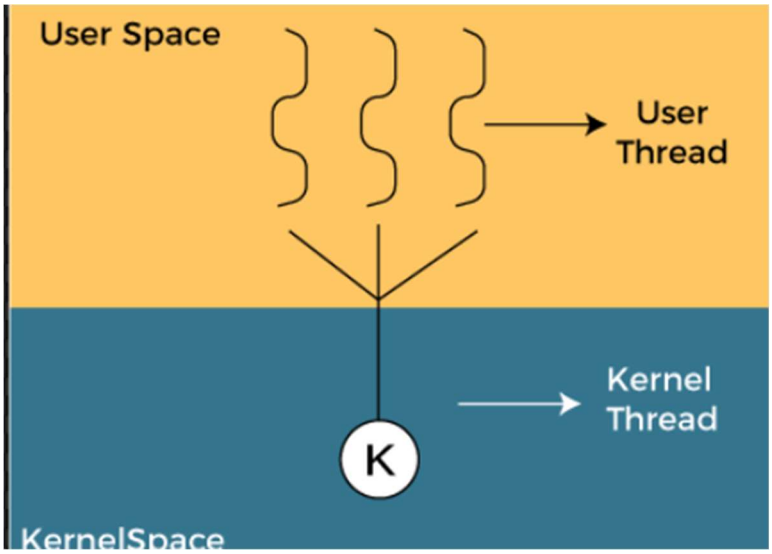

what is thread scheduling

Thread scheduling is the process of assigning available threads to the processor for execution. The operating system scheduler is responsible for managing and scheduling threads to ensure efficient use of the processor. Thread scheduling involves various algorithms and techniques to determine which thread should be executed next, based on factors such as thread priority, time slice, and blocking conditions. The goal of thread scheduling is to maximize the utilization of system resources while ensuring fair access to the processor for all threads.

types of thread scheduling

There are two types of thread scheduling:

1. User-level thread scheduling: In this type of scheduling, the scheduling is done by the application or thread library itself, rather than the operating system. The thread library manages the scheduling of threads and decides which thread should run next.
2. Kernel-level thread scheduling: In this type of scheduling, the scheduling is done by the operating system's kernel. Each thread is associated with a kernel-level thread, and the kernel schedules these threads for execution.

Reference: Operating System Concepts, 10th Edition by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne. Chapter 4: Threads.

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