

Explain mutual exclusion and synchronization with example.

Mutual Exclusion:

Mutual exclusion refers to the concept of ensuring that only one process or thread can access a shared resource at any given time. It prevents multiple processes from simultaneously modifying or reading the same data, which could lead to data inconsistency or corruption.

Example of Mutual Exclusion:

Imagine a simple scenario where two people, Alice and Bob, are trying to update the balance of their shared bank account. Without mutual exclusion, both Alice and Bob might access the account simultaneously, leading to incorrect results or errors. However, with mutual exclusion, only one person can access the bank account at a time, ensuring that their operations are executed in a sequence, preventing conflicts and maintaining the correct balance.

Synchronization:

Synchronization refers to the coordination of multiple processes or threads to ensure they behave in an orderly and well-defined manner. It involves controlling the order of execution of processes or threads to avoid race conditions, data inconsistencies, and other potential issues that can arise in concurrent systems.

Example of Synchronization:

Consider a printer shared by multiple computers in an office. If two or more computers send

Explain mutual exclusion and synchronization with example.

print requests simultaneously without synchronization, there may be conflicts, and the printed documents could become garbled. To synchronize the print jobs, the computers must communicate with each other and queue their print requests one at a time. This way, the printer can process the jobs in the correct order, avoiding printing conflicts and ensuring that all documents are printed correctly.