KTU OS Lab Viva Questions and Answers

Very Hard but Commonly Asked Viva Questions (Conceptual & Practical):

1. What is a critical section and how is it implemented in lab programs?

A critical section is the part of a program that accesses shared resources. It must be executed exclusively by one process at a time. Implementations include Petersons Algorithm using flag[] and turn variables.

2. Explain the difference between wait() and signal() in semaphore implementation.

wait() decreases the semaphore value and may block a process if the value is negative. signal() increases the value and may unblock waiting processes.

3. In the Banker's Algorithm, why is the need matrix important?

The need matrix shows the remaining resource requirement of each process. It helps determine if the system is in a safe state.

4. In FCFS scheduling, how can high waiting time be reduced?

By reducing the length of longer jobs or reordering them. FCFS is not ideal for real-time systems due to the convoy effect.

5. How does Round Robin scheduling ensure fairness?

Each process gets an equal time slice in a cyclic order. If the time quantum is too small, it causes overhead; too large, it mimics FCFS.

6. In SJF, how do you determine the next shortest job without knowing the burst time in advance?

In practice, it's estimated based on past behavior. SJF is optimal for minimum average waiting time but may cause starvation.

7. What are the conditions for deadlock?

Mutual exclusion, hold and wait, no preemption, and circular wait.

8. How is memory managed in your paging or memory allocation program?

Memory is divided into frames (physical) and pages (logical). A page table maps pages to frames.

9. What is the difference between logical and physical address in paging simulation?

Logical address is generated by CPU; physical address is the actual location in RAM. Paging uses page tables for mapping.

10. How does the FIFO page replacement algorithm work, and why does it suffer from Belady's anomaly?

Replaces the oldest page. Beladys anomaly shows more frames may increase faults.

"What is called..." Style Questions and Answers:

1. What is called a critical section in a process?

A part of a process where shared resources are accessed. Must be executed by only one process at a time.

2. What is called mutual exclusion?

Ensuring only one process enters the critical section at a time.

3. What is called a race condition?

When two processes access shared data concurrently and the final result depends on timing.

4. What is called process synchronization?

Coordinating processes to execute in a specific order to avoid conflicts.

5. What is called a semaphore?

A variable used to control access to shared resources and avoid race conditions.

6. What is called busy waiting?

When a process continuously checks a condition, wasting CPU cycles.

7. What is called deadlock in operating systems?

A situation where processes wait indefinitely for each others resources.

8. What is called the safe state in Bankers Algorithm?

A state where the system can allocate resources safely without entering deadlock.

9. What is called starvation in scheduling?

A process waits indefinitely due to continuous preemption by higher-priority processes.

10. What is called context switching?

Saving and restoring the state of processes during scheduling.

11. What is called preemptive scheduling?

CPU can be taken from a process before it finishes.

12. What is called non-preemptive scheduling?

Once a process starts, it runs till completion.

13. What is called aging in CPU scheduling?

Increasing the priority of a waiting process over time to prevent starvation.

14. What is called a page fault?

When a program accesses a page not in memory.

15. What is called a frame and a page?

Pages are blocks of logical memory; frames are blocks of physical memory.

16. What is called internal and external fragmentation?

Internal: unused space inside a block. External: unused space between blocks.

17. What is called a page replacement algorithm?

Decides which page to replace during a page fault.

18. What is called Beladys anomaly?

More frames may cause more page faults in FIFO.

19. What is called logical and physical address?

Logical: generated by CPU. Physical: actual memory address.

20. What is called demand paging?

Load pages only when needed.

21. What is called a system call?

A method to request OS services from user programs.

22. What is called a thread?

Smallest unit of execution inside a process.

23. What is called the producer-consumer problem?

A synchronization problem where one produces and one consumes data using a shared buffer.

24. What is called the bounded buffer problem?

Producer-consumer problem with a limited-size buffer.

25. What is called inter-process communication (IPC)?

Mechanism that allows processes to communicate and coordinate.
