Dr. MPS Group of Institutions

BCA – 3rd Semester

Question Bank: Operating Systems (Jan – 2022)

1. Explain briefly:

a) Define preemption and non-preemption.

b) What is Semaphore? Mention its properties. Define Busy Waiting. How to overcome busy waiting using Semaphore operations?

c) What are the various file accessing methods?

d) Mention the objectives and functions of an operating system.

2. a) What is the critical section? What are the minimum requirements that should be satisfied by a solution to critical section problem?

b) What is a Scheduler? Explain different CPU Schedulers. How to implement process synchronization using i)Test and Set ii) SWAP iii) Lock instructions? Explain with Pseudo code.

c) What is paged segmentation? How it can be implemented? Discuss its advantages and disadvantages.

3. a) Explain the concept of demand paging in detail with neat diagrams.

b) Given memory partition of 100 KB, 500 KB, 200 KB and 600 KB (in order). Show with neat sketch how would each of the first-fit, best-fit and worst fit algorithms place processes of 412 KB, 317 KB, 112 KB and 326 KB (in order).

c) What is a deadlock? Consider the deadlock situation that could occur in the dining philosopher's problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. What are the solutions for this problem?

d) Explain Deadlock Detection scheme for Several Instances of a resource Type. Explain the different techniques to recover the system from deadlock. In what way resource allocation graphs are used for detection of deadlocks? Write the algorithm.

4. a) Discuss the different file allocation methods with suitable example.

b) Compare and contrast free space management and swap space management.

5. a) Explain the techniques used to prevent the deadlocks.

b) Explain Banker's deadlock-avoidance algorithm with an illustration.

6. a) Explain the steps involved in process creation and process termination.

b) Demonstrate FIFO and Round Robin CPU scheduling algorithms with suitable example.

7. a) Write the difference between internal and external fragmentation.

b) Explain the three allocation methods in file system implementation. Illustrate with proper diagram.

c) What are the objectives of file management systems? Explain the file system architecture.

d)

Process	Arrival Time	Burst Time
1	0	3
2	2	6
3	4	4
4	6	5
5	8	2

Perform non preemptive CPU scheduling algorithms on the given snapshot and analyze their performance.

8. a) Consider the following page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the optimal page replacement algorithm, assuming three frames and all frames are initially empty.

b) Discuss various issues related to the allocation of frames to processes.

c) Explain deadlock avoidance using banker's algorithm with suitable example.

9. a) With a neat diagram, explain the layered structure of UNIX operating system.

b) What are the various attributes that are associated with an opened file?

10. a) Distinguish between Logical and Physical address space.

b) What is a Virtual Memory? Discuss the benefits of virtual memory technique.

11. a) What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem?

b) Explain and compare the SCAN and C-SCAN disk scheduling algorithms.

12. a) What are the disadvantages of single contiguous memory allocation? Explain.

b) Discuss the hardware support required to support demand paging.

13. a) How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.

b) Is it possible to have a deadlock involving only a single process? Explain.

14. a) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created?

b) Explain the Round Robin scheduling algorithm with a suitable example.

15. a) Explain the various methods for free-space management.

b) Discuss various issues involved in selecting appropriate disk scheduling algorithm.