Model Question Paper

RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION

101003/CS400D Operating Systems

Max. Marks: 100 Duration: 3 Hours

PART-A

(Answer All Questions. Each question carries 3 marks)

1. How does hardware find the Operating System kernel after system switch-on?

2. What is the purpose of a system call in an operating system?

3. Why is context switching considered as an overhead to the system?

4. How is inter process communication implemented using shared memory?

5. Describe resource allocation graph for the following.

a) with a deadlock b) with a cycle but no deadlock.

6. What is critical-section? What requirement should be satisfied by a solution to the critical section problem?

7. Consider the 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 occur while using FCFS for the following cases.

a) frame = 2 b) frame = 3

8. Differentiate between internal and external fragmentations.

9. Compare sequential access and direct access methods of storage devices.

10. Define the terms (i) Disk bandwidth (ii) Seek time.

PART-B

(Answer any one question from each module)

11. a) Explain the following structures of an operating system (i) Monolithic systems (ii) Layered Systems (iii) Micro Kernel (iv) Modular approach. (12)

b) Under what circumstances would a user be better off using a time sharing system than a PC or a single user workstation? (2)

OR

12. a) What is the main advantage of the microkernel approach to system design? How do user programs and system programs interact in a microkernel architecture? (8)

b) Describe the differences between symmetric and asymmetric multiprocessing? What are the advantages and disadvantages of multiprocessor systems? (6)

13. a) Define process. With the help of a neat diagram explain different states of process. (8)

b) Explain how a new process can be created in Unix using fork system call. (6)

OR

14 a) Find the average waiting time and average turnaround time for the processes given in the table below using:- i) SRT scheduling algorithm ii) Priority scheduling algorithm (9)

Process	Arrival Time (ms)	CPU Burst Time (ms)	Priority
P1	0	5	3
P2	2	4	1
P3	3	1	2
P4	5	2	4

b) What is a Process Control Block? Explain the fields used in a Process Control Block. (5)

15. Consider a system with five processes P0 through P4 and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and C has 7 instances. Suppose at time t_0 following snapshot of the system has been taken:

Process	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

i) What will be the content of the Need matrix? Is the system in a safe state? If Yes, then what is the safe sequence? (8)

ii) What will happen if process P1 requests one additional instance of resource type A and two instances of resource type C? (6)

OR

16. a) State dining philosopher's problem and give a solution using semaphores. (7)

b) What do you mean by binary semaphore and counting semaphore? With C struct, explain implementation of wait () and signal() (7)

17. 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. Find out the number of page faults if there are 4 page frames, using the following page replacement algorithms i) LRU ii) FIFO iii) Optimal (9)

b) Explain the steps involved in handling a page fault. (5)

OR

18. a) With a diagram, explain how paging is done with TLB. (5)

b) Memory partitions of sizes 100 kb, 500 kb, 200 kb, 300 kb, 600 kb are available, how would best ,worst and first fit algorithms place processes of size 212 kb, 417 kb, 112 kb, 426 kb in order. Rank the algorithms in terms of how efficiently they use memory. (9)

19. a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive currently services a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following algorithms i) FCFS ii) SSFT iii) SCAN iv) LOOK v) C-SCAN (10)

b) What is the use of access matrix in protection mechanism? (4)

OR

20. a) Explain the different file allocation operations with advantages and disadvantages. (8)

b) Explain the following i) file types ii) file operation iii) file attributes (6)