PRS/KS/24/2639

Faculty of Science & Technology

Fourth Semester B.Tech. (Information Technology) (C.B.C.S.) Examination

OPERATING SYSTEM

Time : Three Hours] [Maximum Marks : 70

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question No. **1 OR** Question No. **2**.
(3) Solve Question No. **3 OR** Question No. **4**.
(4) Solve Question No. **5 OR** Question No. **6**.
(5) Solve Question No. **7 OR** Question No. **8**.
(6) Solve Question No. **9 OR** Question No. **10**.
(7) Assume suitable data wherever necessary.
(8) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Explain any four types of operating system. 7

(b) Differentiate the following :

(i) User's view and system's view

(ii) Multitasking and multiprogramming. 7

OR

2. (a) Define operating system. What are different services offered by OS ? 7

(b) Explain different types of Kernel. 7

3. (a) Consider the following set of processes :

Process	Arrival time (MS)	Burst Time (MS)
P0	0	3
P1	1	5
P2	2	2
P3	3	5
P4	4	5

Calculate waiting and turnaround time for each algo :

(i) FCFS

(ii) SJF

(iii) RR (Slice = 2) 7

(b) Write short note on scheduling queues. 7

OR

4. (a) Draw the state transition diagram of process and explain each state in detail. 7

(b) Define thread. Explain the various multithreaded models in detail. 7

5. (a) Define deadlock. What are the necessary conditions for occurrence of deadlock ? 7

(b) Consider following snapshot of a system :

Available

A	B	C	D
1	5	2	0

Process	Allocation				Max			
	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2
P1	1	0	0	0	1	7	5	0
P2	1	3	5	4	2	3	5	6
P3	0	6	3	2	0	6	5	2
P4	0	0	1	4	0	6	5	6

(i) What is the content of matrix need ?

(ii) Is the system in safe state ? Prove it.

(iii) If a request from process P1 arrives for (0,4,2,0), can the request be immediately granted ? Why ? 7

OR

6. (a) What is critical section problem ? Also explain solution to the critical section problem. 7

(b) Explain how deadlock can be prevented. 7

7. (a) Explain the paging and its implementation. What hardware is required for paging ? 7

(b) Discuss the following :

(i) Segmentation

(ii) Memory Partitioning. 7

OR

8. (a) Explain the need of virtual memory and how it is implemented ? 7

(b) Consider the following page reference string 1,2,3,4,1,2,5,1,2,3,4,5 for memory with 3 frames. How many page fault would occur for the following page replacement algorithms ?

(i) LRV

(ii) FIFO

(iii) Optimal. 7

Model Questions

9. (a) What is disk scheduling ? Explain Scan disk scheduling algorithm with suitable example. 7

(b) Discuss the following :

(i) Disk Cache

(ii) I/O System. 7

OR

10. (a) Suppose a disk drive has 400 cylinders, numbered from 0 to 399. The drive is currently serving a request at cylinder 142, and the previous request was at cylinder 124. The queue of pending request in FIFO order is 84,147,99,176,94,150,102,175,130, starting from current head position. What is the total distance that the disk arm moves to satisfy all the pending requests for the following algorithms ?

(i) FCFS

(ii) SSTF

(iii) SCAN

(iv) LOOK 7

(b) Describe operating system design issues in detail. 7

B.Tech. (Information Technology) Fourth Semester (C.B.C.S.)

Operating System

P. Pages : 2 **PSM/KW/23/2639**

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4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Due credit will be given to neatness and adequate dimensions.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What are the different services provided by the operating system? **6**

b) Differential the following:- **8**
i) User view and system view.
ii) Multitasking and multiprogramming.

OR

2. a) What is an operating system? List the different types of operating system. **6**

b) Write the essential properties of followings:- **8**
i) Real time O.S.
ii) Multiprocessor O.S.
iii) Web based O.S.
iv) Distributed O.S.

3. a) Discuss about the process control Block and its attributes. **7**

b) Brief the thread management carried out by operation system. **7**

OR

4. a) Consider the following set of process:- **8**

Process	CPU Burst	Arrival Time	Priority
P_0	3 ms	0	3
P_1	5 ms	1	1
P_2	2 ms	2	2
P_3	5 ms	3	4

Calculate the average waiting time and turnaround time for each:-
i) SJF
ii) Round Robin
iii) SJF Non-preemptive

b) What is the difference between program and process. List the different process states. **6**

Model Questions

5.	a)	Discuss the various methods used to implement deadlock detection.	**7**
	b)	What do you mean by deadlock? State the difference between deadlock avoidance and deadlock detection.	**7**
		OR	
6.	a)	Explain the Banker's algorithm.	**7**
	b)	Elaborate the following **any three**:- i) Critical section ii) Semaphores iii) Monitors iv) Mutual exclusion	**7**
7.	a)	What is memory fragmentation? Explain internal and external fragmentation.	**6**
	b)	Consider the following page reference string 4 3 2 1 4 3 5 4 3 1 5. Assume frame size = 3. How many page faults will occur for :- i) FIFO page replacement policy. ii) LRU page replacement policy.	**8**
		OR	
8.	a)	Discuss the following concepts:- i) Paging ii) Segmentation iii) Thrashing	**8**
	b)	Brief the optimal page replacement policy.	**6**
9.	a)	Discuss any two disk scheduling algorithms in detail.	**7**
	b)	Elaborate the following:- i) Design issues of O.S. ii) Organization of I/O function	**7**
		OR	
10.	a)	What do you mean by disk cache?	**4**
	b)	Suppose the heads of moving disk with 200 cylinders and is currently at track 60. If the queue of a request is kept in order as 65, 170, 35, 120, 10, 140. What are the total head movements to satisfy the request for the scheme:- i) SSTF ii) C-SCAN iii) FCFS iv) SCAN v) LOOK	**10**

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B.Tech. Fourth Semester (Information Technology) (C.B.C.S.)

Operating System

P. Pages : 2 **MSP/KS/23/2599**

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5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What is operating system? OS is called resource manager. Explain. **8**

b) Difference between thread and process
Difference between Program and process. **6**

OR

2. a) Discuss the following with reference to file. **9**
i) Pieces of information associated with an open file.
ii) File attributes
iii) File operations

b) Explain kernel architecture. **5**

3. a) Calculate the average waiting time and average turnaround time for the following situation. **8**
i) SJF ii) Priority iii) RR (time quantum = 2)

Process	Burst time	Priority	Arrival time
P0	5	1	1
P1	7	3	5
P2	6	2	0

b) What are the different types of schedulers present in the system? Bring out the relevance of each of them. **6**

OR

4. a) Discuss content switching in brief & Explain process control block. **7**

b) What is meant by a system call? How it is used by application program during execution? **7**

5. a) Explain semaphores and its limitations. **7**

b) What do you understand by critical section problem? What requirement should be met by its solution? **7**

OR

6.		Discuss any two of the classical problems of synchronization. i) Dinning philosopher. ii) The readers writers problem. iii) The Bounded buffers problem.	**14**
7.	a)	What is page fault? How it can be controlled.	**6**
	b)	Describe the following. i) Swapping ii) Internal and external fragmentation iii) Paging.	**8**
		OR	
8.	a)	Describe i) MMU ii) Overlays iii) Swapping	**7**
	b)	Explain Virtual memory.	**7**
9.	a)	Write a short note on: i) Buffering ii) Spooling iii) Symmetric and Asymmetric multiprocessor system.	**8**
	b)	Describe Producer Consumer Problem.	**6**
		OR	
10.		Suppose that a disk drive has 5000 cylinders numbered from 0 to 4999. The drive is currently serving a request at cylinder 143 and previous request was at cylinder 125. The queue of pending request in FIFO is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithms. i) FCFS ii) SSTF iii) SCAN iv) C-SCAN v) LOOK vi) C-LOOK.	**14**

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Model Questions

B.Tech. (Information Technology) Fourth Semester (C.B.C.S.) Winter 2022

Operating System

P. Pages : 2 **SPM/KW/22/2599**

Time : Three Hours Max. Marks : 70

Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Assume suitable data whenever necessary.
8. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What do you mean by operating system? Discuss the objectives that can be achieved using operating system. And also list the different functions performed by the operating system. **9**

b) What are the characteristics of modern operating system? **5**

OR

2. a) Discuss the following concepts with reference to operating system:- **8**
i) Process ii) System calls
iii) Shell iv) Files

b) Elaborate the following Kernel architectures:- **6**
i) Monolithic ii) Micro-Kernel

3. a) Discuss process management carried out by the operating system. **7**

b) State the difference program and process. Draw and explain the different states of a process. **7**

OR

4. a) What do you mean by thread? Discuss the thread management done by the operating system. **7**

b) Differentiate between preemption and non-preemption process scheduling. Explain the FCFS and SJF process scheduling algorithms. **7**

5. a) What do you mean by race condition? How the race condition is handled in critical section? Explain with suitable example. **6**

b) What do you mean semaphores? **2**

c) Discuss the producer-consumer problem with example. **6**

OR

Model Questions

6.	a)	What is deadlock? Explain the four conditions: mutual exclusion, hold & wait, No preemption and circular wait.		**7**
	b)	Discuss the banker's algorithm.		**7**
7.	a)	What is the need of memory management? Differentiate between logical address space and Physical address space.		**6**
	b)	Discuss the internal and external fragmentation with suitable example. Also, describe the first fit and best fit approach.		**8**
		OR		
8.	a)	Elaborate the following **any one**. i) Paging ii) Segmentation		**5**
	b)	List the requirement to implement the page replacement policies.		**2**
	c)	What are the advantages and disadvantages of following page replacement algorithms: i) FIFO ii) LRU		**7**
9.	a)	Describe the I/O management carried out by operating system.		**5**
	b)	What are design issues found with the operating system?		**4**
	c)	What do you mean by I/O buffering? Explain the need of I/O buffering.		**5**
		OR		
10.	a)	What do you mean by disk scheduling in OS? Explain any one disk scheduling algorithm in detail.		**6**
	b)	Consider a disk queue with requests for I/O to block cylinders. 87, 160, 40, 140, 36, 72, 66, 15 The disk is initially at 60. Find the total head movement using the following disk scheduling algorithms i) FCFS ii) SSTF		**8**

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