

B.Tech II Year II Semester (R20) Regular & Supplementary Examinations August/September 2023

OPERATING SYSTEMS

(Common to IT, CSE, AI&DS, CSE(AI&ML), CSE(AI), CSE(IoT), CSE(DS), CS&D and CSE (CS))

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- (a) Define operating systems. 2M
- (b) What are multiprocessor systems? 2M
- (c) Explain the layout of a process in memory. 2M
- (d) Explain the swapping process. 2M
- (e) Does paging suffer from fragmentation? Explain. 2M
- (f) How is segmentation different from paging? 2M
- (g) What is the significance of access rights associated with each file in a system? 2M
- (h) What are the necessary conditions that cause deadlock in a system? 2M
- (i) Differentiate viruses and worms. 2M
- (j) What is message-authentication code? 2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2 List and explain the different categories of system calls. 10M

OR

3 What are open-source operating systems? What are its benefits? 10M

4 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. 10M

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

OR

5 A writer process like to send some bulk information to a reader process. Explain the IPC mechanism that can be used for the purpose. 10M

6 (a) Explain Optimal page replacement and LRU algorithms for page replacement. 3M

(b) Find the number of page faults for the following page reference string with 3 page frames for Optimal page replacement and LRU algorithms 2 3 4 2 1 3 7 5 4 3. 7M

OR

7 (a) Describe contiguous memory allocation. 5M

(b) Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order). Rank the algorithms in terms of how efficiently they use memory. 5M

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- 8 (a) Which are the different access methods of a file? 5M
(b) What are the different allocation methods of a file? 5M
OR
- 9 Suppose that a disk drive has 200 cylinders numbered from 0 to 199. The disk is currently servicing at cylinder 100 and the previous request was at cylinder 120. The queue of pending requests in FIFO order is 23, 89, 132, 42, 187. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the scheduling algorithms. (i) FCFS, (ii) SSTF, (iii) SCAN. 10M
- 10 To protect a system, what are the four levels of security measures to be taken. 10M
OR
- 11 Discuss the use of cryptography as a security tool. 10M

B.Tech II Year II Semester (R20) Regular & Supplementary Examinations April/May 2024

OPERATING SYSTEMS

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Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- | | |
|--|----|
| (a) Define an operating systems. | 2M |
| (b) Write a neat diagram of storage device hierarchy. | 2M |
| (c) Define a process. Give an example. | 2M |
| (d) What do you mean by sleep and wakeup? Explain. | 2M |
| (e) What is paging? Give an example. | 2M |
| (f) What are memory-mapped files? Explain. | 2M |
| (g) What are resources which may cause deadlock? Explain. | 2M |
| (h) Write the overview of disk structure. | 2M |
| (i) What are the goals of system protection? | 2M |
| (j) Why user authentication is essential in system security? | 2M |

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

- 2 (a) Discuss any two open source operating systems. 5M
- (b) With a neat diagram, explain components of computer systems, and explain what operating systems do. 5M

OR

- 3 (a) Explain operating system services with a neat diagram. 5M
- (b) Describe three general methods for passing parameters to the operating system. 5M

- 4 (a) Explain the process of inter-process communication in detail. 5M
- (b) Explain readers and writers problem in detail. 5M

OR

- 5 (a) What do you mean by multiple process scheduling? Explain. 5M
- (b) Explain the process of communication in client server systems. 5M

- 6 (a) Explain why mobile operating systems such as IOS and Android do not support swapping. 5M
- (b) Discuss the hardware support required to support demand paging. 5M

OR

- 7 (a) Under what circumstances do page faults occur? Describe the actions taken by the operating system when a page fault occurs. 5M
- (b) Consider the hierarchical paging scheme used by the VAX architecture. How many memory operations are performed when a user program executes a memory-load operation? 5M

- 8 (a) Write the safety algorithm and resource-request algorithm of Bankers algorithm. 5M
- (b) Why is it important to balance file-system I/O among the disks and controllers on a system in a multitasking environment? 5M

OR

- 9 (a) Assume a multithreaded application uses only reader–writer locks for synchronization. Applying the four necessary conditions for deadlock, is deadlock still possible if multiple reader–writer locks are used? 5M
- (b) Compute the minimum transfer sizes that give acceptable utilization for cache, memory, and tape. 5M

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- 10 (a) Consider a computing environment where a process is given the privilege of accessing an object only n times. Suggest a scheme for implementing this policy. 5M
- (b) A password may become known to other users in a variety of ways. Is there a simple method for detecting that such an event has occurred? Explain your answer. 5M

OR

- 11 (a) What protection problems may arise if a shared stack is used for parameter passing? 5M
- (b) The list of all passwords is kept within the operating system. Thus, if a user manages to read this list, password protection is no longer provided. Suggest a scheme that will avoid this problem. (Hint: Use different internal and external representations.) 5M
