



B.Tech IV Semester Regular Examinations, July 2024

OPERATING SYSTEMS
(INFORMATION TECHNOLOGY)

Maximum Marks: 60

Date: 25.07.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory and carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub-questions.

Part-A		CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	Define the term operating system.		
b)	List the objectives of an operating system.	CO1	L1
c)	Define process.	CO1	L1
d)	Distinguish between preemptive and non-preemptive scheduling.	CO2	L1
e)	List the steps needed for page replacement.	CO2	L1
f)	What is swapping?	CO3	L1
g)	Outline directory structure.	CO3	L1
h)	List the various attributes in file system.	CO4	L1
i)	Define Critical section problem.	CO4	L1
j)	Define Deadlock.	CO5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	a) Operating system is resource manager"-Justify this statement with suitable functionality of OS. [5]	CO1	L4
	b) Explain the operating system structure and its operations in detail. [5]		L2
OR			
3	a) With a neat sketch, discuss the services that an operating system provides to users, processes, and other systems. [5]	CO1	L3
	b) Explain in detail the various system calls handled by the operating system. [5]		L2
4	a) What is process? Explain the different states of the process with a state diagram. [5]	CO2	L2
	b) 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? [5]		L2

	OR																														
5	<p>Calculate the average waiting time for the processes using non-preemptive SJF scheduling algorithm. [10]</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Process</th> <th>Arrival Time</th> <th>Burst time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>7</td> </tr> <tr> <td>P2</td> <td>2</td> <td>4</td> </tr> <tr> <td>P3</td> <td>4</td> <td>1</td> </tr> <tr> <td>P4</td> <td>5</td> <td>4</td> </tr> <tr> <td>P5</td> <td>3</td> <td>4</td> </tr> </tbody> </table>	Process	Arrival Time	Burst time	P1	0	7	P2	2	4	P3	4	1	P4	5	4	P5	3	4	CO2	L3										
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6	<p>a) What is swapping? Explain with a neat sketch. [5] b) What is demand paging and explain the paging technique in detail with an example. [5]</p>	CO3	L2 L2																												
	OR																														
7	<p>a) Consider the following page reference string 1,2,3,4,5,2,6,7,3,2,4,1,7,1,4,3,2,3,4,7,1. Compare the number of page faults with frame sizes 3,4 and 5 with any replacement algorithm. [7] b) What is a Virtual Memory? Discuss the benefits of the virtual memory technique. [3]</p>	CO3	L3 L2																												
8	Explain the different file access methods in detail with a neat diagram. [10]	CO4	L2																												
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9	<p>a) Discuss the different file allocation methods with suitable examples. [7] b) Compare and contrast free space management and swap space management. [3]</p>	CO4	L3 L3																												
10	<p>Consider the following snapshot of a system. [10]</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Process</th> <th>Allocation</th> <th>Max</th> <th>Available</th> </tr> <tr> <th>A B C D</th> <th>A B C D</th> <th>A B C D</th> <th></th> </tr> </thead> <tbody> <tr> <td>P0</td> <td>0 0 1 2</td> <td>0 0 1 2</td> <td>15 2 0</td> </tr> <tr> <td>P1</td> <td>1 0 0 0</td> <td>1 7 5 0</td> <td></td> </tr> <tr> <td>P2</td> <td>1 3 5 4</td> <td>2 3 5 6</td> <td></td> </tr> <tr> <td>P3</td> <td>0 6 3 2</td> <td>0 6 5 2</td> <td></td> </tr> <tr> <td>P4</td> <td>0 0 1 4</td> <td>0 6 5 6</td> <td></td> </tr> </tbody> </table> <p>Solve the following questions using the banker's algorithm: a. What is the content of the matrix <i>Need</i>? Is the system in a safe state? b. If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?</p>	Process	Allocation	Max	Available	A B C D	A B C D	A B C D		P0	0 0 1 2	0 0 1 2	15 2 0	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		CO5	L3
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11	<p>Write a short note on a) Implementation of Access Matrix [5] b) Capability-Based Systems [5]</p>	CO5	L2																												