VR Siddhartha Engineering College
Department of Information Technology

INFORMATION TECHNOLOGY

17IT3305: OPERATING SYSTEMS ASSIGNMENT-II QUESTIONS
A.Y:2021-22

<table>
<tr><th colspan="2">Question No.</th><th>Question</th><th>Course Outcome</th><th>BTL</th></tr>
<tr><td>1.</td><td>a</td><td>What is Safe sequence?</td><td>CO3</td><td>K2</td></tr>
<tr><td></td><td>b</td><td>Assume that we have following resources:
➢ 5 tape drives
➢ 2 graphic displays
➢ 4 Printers
➢ 3 disks
We can create a vector representing our total resources: Total = (5, 2, 4, 3). Consider we have already allocated these resources among four processes as demonstrated by the following matrix named Allocation
<table><tr><th>Process Name</th><th>Tape Drives</th><th>Graphics</th><th>Printers</th><th>Disk Drives</th></tr><tr><td>Process A</td><td>2</td><td>0</td><td>1</td><td>1</td></tr><tr><td>Process B</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Process C</td><td>1</td><td>0</td><td>1</td><td>1</td></tr><tr><td>Process D</td><td>1</td><td>1</td><td>0</td><td>1</td></tr></table>The vector representing the allocated resources is the sum of these columns:

Allocated = (4, 2, 2, 3).

The need matrix is given by
<table><tr><th>Process Name</th><th>Tape Drives</th><th>Graphics</th><th>Printers</th><th>Disk Drives</th></tr><tr><td>Process A</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Process B</td><td>0</td><td>1</td><td>1</td><td>2</td></tr><tr><td>Process C</td><td>3</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Process D</td><td>0</td><td>0</td><td>1</td><td>0</td></tr></table></td><td>CO3</td><td>K3</td></tr>
</table>

		Implement bankers algorithm for the given problem instance and check whether the system is in safe and if the system is safe generate safe sequence.		
2	a	What is Deadlock and what are the necessary conditions for the deadlock?	CO3	K1
	b	Briefly discuss how deadlocks can be prevented.	CO3	K2
3	a	Compare and contrast internal fragmentation with external fragmentation.	CO3	K2
	b	Summarize the concepts of Paging with necessary hardware.	CO3	K2
4	a	List and explain the methods to recover from deadlock.	CO3	K2
	b	Apply Deadlock detection algorithm to the following system state and check whether deadlock exists or not. Available = (2 1 0 0) R={A, B, C, D}, P={P0, P1, P2} Request = $\begin{pmatrix} 2 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 2 & 1 & 0 & 0 \end{pmatrix}$ Allocation = $\begin{pmatrix} 0 & 0 & 1 & 0 \\ 2 & 0 & 0 & 1 \\ 0 & 1 & 2 & 0 \end{pmatrix}$.	CO3	K3
5	a	What is page fault and what are the steps to handle page fault?	CO3	K2
	b	A system uses 3 page frames for storing process pages in main memory. Assume that all the page frames are initially empty. What is the total number of page faults that will occur while processing the page reference string given below by implementing First in First out (FIFO) page replacement policy, Optimal and LRU Page Replacement algorithms? 4 , 7, 6, 1, 7, 6, 1, 2, 7, 2 Analyze the above algorithms in terms of page faults.	CO2	K4
6.	a	List and explain the strategies to select free hole in dynamic memory allocation	CO3	K2
	b	Consider the following segment table	CO3	K3

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

		Compute the physical addresses for the following logical addresses? a. 0, 430 b. 1, 10 c. 2, 500 d. 3, 400 e. 4, 112		