



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Third Semester

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

U18AII3203:Operating System

COURSE OUTCOMES

CO1: Apply the concepts of CPU scheduling and Process synchronization

CO2: Experiment creation of different virtual machines in a hypervisor

CO3: Simulate the principles of memory management

CO4: Examine the features of various open source operating systems

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|--|-----|----|
| 1. Distinguish between client server and peer-peer models. | CO1 | K2 |
| 2. Compare and contrast DMA and Cache memory. | CO1 | K2 |
| 3. What are the differences between user level threads and kernel level threads? Under what circumstances is one type better than the other? | CO2 | K1 |
| 4. Define Critical Section Problem. | CO2 | K1 |
| 5. What are the methods for handling deadlocks? | CO3 | K1 |
| 6. Why are page sizes always a power of 2? | CO3 | K2 |
| 7. Write a Unix command to store the total number of files present in the particular directory and write a Unix command to check whether the given date is "Monday". | CO4 | K3 |
| 8. What are permissions and user grants in the unix file systems? | CO4 | K3 |
| 9. Write the syntax for compiling a C program using make command. | CO4 | K3 |
| 10. List the running processes and display the process ID for your terminal and kill a process and display the CPU resource utilization. | CO4 | K3 |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|----|-----|----|
| 11. a) Describe the operating system operations in detail. Justify the reason why the lack of a hardware supported dual mode can cause serious shortcoming in an operating system | 8 | CO1 | K2 |
| b) Illustrate the various types of system calls for each services of operating system with an example for each. | 8 | CO1 | K2 |
| 12. a) What is race condition? Describe a solution to the Dining philosopher problem so that no races arise. Explain the critical section problem and solution to critical section problem. | 16 | CO2 | K3 |
| 13. a) Example: Consider a system that contains five processes P1, P2, P3, P4, P5 and the three resource types A, B and C. Following are the resources types: A has 10, B has 5 and the resource type C has 7 instances. | 8 | CO3 | K3 |

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	0	1	0	7	5	3	3	3	2
P2	2	0	0	3	2	2			
P3	3	0	2	9	0	2			
P4	2	1	1	2	2	2			
P5	0	0	2	4	3	3			

Answer the following questions using the banker's algorithm:

1. What is the need matrix?
2. Determine if the system is safe or not and give the safe sequence if available.
3. What will happen, when the system accept immediately, the resource request (1, 0, 0) for process P1?

b) Write about any two structures of the page table. 8 CO3 K3

14. a) Explain about various types of processes in Unix operating system 16 CO4 K2

15. a) Consider the following CPU processes with Burst time (in mill seconds) and Priority as given below 16 CO2 K3

i)

Process	Burst Time	Arrival time
P1	5	0
P2	24	3
P3	16	2
P4	10	1
P5	3	3

Calculate the average waiting time and turnaround time for First-Come, First-Served Scheduling

ii)

Process	Burst Time	Priority	Arrival time
P1	6	2	0
P2	12	4	2
P3	1	5	3
P4	3	1	0
P5	4	3	1

Calculate the average waiting time and turnaround time for for Priority Scheduling (Highest priority-5)

16 a) Page reference String is given in sequence as
6,1,2,3,2,4,3,6,4,3,4,1,2,3
and frame size is 3. Calculate hit ratio and page fault ratio using LRU ,Optimal,
FIFO page replacement techniques

16 CO3 K3
