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**Presidency University**

**Bengaluru**

 **School Of Computer Science and Engineering & Information Science**

**Summer term End-Term Examinations, Aug 2024**

**Date**: 08.08.2024

**Time**: 9.30 AM- 12.30 PM

**Max Marks**: 100

**Weightage**: 50%

**Odd Semester**: 2023 - 24

**Course Code**: CSE3120

**Course Name**: Operating Systems

**Department:** CSE

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1 | 1. What is Operating Systems in view of user and system? Explain.
 | 4 | CO1 | L1 |
| 1. Explain the dual mode operation of Operating Systems with a neat diagram.
 | 6 | CO1 | L2 |
| 1. What are System calls? Explain the different types.
 | 10 | CO1 | L3 |
| OR |
| 2 | 1. Explain System programs with appropriate example.
 | 4 | CO1 | L1 |
| 1. List and explain the design goals of Operating Systems.
 | 6 | CO1 | L2 |
| 1. Describe the Architecture of a traditional Linux operating system with a neat diagram.
 | 10 | CO1 | L3 |

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| --- | --- | --- | --- | --- |
| 3 | 1. What is Process Control Block? Explain the information maintained in it.
 | 4 | CO2 | L1 |
| 1. Describe Context Switch in Operating Systems with a neat diagram
 | 6 | CO2 | L2 |
| 1. For blow processes compute the average waiting time throughput using Round Robin (time quantum=2 MS) and FCF Scheduling algorithms

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P0 | 0 | 9 |
| P1 | 0 | 5 |
| P3 | 2 | 6 |
| P4 | 3 | 7 |

 | 10 | CO2 | L3 |

OR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 1. Define Process. Explain the different states of a process with a neat diagram.
 | 4 | CO2 | L1 |
| 1. Describe the implementation of Inter process Communication using shared memory.
 | 6 | CO2 | L2 |
| 1. Calculate Average Waiting Time and Average Turnaround time for the given system scenario if it follows SRTF algorithms.

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time(in MS) | Burst Time(in MS) |
| P1 | 0 | 21 |
| P2 | 1 | 6 |
| P3 | 2 | 2 |
| P4 | 0 | 1 |
| P5 | 3 | 5 |

 | 10 | CO2 | L3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 5 | 1. What are cooperative and Concurrent Processes? Explain with example
 | 4 | CO3 | L1 |
| 1. Define Critical Section (CS)? Discuss about the necessary conditions satisfied by CS solutions.
 | 6 | CO3 | L2 |
| 1. What is Dining philosopher problem? Explain the algorithm with detail steps.
 | 10 | CO3 | L3 |

OR

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| --- | --- | --- | --- | --- |
| 6 | 1. What is Deadlock? Explain the necessary conditions for Deadlock.
 | 4 | CO3 | L1 |
| 1. Describe the steps involved in deadlock recovery in brief.
 | 6 | CO3 | L2 |
| 1. Determine whether the following system is safe using Banker's Algorithm. If the request form P1 arrives for (1 0 2) can be granted immediately or not.

|  |  |  |  |
| --- | --- | --- | --- |
| Process | AllocationA B C | MaxA B C | AvailableA B C |
| P0 | 0 1 0 | 7 5 3 | 3 3 2 |
| P1 | 2 0 0 | 3 2 2 |  |
| P2 | 3 0 2 | 9 0 2 |
| P3 | 2 1 1 | 2 2 2  |

 | 10 | CO3 | L3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 7 | 1. Write a program to demonstrate to creating a new process and waiting for a process
 | 4 | CO3 | L1 |
| 1. Write a bankers algorithm for deadlock avoidance
 | 6 | CO3 | L2 |
|  C:\Users\Admin\Downloads\WhatsApp Image 2021-12-27 at 10.46.05.jpegAbove RAG depicts the current situation in a system. [10] 1. Mention the number of request edges and allocation edges. [2]
2. Mention the different resources types and their instances. [2]
3. Mention the number of cycles. [2]
4. Find out whether a deadlock exists or not. If yes, mention the number and names of the processes involved in the deadlock. If no, justify the answer. [4]
 | 10 | CO3 | L3 |

OR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 8 | Answer the following questions using the banker’s algorithm:1. What is the content of the matrix Need? [6]

C:\Users\Admin\Desktop\Capture.JPG | 4 | CO3 | L1 |
| 1. Is the system in a safe state? [3]
 | 6 | CO3 | L2 |
| 1. If a request from thread T1 arrives for (0,4,2,0), can the request be granted immediately?
 | 10 | CO3 | L3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 9 | 1. What are the design goals of Operating Systems explain any two.
 | 4 | CO1 | L1 |
|

|  |
| --- |
| 1. Recognise different technologies in the different generations of OS.
 |

 | 6 | CO1 | L2 |
| 1. Discuss in detail about the operating system structure of MS DOS, UNIX, layered and Microkernel with neat diagrams.
 | 10 | CO1 | L3 |

OR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10 | 1. What are threads? Explain the different threading models.
 | 4 | CO2 | L1 |
| 1. Explain briefly the different threading issues.
 | 6 | CO2 | L2 |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Calculate Average Waiting Time, Average Turnaround time for the given system scenario if it follows SJF preemptive algorithms.

|  |  |  |
| --- | --- | --- |
| Process | AT(ms) | BT(ms) |
| P1 | 0 | 12 |
| P2 | 2 | 7 |
| P3 | 2 | 5 |
| P4 | 3 | 2 |
| P5 | 4 | 3 |

 |

 | 10 | CO2 | L3 |