PMAS Arid Agriculture University Rawalpindi

# University Institute of Information Technology

Final-Term Spring 2023 (Theory)

# BSCS-4th Semester

**Operating System – Credit Hours:** 4(3-3)

# CS-583

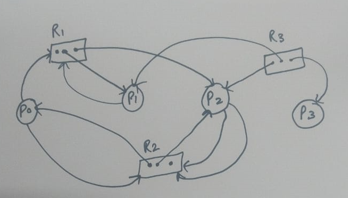
**Registration No.**

# Read all questions carefully and avoid irrelevant details.

**Total Time: 120 Minutes Maximum Points: 30**

# Q1. Answer the following questions: [5+5]

1. Consider the resource allocation graphs given below and find if the system is in a deadlock state otherwise finds a safe sequence. Also find the availability of resources.



1. Consider a situation where we have a file shared between many people. If one of the person tries editing the file, no other person should be reading or writing at the same time, otherwise changes will not be visible to him/her. By considering the above scenario, identify problems and how to solve these problem by using semaphore?

**Q2:** Calculate using Banker’s algorithm whether the system is in safe state or not by considering the following situation: **(10)**

4 processes, 4 resources

a. 10 instances b) 6 instances c) 12 instances d) 4 instances

Process 1 initially needs resources: a, b, c, d = 0, 0, 0, 0 respectively.

Available resources: a, b, c, d = 2, 1, 4, 3 respectively. Snapshot at time to:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Process | Allocation | | | | Max Need | | | | Remaining Need | | | | Available | | | |
|  | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| P1 | 3 | 2 | 1 | 0 | 3 | 2 | 1 | 0 |  |  |  |  |  |  |  |  |
| P2 | 1 | 2 | 4 | 1 | 1 | 4 | 5 | 4 |  |  |  |  |  |  |  |  |
| P3 | 2 | 0 | 2 | 0 | 4 | 2 | 12 | 4 |  |  |  |  |  |  |  |  |
| P4 | 2 | 1 | 1 | 0 | 4 | 2 | 2 | 4 |  |  |  |  |  |  |  |  |

**Q3.** Consider the following five processes each having its own unique burst time and arrival time. Priority of each process is also mentioned. Make the Gantt chart and calculate Completion time (CT), Turnaround Time (TAT) and waiting time (WT), and average wait time by using

# SJF (ignore priority)

1. **Priority Scheduling Algorithm**. (higher the number higher the priority) **[5+5]**

|  |  |  |  |
| --- | --- | --- | --- |
| Priority | Process | Burst time | Arrival time |
| 10 | P1 | 6 | 2 |
| 30 | P2 | 2 | 5 |
| 20 | P3 | 8 | 1 |
| 40 | P4 | 3 | 0 |
| 50 | P5 | 4 | 4 |

# Good Luck 

NOTE: Please mention Name and Signature of each Instructor at the end or back of the question paper (compulsory). Instructor Name 1:

Instructor Name 2:

Instructor Name 3: