**Department of Computer Science & Engineering**

**University of Asia Pacific (UAP)**

**Program: B.Sc. in Computer Science and Engineering**

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| **Final Examination** | **Spring 2021** | **4th Year 1st Semester** |
| **Course Code: CSE 405** | **Course Title: Operating Systems** | **Credits: 3** |
| **Full Marks: 120\* (Written)** |  | **Duration: 2 Hours** |
| \* Total Marks of Final Examination: 150 (Written: 120 + Viva: 30) | | |
| **Instructions:**   1. There are **Four (4)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins. 2. Non-programmable calculators are allowed. | | |

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| **1.** | **a)** | Take your student ID, then take the reverse string of your student ID. Now append them. Now Suppose this represent the page requests for a system Now, apply all the three page replacement algorithms on this scenario, where window size = 3, and analyze which algorithm is better best and explain why. | 30 |
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| **2.** | **a)** | Suppose, there are 5 processes *P*0 through *P*4; 3 resource types: *P* (11 instances), *Q* (6 instances), and *R* (8 instances)  Snapshot at time *T*0:  *Allocation Max*  *P Q R P Q R*  *P*0 1 2 1 8 6 4  *P*1 3 1 1 4 3 3  *P*2 4 1 3 9 1 3  *P*3 3 2 2 3 3 3  *P*4 1 1 3 5 4 4  Here, Available = the last three digits of your ID, BUT, mod each digit with 3. For example of the last 3 digit of your Id is 198, them Available = 102, (1%3 = 1, 9%3 = 0, 8%3 = 2). Now, perform Bankers and determine if there is any Deadlock present in this scenario. | 30 |
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| **3.** | **a)** | |  |  |  | | --- | --- | --- | | Process | Burst time | Priority | | P | 3 | 8 | | Q | 2 | 5 | | R | 7 | 5 | | S | 5 | 2 | | t | 12 | 1 |   Consider the given scenario. Now, apply pre-emptive priority scheduling and shortest job first for the given scenario and prepare the gantt chart and calculate the average waiting time. | 20 |
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|  | **b)** | Why do we need inode number in a file system? Explain. | 10 |
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| **4.** | **a)** | What are the different states of a process? Explain with diagram. | 15 |
|  | **b)** | Write short notes on: Web-based System, Client-Server System, Peer to Peer System. | 15 |
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| **OR** |  |  |  |
|  | **a)** | Explain the Services provided by Operating System | 15 |
|  | **b)** | Write short notes on: Different types of schedulers, Different types of process scheduling queues. | 15 |
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