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MCS-041

MASTER OF COMPUTER APPLICATION (MCA) (REVISED)

Term-End Examination

June, 2020

MCS-041 : OPERATING SYSTEM

Time : 3 Hours *Maximum Marks : 100*

Weightage : 75%

Note : *(i) Question No. 1 is compulsory.*

*(ii) Attempt any **three** questions from the rest.*

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1. (a) State Reader's/Writer's problem. Write and explain its semaphore based solution. 10

(b) What is the purpose of mutual exclusion algorithm ? Write and explain Ricart and Agrawala's mutual exclusion algorithm for distributed operating system. 10

(c) Explain page reference string. Consider the page reference string :

1, 2, 3, 3, 3, 4, 2, 2, 1, 5, 6, 2, 1

How many page faults would occur for the following algorithm, assuming 2 frames ?

10

(i) FIFO

(ii) LRU

(iii) Optimal Replacement

(d) What is the purpose of kernel layer in Windows 2000 O/S structure ? Briefly describe. 10

2. (a) Discuss the common failures in distributed systems. 10

(b) Explain SCAN and FCFS scheduling algorithm with suitable head-movement diagrams for the given example : 10

Starting cylinder is 100 in the direction of increasing cylinder number. Cylinder request :

150, 160, 194, 94, 56, 54, 38, 37, 18

3. (a) Define a Remote Procedure Call (RPC). Explain the implementation of RPC in a distributed system. 10

(b) What are the essential conditions for a deadlock to occur ? Explain with an example. Also write and discuss Banker's deadlock avoidance algorithm. 10

4. (a) Explain Take-Grant model for security in an operating system. Give an example to illustrate the model. 10

(b) Explain the paging address translation by direct mapping and associative mapping. 10

5. Write short notes on any ***four*** of the following : 5 each

(a) Demand Paging and Demand Segmentation

(b) Redundant Array of Inexpensive Disks (RAID)

(c) Role Based Access Control

(d) Process States

(e) NTFS (New Technology File System)