MCS-041

MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)

Term-End Examination

December, 2021

MCS-041 : OPERATING SYSTEMS

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) Explain FCFS and SSTF disk scheduling algorithms. Calculate the total head movement with FCFS and SSTF for the following blocks :   10

    44, 60, 22, 90, 102, 40, 62, 70, 09

    Initially the head is on block no. 20. Draw the movement diagram also.

P. T. O.

    (b) Write and explain the Bell-La Padula model of security.   10

    (c) Describe the implementation of inter-process communication using shared memory and message passing with the help of suitable examples.   10

    (d) The following is the sequence of page requests :   10

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

    Assume that there are three frames. How many page faults will occur if the following algorithms are used to replace the pages ?

    (i)   FCFS

    (ii) LRU

    (iii) OPT

2. (a) Explain the booting process of WINDOWS 2000 operating system.   10

(b) With respect to multiprocessor synchronization, explain the following : 10

    (i)   Test and Set

    (ii) Compare and Swap

    (iii) Fetch and Add

3. (a) Discuss the following techniques which can be employed to decrease the impact of bus and memory saturation in bus-oriented system :   10

    (i)   Wider-bus technique

    (ii) Split Request/Reply protocols

  (b) What is mutual exclusion ? Explain with the help of an example. Explain the 'wait' and 'signal' operations of semaphore. Explain the solution to mutual exclusion using semaphore.   10

4. (a) Discuss the segmented paging and paged segmentation combined systems of memory management.   10

  (b) Discuss CPU scheduling in UNIX.   10

5. Write short notes on the following :   5×4=20

  (a) UNIX directory and file structure

  (b) Distributed shared memory

  (c) Rule-based access control (security model)

  (d) Virtual memory