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MCS–041

MASTER OF COMPUTER APPLICATIONS (MCA) (REVISED)
Term-End Examination
June, 2024
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) What is Deadlock ? Discuss the necessary and sufficient conditions for deadlock occurrence. Also, explain how the deadlock can be prevented. 10

   (b) What is a critical section in a program ? What are the properties of the code that form a critical section ? Briefly explain. 5

   (c) What are threads ? Why to use them ? Explain the two levels of threads namely system/kernel threads and user level treads. 5

(d) Consider the page reference string :

1, 2, 3, 4, 2, 4, 3, 1, 5, 3, 4, 2, 7, 8, 9, 5, 1

Calculate how many page faults would occur for LRU and FIFO page replacement algorithm, when the no. of frames given is 3. Assume that all the frames initially one empty. 10

(e) What is Remote Procedure Call (RPC) ? Describe the steps involved in the execution of a RPC. 10

2. (a) Explain the CPU-scheduling in UNIX Operating System. 5

(b) Explain briefly the kernel layer of Windows 2000. 5

(c) List and explain the design issues involved in distributed systems. 10

3. (a) How paging scheme solves the problem faced in variable size partitions of memory ? Explain its principle of operation and address translation scheme. 10

(b) Explain Access Matrix and Role-base Access control security models of an O/S. 10

4. (a) With the help of diagrams, describe crossbar and hypercube multiprocessor interconnection architectures. 10

   (b) List and explain any *five* functions of an operating system. 10

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

   (a) Semaphores

   (b) Segmented Paging

   (c) Scan and C-Scan disk scheduling algorithms

   (d) Real-time operating system