

MCA (Revised)

Term-End Examination

06716

June, 2016

MCS-041 : OPERATING SYSTEMS

Time : 3 hours

Maximum Marks : 100

(Weightage 75%)

Note : *Question no. 1 is compulsory. Attempt any three questions from the rest.*

1. (a) Differentiate amongst multiprogrammed, multiuser and multitasking operating systems. Also discuss the advantages and limitations of each operating system. 10

- (b) What is understood by the transparency issues in distributed operating system ? Explain all the transparency issues in brief. 10

- (c) Consider the following set of processes, with the lengths of the CPU burst time given in milliseconds :

<i>Processes</i>	<i>Burst Time</i>
P1	10
P2	6
P3	22
P4	13
P5	5

All five processes arrive at time 0, in the order given. Draw Gantt charts illustrating the execution of the processes using FCFS, SJF, and RR (quantum = 2) scheduling. What is the turnaround time of each process for each of the scheduling algorithms ? Also find the average waiting time for each algorithm.

10

- (d) Explain FCFS and SSTF disk scheduling algorithms. Consider the following disk block created at a time :

53, 95, 143, 41, 125, 16, 138, 72, 58

Assuming the disk head initially at block number 60, draw the scheduling chart for FCFS and SSTF algorithms.

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2. (a) Explain the concept of memory management in Windows 2000 or higher. 5
- (b) Illustrate a 3-dimensional hypercube system and describe its connection features. 5
- (c) Explain Ricart and Agrawala's mutual exclusion algorithm and how it is used to break the ties. 10
3. (a) What is the difference between a loosely coupled system and a tightly coupled operating system ? Explain with examples. 6
- (b) Why is a thread called a light weight process ? Differentiate between a process and a thread. List the data items associated with both process and thread. 7
- (c) What is the difference between security policy and security model ? Explain the access matrix model. 7
4. (a) The following is the sequence of page requests :
- 5, 3, 1, 3, 1, 3, 4, 1, 3, 4, 5, 2, 4, 5, 3
- Assume that there are 3 frames in memory. Illustrate the number of page-faults with the following page replacement algorithms : 10
- (i) FIFO
- (ii) LRU
- (iii) OPT

- (b) List and explain the four necessary conditions that must hold simultaneously for a deadlock to occur. Explain different ways to prevent a deadlock. 10
5. (a) Explain at least three techniques of implementing authentication. How is security ensured in Network OS ? 6
- (b) What are the different kinds of file permissions in UNIX OS ? Explain in brief. 8
- (c) What is understood by logical and physical address ? How does the memory separation help in forming a virtual memory system ? 6
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