

Total No. of Questions : 5] [Total No. of Printed Pages : 4

Roll No.

MCA-201

M. C. A. (Second Semester) EXAMINATION, June, 2008

OPERATING SYSTEM

(MCA-201)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *two* parts from each question. All questions carry equal marks.

Unit-I

1. (a) Describe the evolution of an operating system from simple batch processing to today's operating system with their advantages and disadvantages. 10
- (b) Describe the differences among short-term, medium term and long-term scheduling. 10
- (c) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds : 10

Process	Arrival Time	Burst Time
P ₁	0.0	8
P ₂	0.4	4
P ₃	1.0	1

R T O.

- (i) What is the average turnaround time for these processes with the FCFS scheduling algorithm ?
- (ii) What is the average turnaround time for these processes with the SJF scheduling algorithm ?

Unit - II

- 2. (a) What is paging ? Discuss under what circumstances page faults occur ? Discuss the actions taken by the operating system when a page fault occurs. 10
- (b) Consider the following page-reference string :
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
How many page faults would occur for the following replacement algorithms, assuming four frames ? 10
 - (i) FIFO replacement
 - (ii) LRU replacement
 - (iii) Optimal replacement
- (c) When virtual memory is implemented in a computing system, it carries certain costs and certain benefits. List those costs and the benefits. It is possible for the costs to exceed the benefit. Explain what measures you take to ensure that this imbalance does not occur ? 10

Unit - III

- 3. (a) What is the meaning of the term busy waiting ? What other kinds of waiting are there in an operating system ? Can busy waiting be avoided altogether ? Explain your answer. 10
- (b) What is monitor construct ? What additional synchronization mechanisms are required with monitor ? 10

- (c) Consider the following snapshot of system : 10

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Discuss the following questions using Banker's algorithm :

- What is the context of the matrix need ?
- Is the system in a safe state ?
- If process P₁ requests one additional instance of resource type A and two instance of resource type C, can the request be granted immediately ?

Unit - IV

- (a) What is file system ? Why do some systems keep track of a file, while others leave it to the user or simply do not implement multiple file types ? Which system is better ? 10

(b) Consider a file system on a disk that has both logical and physical block size of 512 bytes. Assume that the information about each file is already in memory. For each of the three allocation strategies (contiguous, linked and indexed) answer these questions : 10

 - How is the logical-to-physical address mapping accomplished in this system ? (For the indexed allocation, assume that a file is always less than 512 blocks long).

- (ii) If we are currently at logical block 10 (the last block accessed was block 10) and want to access logical block 4, how many physical blocks must be read from the disk ?
- (c) Suppose the head of a moving head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 53 and has just finished a request at track 35. If the queue of requests is kept in FIFO order :

98, 183, 37, 122, 14, 124, 65, 67

What is the total head movement to satisfy these requests for the following disk scheduling algorithm ? 10

- (i) FCFS
(ii) SSTF
(iii) SCAN
(iv) LOOK

Unit-V

5. (a) Explain the following performance evaluation technique : 10
- (i) bottlenecks and saturation
(ii) benchmarks
- (b) What are two differences between user-level threads and kernel-level threads ? Under what circumstances is one type better than the other ? 10
- (c) Compare and contrast the features of WINDOWS and LINUX operating system. 10