MCA (Revised)

07631

Term-End Examination

June, 2017

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) Explain FIFO, Optimal and LRU page replacement algorithms with an example reference string. Mention the merits and demerits of each of the above algorithms.   *10*

    (b) Explain the FCFS, preemptive and non-preemptive versions of SJF and Round Robin (time slice = 2) scheduling algorithms with Gantt charts for the four processes given. Compare their average turnaround and waiting time.   *10*

Process	Arrival Time	Burst Time (millisec)
P1	0	8
P2	1	4
P3	2	9
P4	3	5

(c) Explain the Bell – LaPadula model. Also describe the five components of an Information Flow model. *10*

(d) Consider the following snapshot of a system :

	Allocation			Maximum			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using Banker's algorithm : *10*

(i) Is the system in a safe state ?

(ii) If a request from P1 arrives for (1, 0, 2), can the request be granted immediately ? Show it.

2. (a) Describe the process states with the help of a state diagram. Define process control block and its role in the context of switching of the process. *10*

(b) Give the features of symmetric and asymmetric multiprocessing systems. *5*

(c) What is Remote Procedure Call (RPC) ? Explain how it works. *5*

3. (a) What are system calls ? How are system calls categorized ? Explain the sequence of system calls for copying one file to another (new) file. *10*

(b) Explain memory management in Unix system. *10*

4. (a) Discuss the following in brief : *10*

(i) File Attributes and Types

(ii) Sequential File Access

(iii) Direct File Access

(iv) Tree Structured Directories

(b) Describe the Access Matrix model used for protection in a computer system. Also explain the Biba Integrity Model for security. *10*

5. (a) Explain Lamport's Bakery Algorithm with an example. What is its drawback ? Explain. *10*

(b) Explain file system management in the Windows 2000 operating system. *10*