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10MCA35

## Third Semester MCA Degree Examination, June/July 2015

### Operating Systems

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1 a. List the essential properties of the following types of systems:
- i) Real time system
  - ii) Hand held system
  - iii) Distributed system
  - iv) Clustered system
- (12 Marks)
- b. List and explain operating system services. (08 Marks)
- 2 a. With the help of a state transition diagram, explain various states of a process. (06 Marks)
- b. Distinguish different types of schedulers. (06 Marks)
- c. Consider the following set of processes with the length of the CPU given in milliseconds:

Process	Burst time	Priority
P <sub>1</sub>	10	3
P <sub>2</sub>	1	1
P <sub>3</sub>	2	3
P <sub>4</sub>	1	4
P <sub>5</sub>	5	2

- i) Draw four Gantt chart using the following scheduling algorithms:  
i) FCFS ii) SJF iii) Priority iv) RR (quantum = 1).
  - ii) Find waiting time and turnaround time of each process.
  - iii) Which of the algorithms results in the minimum average waiting time? (08 Marks)
- 3 a. What is a thread? Explain the concept of multithreading and their various models. (10 Marks)
- b. What is a semaphore? Define wait and signal operations. (06 Marks)
- c. Explain multilevel feedback scheduling algorithm. (04 Marks)
- 4 a. What is a deadlock? What are the four conditions that cause dead lock? Explain. (10 Marks)
- b. Consider the following snapshot of a system:

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P <sub>0</sub>	0	0	1	2	0	0	1	2	1	5	2	0
P <sub>1</sub>	1	0	0	0	1	7	5	0				
P <sub>2</sub>	1	3	5	4	2	3	5	6				
P <sub>3</sub>	0	6	3	2	0	6	5	2				
P <sub>4</sub>	0	0	1	4	0	6	5	6				

Answer the following questions using banker's algorithm:

- i) What is the content of the matrix need?
- ii) Is the system in a safe state?
- iii) If a request from process P<sub>1</sub> arrives for (0 4 2 0), can the request be granted immediately? (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.

- 5** a. Describe both the internal and external fragmentation problems encountered in continuous memory allocation scheme. **(10 Marks)**  
b. Explain segmentation method of memory allocation. **(10 Marks)**
- 6** a. Discuss demand paged allocation scheme. **(10 Marks)**  
b. Consider the following page reference string:  
2 3 2 1 5 2 4 5 3 2 5 2  
How many page faults occur for the following replacement algorithms, assuming three frames? : i) FIFO ii) LRU iii) Optimal. **(10 Marks)**
- 7** a. What is a file? List and explain different file attributes and various operations on a file that could be performed. **(08 Marks)**  
b. Differentiate:  
i) Sequential and direct access method  
ii) Single level and two level directory structures. **(06 Marks)**  
c. Explain any two disk scheduling algorithms. **(06 Marks)**
- 8** a. What is access matrix? How is access matrix implemented? **(10 Marks)**  
b. Explain 3 main components of a Linux system with a neat diagram. **(10 Marks)**

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