

G 6161

M.E. DEGREE EXAMINATION, MAY/JUNE 2007.

First Semester

Computer Science and Engineering

CS 1603 — OPERATING SYSTEMS

(Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Which is advantageous to the user of a system? A stand alone machine of a time sharing system. Justify
2. Distinguish between preemptive and non preemptive scheduling.
3. Differentiate light weight and heavy weight process.
4. What is a critical section? Discuss.
5. What is demand paging?
When does thrashing occur? What is its effect?
6. What are the activities carried out by the file system on a file open request?
Describe the structure of a disk? What is the need for disk scheduling?
7. Distinguish between stateful and stateless servers.
8. Define the happened before relation. Give an example of a situation where this relation is used.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the characteristic features of (1) Main frame (2) Multiprocessor (3) Real time (4) Distributed system. (8)
- (ii) Apply preemptive SJF and FCFS scheduling. (8)

Process	Arrival time	Burst time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Find the average waiting time.

Which of these schemes perform better? Give a situation where the other scheme would have better performance.

Or

- (b) (i) What are the different levels of transparencies to be considered in design of distributed system? (8)
- (ii) Apply priority scheduling and RR (quantum = 3) scheduling. Find the average turn around time. (8)

Process	Burst time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

A smaller priority number implies a low priority. What are the limitations of priority based scheduling. Suggest a solution to overcome the limitation.

12. (a) (i) Explain how mutual exclusion can be implemented with Test and Set and Swap instruction. (10)
- (ii) Explain any two classical problems of synchronization. (6)

Or

- (b) (i) Explain how deadlock can be prevented. Write an algorithm for deadlock prevention. (8)
- (ii) Explain the process state diagram. (3)
- (iii) Apply Banker's algorithm. (5)

	Allocation				Max				
	A	B	C	D	A	B	C	D	
P0	0	0	1	2	0		0	1	2
P1	1	0	0	0	1		7	5	0
P2	1	3	5	4	2		3	5	6
P3	0	6	3	2	0		6	5	2
P4	0	0	1	4	0		6	5	6

Available			
A	B	C	D
1	5	2	0

Is the system in a safe state? If a request from P , arrives for $(0, 4, 2, 0)$? Can the request be granted immediately? Discuss

- (a) Explain the following with respect to paging environment :
- (i) Paging hardware and its working. (4)
- (ii) Sharing. (3)
- (iii) Memory Fragmentation (4)
- (iv) Find the number of page faults using FIFO and LRU (stack method). Let the number of frames be 3 and the reference string be $7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1$ (5)

Or

- (b) (i) Differentiate internal and external fragmentation with an example each. (4)
- (ii) Explain the following with respect to segmentation environment :
- (1) Segmentation hardware and its working. (4)
- (2) Sharing. (3)
- (iii) Find the number of page faults using optional and LRU (counter method). Let the number of frames be 3 and the reference string be $7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1$. (5)

14. (a) Explain any four algorithms for implementing disk scheduling with an example each. Analyse the performance of each of these algorithms. (16)

Or

- (b) (i) Explain the various allocation methods and their pros and cons. (10)
(ii) Explain how free space management can be implemented. (6)
15. (a) (i) Discuss the importance and types of event ordering in distributed systems. (8)
(ii) Explain any two approaches for implementing mutual exclusion in distributed systems. (8)

Or

- (b) (i) Explain how concurrency control is implemented in distributed system. (8)
(ii) Explain the bully and ring election algorithms. (8)
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