Reg. No. : | | | | | | | | | | | |

W 6124

M.E. DEGREE EXAMINATION, JANUARY 2008.

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. Define CPU utilisation. What would be the CPU utilisation if it is heavily loaded and when it is lightly loaded?

2. What is starvation? Suggest a technique for overcoming starvation.

3. Define and give an example for co-operating process.

4. Differentiate light weight and heavy weight process.

5. Differentiate physical address and logical address.

6. Differentiate internal and external fragmentation.

7. State how file protection can be achieved.

8. Differentiate look and scan scheduling.

9. What is access transparency?

10. What is a stateful file server? Give an example.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write short notes on distributed systems and real time systems. (5 + 3)

(ii) Apply FIFO and preemptive SJF scheduling algorithms and find the average waiting time and turnaround time. (4 + 4)

Job	Arrival Time	CPU bursts
A	0	10
B	1	8
C	3	12
D	4	4
E	6	10

Or

(b) (i) Explain the operating system structure of DOS and UNIX. (3 + 5)

(ii) Apply preemptive priority scheduling and find the average waiting time and turnaround time. (4)

Job	Arrival time	CPU bursts	Priority
A	0	10	4
B	1	8	2
C	3	12	6
D	4	4	1
E	6	10	5

(iii) Apply round robin scheduling and find the average waiting time and turnaround time. The time quantum is 3. (4)

Job	CPU bursts
A	7
B	10
C	9
D	8

12. (a) (i) Explain how mutual exclusion can be achieved using test and set and swap instruction. (10)

(ii) Explain any three classical problems of synchronization. (6)

Or

(b) (i) Explain the semaphore structure to overcome busy waiting. (6)

(ii) Explain the techniques for recovering from deadlock. (4)

(iii) Apply Banker's algorithm and find whether the system is in a safe state. Find the total number of resources in the system. (6)

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

13. (a) (i) Explain the implementation of the page table using TLB. (6)

(ii) If the memory map is as given apply first-fit, best-fit and worst-fit policy to accommodate the jobs A, B and C. (5)

OS

12 K (free)

in use

25 K (free)

in use

10 K (free)

in use

6 K (free)

Job	Memory
A	10 K
B	5 K
C	20 K

(iii) Apply FIFO and LRU (Stack method) page replacement algorithms and find the number of page faults. Use 4 frames. The reference string is 0, 1, 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 7, 3, 1, 2, 0, 2, 3. (5)

Or

(b) (i) Explain the segmentation method of memory management. (6)

(ii) Explain how sharing can be achieved in a segmentation environment. (5)

(iii) Apply optimal and LRU (counter method) page replacement algorithms and find the number of page faults. Use 4 frames. The reference string is 0, 1, 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 7, 3, 1, 2, 0, 2, 3. (5)

14. (a) (i) Explain the various directory structures. (8)

(ii) Explain the methods for implementing free space management. (8)

Or

(b) (i) Explain the different methods for allocating space on disk. (10)

(ii) Explain the methods for implementing directory. (6)

15. (a) (i) Explain the features that a naming system should satisfy. (8)

(ii) Explain the implementation of logical clocks. (8)

Or

(b) Explain the three approaches for implementing mutual exclusion in distributed systems.
