G 3533

M.C.A. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

MC 1655 — OPERATING SYSTEMS

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. "Multiprogramming increases CPU utilization" — Justify.

2. Draw the System structure of any one Operating System.

3. How is communication achieved in Client-server systems?

4. For the processes listed, in table 1 draw a chart illustrating their execution using Shortest Job First.

Process	Arrival Time	Processing Time
A	0.000	3
B	1.001	6
C	4.001	4
D	6.001	2

Table 1

5. Differentiate Dead lock and starvation Give an example.

6. Write the pseudo code for Wait and Signal semaphore Operations.

7. In Simple Paging scheme briefly describe the functions performed by the OS Software.

8. A file has fixed size of 15 byte records. Assuming the first record is record 1, the first byte of record 5 will be at what logical location? Give answers for both sequential access file and direct access file.

9. Write the main components of a Linux system.

10. On a System using fixed partitions with sizes 2^{16}, 2^{24}, 2^{32} how many bits must the limit register have?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What does the CPU do when there are no programs to run? (3)

(ii) Illustrate the CPU switching mechanism with a neat diagram (3)

(iii) Briefly explain the three major activities of an operating System with regard to Secondary storage management. (6)

(iv) What is the purpose of system calls? (4)

Or

(b) (i) Discuss the features of real time systems. Explain briefly. (6)

(ii) Explain briefly three major activities of an operating system with regard to process management. (6)

(iii) Differentiate symmetric multiprocessing and asymmetric multi processing. (4)

12. (a) For the processes listed in Table 1 of question 4. What is the turn around time and the average waiting time(both rounding to the nearest hundredth) using

(i) First Come First Served?

(ii) Shortest remaining time?

(iii) Round Robin (quantum = 2)?

(iv) Round Robin (quantum = 1)? (16)

Or

(b) Explain Co-operating Processes in detail : (16)

13. (a) (i) Describe the bounded buffer problem of Synchronization. (8)

(ii) What is a binary semaphore? Explain (8)

Or

(b) Write short notes on :

(i) Dead lock handling methods. (8)

(ii) Monitors. (8)

14. (a) (i) What are the major differences between Paging and segmentation? (4)

(ii) On a System using paging and segmentation, the virtual address space consists of up to 16 segments where each segment can be up to 216 bytes long. The hardware pages each segment into 512 byte pages. How many bits in virtual address specify the following :

- Segment Number
- Page Number
- Offset within page
- Entire virtual address. (8)

(iii) Prove that the page replacement strategy that suffers from Belady's anomaly cannot be optimal. (4)

Or

(b) What is thrashing? Write the causes of thrashing. Also explain page fault frequency in detail. (16)

15. (a) (i) What is the advantage of allowing non-file objects in the file system structure? (4)

(ii) Describe any two directory allocation methods in detail. (12)

Or

(b) (i) How is a file with two names different from having two copies of a file? (4)

(ii) Write about Linux's Security model in detail. (12)
