B 2152

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fifth Semester

Computer Science and Engineering

CS 333 — OPERATING SYSTEMS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between tightly coupled systems and loosely coupled systems.

2. What is multitasking?

3. State the function performed by a Short-term scheduler.

4. Describe the actions taken by a kernel to context-switch between processes.

5. Compare paging with segmentation with respect to the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses.

6. State why are page sizes always powers of two.

7. Is it possible for a process to have two working sets? One representing data and another representing code? Explain.

8. If the operating system were to know that a certain application is going to access the file data in a sequential manner, how could it exploit this information to improve performance?

9. Define mirroring in the context of disk reliability.

10. State the major components of LINUX operating system.

PART B — (5 × 16 = 80 marks)

11. (a) List and briefly discuss the responsibilities of the operating system in connection with

(i) Memory management (6)

(ii) File management. (6)

(iii) Disk management. (4)

Or

(b) List and discuss the types of system calls provided by the operating system under the following categories :

(i) Process Control (6)

(ii) File manipulation (5)

(iii) Device manipulation. (5)

12. (a) (i) With a neat sketch explain the various states of a process. (6)

(ii) List and discuss the pieces of information associated with a specific process that are contained in a Process Control Block. (10)

Or

(b) (i) Define the critical section problem. List and discuss the three requirements that a solution to the critical section problem must satisfy. (8)

(ii) What is dead lock? List and discuss the four conditions for dead lock. Diagrammatically illustrate deadlock with an example. (8)

13. (a) (i) With a relevant example discuss any one preemptive and non preemptive CPU scheduling algorithms. (8)

(ii) Discuss Multilevel Queue Scheduling and Multilevel Feedback Queue Scheduling algorithms. (8)

Or

(b) (i) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory? (10)

(ii) Why are segmentation and paging sometimes combined into one scheme? Discuss. (6)

14. (a)

(b)

15. (a)

(b)

14. (a) (i) Why page faults occur? Discuss the various techniques for handling page faults. (12)

(ii) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? (4)

Or

(b) (i) List and discuss the objectives of a file management system. (8)

(ii) Discuss the merits and demerits of supporting links to files that cross mount points (that is, the file link refers to a file that is stored in a different volume). (4)

(iii) What are the advantages of the variation of linked allocation that uses a FAT to chain together the blocks of a file? (4)

15. (a) (i) The Linux scheduler implements soft real-time scheduling. What features are missing that are necessary for some real-time programming tasks? How might they be added to the kernel? (12)

(ii) In what circumstances is the system-call sequence fork( ) exec ( ) most appropriate? When is vfork( ) preferable? (4)

Or

(b) Discuss the various techniques through which files can be allocated space on disk. Give relevant example and diagrammatic illustration. (16)
