16333(D)

M. Tech 1st Semester Examination

Operating System and Case Study

CSE1-515   DEC 2016

Time : 3 Hours   Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question each from Sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) Explain microkernel approach to the design of an operating system. Give its various advantages and disadvantages. (10)

   (b) List five services provided by the operating system. How each of these provides convenience to the user. Explain in which cases it is not possible for user level programs to provide these services. (10)

2. (a) How user level threads differ from those of kernel level threads? Give one example of each type. Also, explain the mapping between user level and kernel level threads. (10)

   (b) Give priority scheduling and multilevel queue scheduling algorithms for process scheduling. Take an example to elaborate. (10)

SECTION - B

3. (a) What is critical section problem? How it can be solved by semaphores? Use semaphore to solve producer-consumer problem? (10)

   (b) Consider the following four processes, with the length of the CPU burst given in milliseconds.

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

Calculate the average waiting time for

(i) Preemptive STF schedule

(ii) Non preemptive STF schedule. (10)

4. (a) Consider the following reference string: 7,0,1,2,0,3,0,4,2, 3,0,3,2,1,2,0,1,7,0,1

   Assume there are three frames which are initially empty. Using FIFO and LRU page replacement algorithms, determine the number of page faults for the reference string above. Provide necessary diagram for page frames. (10)

   (b) What is demand paging? Explain the basic method for implementing demand paging. Also explain thrashing and give method to avoid it. (10)

SECTION - C

5. (a) Consider the following disk queue with requests for 1/0 to blocks on cylinders 98,183,37,122,14,124,65,67 in that order. If the disk head is initially at cylinder 53, using FCFS algorithm find the total head movement in cylinders. Also provide the necessary diagram to show the head movement for the above queue. (10)

(b) Give three basic file allocation methods. How file allocation problem differs from free space management techniques? (10)

6. (a) In a file system, what are different access control methods? How directory structure helps in better organization and access control? (10)

(b) Explain in detail the system booting process. (10)

SECTION - D

7. (a) What are the phases in signaling process? Explain what is meant by the lifetime of a signal. (10)

(b) What is meant by signal catching function? What are the advantages of signal function? (10)

8. (a) How processes are created and managed in Unix? If a parent process is killed, how to ensure that its child processes are also cleaned up? (10)

(b) Explain the Unix file system. Also, explain the mount procedure. (10)

SECTION - E

9. (a) Differentiate with proper example between multiprogramming and time sharing.

(b) Differentiate between logical address space and physical address space.

(c) Why OPT page replacement policy gives the best performance in terms of page hits? What is the problem with this policy?

(d) Explain various Unix commands used for managing processes like creating, destroying, find process id, changing priority, crating child processes etc.

(e) Give various deadlock recovery techniques. (4×5=20)