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06CS53

Fifth Semester B.E. Degree Examination, May/June 2010
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the following terms :
i) Bootstrap program ii) Caching iii) Trap
iv) Job pool v) Symmetric multiprocessing. **(10 Marks)**

b. Explain two sets of operating system services that are helpful to user as well as efficient operation of system. **(05 Marks)**

c. Write and explain the sequence of system calls for copying a file to another (new) file. **(05 Marks)**

2 a. What is PCB? Enumerate and explain various fields in PCB. **(04 Marks)**

b. What is multithreading? Explain the benefits of multithreaded programming. **(05 Marks)**

c. Consider the following set of processes :

Process	Arrival time	Burst time
P_1	0	1
P_2	1	9
P_3	2	1
P_4	3	9

i) Draw Gantt charts showing the execution of these processes using FCFS, preemptive SJF, non-preemptive SJF and RR (Quantum – 1) scheduling schemes.
ii) Compute the turn around time and waiting time for each process for each of the schemes above.
iii) Compute the average turn around time and average waiting time in each scheme and thus find the best scheme in this particular case. **(11 Marks)**

3 a. Define race condition. List the requirements that a solution to critical section problem must satisfy. **(05 Marks)**

b. What are semaphores? Explain two primitive semaphore operations. What are the advantages of semaphore? **(07 Marks)**

c. Define the algorithms TestAndSet( ) and swap( ). Show that they satisfy mutual exclusion. **(08 Marks)**

4 a. Explain how resource-allocation graph is used to describe deadlocks. **(05 Marks)**

b. What are the different methods for handling deadlocks? Explain Banker's algorithm. **(11 Marks)**

c. "A safe state is not a deadlock state but a deadlock state is an unsafe state". Explain. **(04 Marks)**

PART – B

5 a. What do you mean by dynamic storage allocation problem? Explain possible solutions to this problem. **(04 Marks)**

b. Explain the concept of forward-mapped page table. **(04 Marks)**

c. 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. Assuming three frames, all initially empty, how many page faults would occur for :
i) LRU ii) FIFO iii) Optimal page replacement algorithms? Which of the algorithms is most efficient in this case? **(12 Marks)**

6 a. What is meant by 'consistency semantics'? Explain the consistency semantics as implemented in a modern O. S. **(07 Marks)**

b. With the help of a neat diagram, describe :
   i) Tree –structured directory
   ii) Acyclic – graph directory. **(08 Marks)**

c. Explain virtual file system(VFS). **(05 Marks)**

7 a. Suppose the position of cylinder is at 53. Sketch the graphical representation for the queue of pending requests in the order – 98, 183, 37, 122, 14, 124, 65, 67 for FCFS, SSTF and LOOK scheduling schemes. Give your comment on this scenario for the above schemes. **(12 Marks)**

b. Describe the access matrix model used for protection in a computer system. **(08 Marks)**

8 Write short notes on :
a. Components of Linux system
b. Processes and threads
c. Conflict resolution mechanism of Linux
d. Linux file system. **(20 Marl**

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