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06CS53

Fifth Semester B.E. Degree Examination, Dec. 2013/Jan. 2014
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain the storage device hierarchy, with a neat diagram. **(08 Marks)**

b. Explain the following in brief :
i) Real time embedded system
ii) Multimedia systems. **(06 Marks)**

c. Write the system call sequence to copy a file from source to destination. **(06 Marks)**

2 a. Explain the implementation of producer – consumer processes using bounded buffer in shared memory systems. **(08 Marks)**

b. Explain the different multithreading models, with neat sketches. **(06 Marks)**

c. Consider the following set of processes

Process	Arrival time (ms)	Burst time (ms)
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

Draw Gantt charts and calculate average waiting time and average turnaround time using non-preemptive SJF and preemptive SJF scheduling algorithms. **(06 Marks)**

3 a. Explain the critical section problem. list and explain the requirements to be met by a solution to critical section problem. **(06 Marks)**

b. Write and explain with respect to synchronization hardware
i) The definition of TestAndSet( ) instruction
ii) Mutual – exclusion implementation with TestAndSet( ). **(06 Marks)**

c. Explain the monitor solution to dining – philosopher problem. **(08 Marks)**

4 a. Explain the resource allocation graph with an example. **(04 Marks)**

b. Explain the Banker's algorithm for deadlock avoidance. **(10 Marks)**

c. Explain the following methods to recover from deadlock
i) Process termination
ii) Resource preemption. **(06 Marks)**

PART – B

5 a. Draw and explain the multistep processing of a user program. **(08 Marks)**

b. In the paging scheme with TLB, it takes 20 ns to search the TLB and 100 ns to access memory. Find the effective access time and percentage slowdown in memory access time if
i) Hit ratio is 80%
ii) Hit ratio is 98%. **(04 Marks)**

c. Prove that Belady's anomaly exists for the following reference string using FIFO algorithm when numbers of frames used are 3 and 4. 1, 2, 3, 4, 1, 2 5, 1, 2, 3, 4, 5. **(08 Marks)**

6 a. List the common file types with their usual extension and function. **(08 Marks)**

b. Explain the typical file – control block, with a neat sketch. **(06 Marks)**

c. Explain any two file allocation methods, in brief. **(06 Marks)**

7 a. With a neat sketch, explain the structure of moving – head disk mechanism. **(06 Marks)**

b. Suppose that a disk has 50 cylinders named 0 to 49. The read/ write head is currently serving at cylinder 15. The queue of pending requests are in order
4, 40, 11, 35, 7, 14
Show the graphical representation and calculate average head movement using C – SCAN and C – Look scheduling algorithms. **(08 Marks)**

c. Explain the following operations in access matrix with an example for each.
i) Copy
ii) Transfer
iii) Limited copy **(06 Marks)**

8 a. Explain the components of Linux system, with a neat diagram. **(06 Marks)**

b. Explain the following with reference to process management in Linux
i) Process identity
ii) Process context. **(08 Marks)**

c. With a neat diagram, explain the memory layout for ELF programs in Linux. **(06 Marks)**