06CS53

Fifth Semester B.E. Degree Examination, Dec.08/Jan.09
Operating System

Time: 3 hrs. Max. Marks:100

Note : ***Answer any FIVE full questions, answering at least Two from each part .***

PART - A

1 a. Define an Operating System. Discuss its role from different perspectives. **(07 Marks)**

b. List out the different services that an operating system provides. Explain. **(06 Marks)**

c. Explain the concept of virtual machines. Bring out its advantages. **(05 Marks)**

d. Differentiate between a trap and an interrupt. **(02 Marks)**

2 a. What is a process? Draw and explain the process state diagram. **(05 Marks)**

b. Discuss the operations of process creation and process termination in UNIX. **(07 Marks)**

c. Describe the implementation of IPC using shared memory and message passing. **(08 Marks)**

3 a. Why is a thread called a LWP? Describe any one threading model and cite an operating system which implements it. Also explain any one of the many threading issues. **(06 Marks)**

b. Consider the following data about processes

Process	Arrival Time	Burst Time	Priority
P_1	0	7	3
P_2	3	2	2
P_3	4	3	1
P_4	4	1	1
P_5	5	3	3

i) Draw charts to illustrate execution using SRTF, preemptive priority and RR (TS = 1msec).

ii) Compute waiting time in each of the cases.

iii) Which of them provide minimal average waiting time and turnaround time?

iv) Find out the time at which there are maximum numbers of processes in the ready queue in the above scenario? **(10 Marks)**

c. Consider a system running 10 I/0 bound tasks and one CPU bound task. Assume I/0 bound tasks issue an I/0 once for every msecs of CPU computing and that each I/0 operation takes 10msecs to complete. Also assume that the context switching overhead is 0.1msec. and that all processes are long running tasks. Comment on the CPU utilization for a RR scheduler when TS = 1msec and TS = 10msec. **(04 Marks)**

4 a. Define race condition. List the requirements that a solution to critical section problem must satisfy. **(04 Marks)**

b. Define the algorithms Test and Set ( ) and Swap ( ). Show that they satisfy mutual exclusion. **(06 Marks)**

c. Consider the following snap shot of resource – allocation at time t_1:

	Allocation	Request	Available
	A B C	A B C	A B C
P_0	0 1 0	0 0 0	0 0 0
P_1	2 0 0	2 0 2	
P_2	3 0 3	0 0 0	
P_3	2 1 1	1 0 0	
P_4	0 0 2	0 0 2	

i) Show that the system is not deadlocked by generating one safe sequence.
ii) At instance t2, P_2 makes one additional request for instance of type C. Show that the system is deadlocked if the request is granted. Write down the deadlocked processes. **(10 Marks)**

PART - B

5 a. Memory partitions of 100KB, 500KB, 200KB, 300KB, 600KB (in order) are available. How would first – fit, best – fit and worst – fit algorithms place processes of 212KB, 417KB, 112KB and 426KB (in order). Which algorithm makes the most efficient use of memory? **(06 Marks)**

b. Differentiate between internal and external fragmentations? How are they overcome? **(04 Marks)**

c. Consider the following page reference stream: 1 , 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for LRU, FIFO and Optimal replacement algorithms assuming 3 and 5 frames? Which one of the above is most efficient? **(10 Marks)**

6 a. What is a file? Describe the different access methods on files. **(07 Marks)**

b. What is file mounting? Explain. **(04 Marks)**

c. Draw a neat diagram and explain finked file allocation. Is FAT linked allocation? Discuss. **(09 Marks)**

7 a. A drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order is : 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance travelled (in cylinders) by the disk arm to satisfy the requests using algorithms FCFS, SSTF, SCAN, LOOK. Illustrate with figures in each case. **(12 Marks)**

b. Explain the access matrix model of implementing protection in operating systems. **(08 Marks)**

8 Write notes on :
a. Buddy system of memory management in UNIX.
b. Thrashing
c. Solution to bounded buffer problem using Semaphore.
d. Bad blocks on disks. **(20 Marks)**

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