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06CS53

Fifth Semester B.E. Degree Examination, June/July 2013
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 different view points that are used to understand the role of an operating system. **(05 Marks)**

b. Why is dual mode operation in operating systems required? Explain. **(04 Marks)**

c. Explain the salient features of
   i) Distributed operating systems
   ii) Real time operating systems. **(06 Marks)**

d. With examples, explain how system calls handle user applications. **(05 Marks)**

2 a. With illustrations, explain how processes are created and executed in an operating system. **(04 Marks)**

b. What is a thread? How does it differ from a process? Differentiate single threaded process and multithreaded process. **(06 Marks)**

c. For the following processes in ready queue, find
   i) average waiting time
   ii) average turn around time using the following scheduling algorithms and Gantt chart illustrations :

Process	Burst time (ms)	Arrival time	Priority
A	10	0	3
B	1	1	1(high)
C	2	2	3
D	1	3	4
E	5	4	2

   i) Shortest job first (preemptive and non –preemptive)
   ii) Priority
   iii) Round robin (q = 2).

(10 Marks)

3 a. What is critical section problem? Explain the requirements to be satisfied by any solution to critical section problem. **(04 Marks)**

b. Describe test and set and swap instructions and their use in synchronization of processes. **(05 Marks)**

c. What is a semaphore? How can it solve mutual exclusion problem? Explain bounded buffer problem using semaphore. **(06 Marks)**

d. Explain solution to dining philosophers problem using monitors. **(05 Marks)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

4 a. Define deadlock and explain the necessary conditions for deadlock situation to occur. **(05 Marks)**

b. Consider the following snapshort of a computing system :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

Answer the following questions using bankers algorithm :

i) What is the content of matrix need?

ii) Is the system in a safe state?

iii) If the request from process P_1 arrives for (0, 4, 2, 0), can the request be granted immediately? Will system be in a safe state? **(10 Marks)**

c. Discuss issues related with recovery from deadlocks. **(05Marks)**

PART – B

5 a. Explain internal and external fragmentation problem encountered in a contiguous memory allocation scheme. **(04 Marks)**

b. Consider the following page – reference string :
2 3 2 1 5 2 4 5 3 2 5 2.
How many page faults occur in the following replacement algorithms by assuming 3 page frames : i) FIFO ii) LRU iii) Optimal. **(09 Marks)**

c. What is virtual memory? How can it be implemented? What are its benefits? **(07 Marks)**

6 a. Explain the different approaches to managing free space on disk storage. **(10 Marks)**

b. What are the different file types? Give their functions along with one example for each type. **(10 Marks)**

7 a. Sketch how SSTF disk scheduling occurs for request queue of cylinder numbers :
55, 58, 39, 18, 90, 160, 150, 38, 184 when the head starts at 100. **(04 Marks)**

b. Describe the access matrix model used for protection in operating systems. **(08 Marks)**

c. Discuss the use of passwords as a mechanism for ensuring user authentication in operating system security. **(08 Marks)**

8 a. Explain the different components of a LINUX system. **(10 Marks)**

b. Discuss how memory management is dealt with in LINUX operating system. **(10 Marks)**

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