

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MID TERM TEST-2

SUMMER SEMESTER - JUNE 2016

B.Tech/ 5th Semester

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IT

COURSE CODE: 10B11CI511

MAX. MARKS: 50

COURSE NAME: Operating Systems

COURSE CREDITS: 4

MAX. TIME: 2 Hrs

Note: Please read all the instructions carefully.

Section-A: Attempt any Five Questions. Each Question Carry Two Marks [2 × 5 = 10]

1. Is it possible to have a deadlock involving only one single-threaded process? Explain your answer.
2. Why page are sizes always powers of 2?
3. Name two differences between logical and physical addresses.
4. Explain the difference between internal and external fragmentation.
5. Show the pictorial diagram for steps in DMA transfer.
6. Write the name of various Disk Scheduling algorithms.

Section-B: Attempt any Five Questions. Each Question Carry Three Marks [4 × 5 = 20]

7. List three examples of deadlocks that are not related to a computer system environment.
8. Consider a logical address space of 64 pages of 1024 words each, mapped onto a physical memory of 32 frames.
 - a. How many bits are there in the logical address?
 - b. How many bits are there in the physical address?
9. What is the optimistic assumption made in the deadlock-detection algorithm? How could this assumption be violated?
10. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?
11. Explain why mobile operating systems such as iOS and Android do not support swapping. Show how the swapping of two processes using a disk as a backing stores occur with the help of figure.
12. Compare the main memory organization schemes of contiguous-memory allocation, pure segmentation, and pure paging with respect to the following issues:
 - c. external fragmentation
 - d. internal fragmentation
 - e. ability to share code across processes

Section-C: Attempt all Questions [20 Marks]

13. What do you mean RAID structure? Show the various levels of RAID.
14. Consider the following segment table:

[4 Marks]

[5 Marks]

Segment	Base	Length
0	219	600
1	2300	14

2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

- 0,430
- 1,10
- 2,500
- 3,400
- 4,112

15. Consider the following snapshot of a system:

[6 Marks]

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:

- What is the content of the matrix **Need**?
- Is the system in a safe state?
- If a request from process P_1 arrives for (0,4,2,0), can the request be granted immediately?

16. Suppose that a disk 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 (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms?

[5 Marks]

- FCFS
- SSTF
- SCAN
- LOOK
- C-SCAN

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