

Second Year/ Third Semester

Subject : Operating System

FM : 60

Time : 3 hours

PM : 24

Year: 2066

Section: A

Attempt any two questions: (2x10=20)

1. Define the term semaphore. How does semaphore help in dining philosophers problem?
2. Explain how file allocation table (FAT) manages the files. Mention the merits & demerits of FAT system. A 200 GB disk has 1-KB block size, calculate the size of the file allocation table if each entry of the table to be 3 bytes.

OR

Suppose that a disk has 100 cylinders, numbered 0 to 99. The drive is currently serving a request at cylinder 43, & previous request was at cylinder 25. The queue of pending request, in FIFO order is: 86, 70, 13, 74, 48, 9, 22, 50, 30

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending request for each of the following disk scheduling algorithms?

- a) FCFS
 - b) SCAN
3. Write short notes on :
 - a) Least recently used page replacement algorithm
 - b) Segmentation
 - c) Associative memory

Section: B

Attempt any eight questions: (8 x 5=40)

4. What is an operating system? Differentiate between time sharing & real time operating system.
5. Why thread is necessary? In which circumstances user-level thread is better than Kernel level thread?
6. Explain about hierarchical directory system systems with diagrammatic examples.
7. How can you define the term process scheduling? Differentiate between I/O bound process & CPU bound process.
8. A system has two process & 3 resource s. Each process needs a maximum of two resources, is deadlock possible? Explain with answer.
9. What do you mean by interrupt? Explain the working mechanism of interrupt controller.
10. Define the term indefinite postponement. How does it differ from deadlock?
11. Explain the mapping of virtual address to real address under segmentation.
Compare the throughput (overall performance) of SCAN with SSTF.

Year: 2067

Section: A

Attempt any two questions: (2x10=20)

1. What is System Calls? Explain the system call flow with the help of a block diagram.

OR

What do you mean by file systems? What are the major difference between file system interfaces & file system implementation? Explain.

2. Write short notes on:
 - a. Disk Scheduling Algorithms.
 - b. Error Handling & Formatting.
 - c. File Operations
3. Consider the following page reference string ; 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 the LRU replacement, FIFO replacement, & optimal replacement algorithms? Assuming three, five, or seven frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each.

Section: B

Attempt any eight questions: (8 x 5=40)

4. Differentiate between personal computer operating systems & mainframe operating systems.
5. When do page fault occur? Describe the actions taken by an OS when a page fault occurs.
6. List four necessary conditions for deadlock. Explain each of them briefly what would be necessary (in the operating system) to prevent the deadlock.
7. Draw & describe the 3-state process model.
8. Does window have any concept of process hierarchy? How does parent control the child?
9. What is the problem with thread implementation in user space when any of the threads get blocked while performing I/O operation?
10. Explain why two level & scheduling is commonly used.
11. What are the main motivations & issues in primary memory management?
12. Explain the disk management with example.

Year: 2067

Section: A

Attempt any two questions: (2x10=20)

1. List the essential properties for the Batch-Oriented and Interactive operating system. For each of the following application which system (Batch or Interactive) is more suitable? State the reason.
 - a) Word processing.
 - b) Generating monthly bank statements
 - c) Computing pi to milling decimal places
 - d) A flight simulator
 - e) Generating mark statement by University

OR

"Using Semaphore is very critical for programmer" Do you support this statements? If yes, prove the statement with some fact. If not, put your view with some logical facts against the statement."

2. Round-robin scheduling behaves differently depending on its time quantum. Can the time quantum be set to make round-robin behave the same as any of the following algorithms?
If so how? Proof the assertion with an example.
 - a) FCFS
 - b) SJF
 - c) SRTN
3. A disk has 8 sectors per track and spins at 600 rpm. It takes the controller time 10 ms from the end of one I/O operation before it can issue a subsequent one. How long does it take to read all 8 sectors using the following interleaving system?
 - a) No interleaving
 - b) Single interleaving
 - c) Double interleaving

Section: B

Attempt any eight questions: (8 x 5=40)

4. What is critical section problem? Why executive critical section must be exclusive? Explain.
5. What must user program be prohibited from writing to the memory locations containing the interrupt vector?
6. What are the difference between the trap and interrupt? What is the use of each function?
7. What is deadlock? State the conditions necessary for deadlock to exit. Give reason, why all conditions are necessary.
8. A Computer with 32-bit address uses a two-level table. Virtual address are split into a 9-bit top level page table field, 11-bit second-level page table field and offset. How large the pages? How much maximum space required when pages tables loaded into memory of each entry required 4 byte.
9. What do you mean by memory fragmentation? Distinguish between the internal and external fragmentation.
10. Under what circumstances do page fault occur? Describe the action taken by operating system when page fault occurs.
11. How many bits would be needed to store the free-space list under the following condition if a bitmap were used to implement?
 - a) 500,000 blocks total and 200,000 free blocks.
 - b) 1,000,000 blocks total and 0 free blocks.Also find how much space is required if it need to be stored in memory.
12. Which one suited, polling/interrupt, for the following types of system? Give reason.
 - a) A system dedicated to controlling single I/O devices.
 - b) A work station running as heavily used web server.