MCA T115: OPERATING SYSTEM
OBJECTIVE TYPE QUESTIONS

Unit 1

1. Primary Purpose of OS is
   To make efficient use of computer resources
   To allow People to use the computer
   To keep system Programmers employed
   To make computer easier to use
2. Which of the following OS work in time critical environment?
   a) Batch OS
   b) Time Sharing OS
   c) Real Time OS
   d) Distributed OS
3. Which is not true about Distributed OS?
   Collection of computer systems dispersed remotely
   Loosely couple systems
   Processors vary in size and functions
   Do share a global clock and memory
4. Architectural support for multi programming is provided by
   a) Spooling
   b) DMA
   c) Time slicing
   d) None
5. System call
   Provides information between process and operating system
   Provides information between input output and memory
   Provides information between peripheral and computer
   Provides information to the system
6. Which is false regarding process
   A running instance of a program.
   A passive entity
   Status is maintained in PCB
   Only one process can run or any processor at a time but many can be ready and waiting
7. Which selects for among the processes that are ready to execute and allocate CPU to one of them?
   Long term scheduler
   Short term scheduler
   Medium term scheduler
   None
8. Which is the preemptive Scheduling algorithm?
   a) FCFS
   b) Round Robin
   c) SJF
   d) None
9. RR Scheduling is the preemptive version of
   FCFS
   FILO

SRTF

None

10. Throughput governs
    a) Efficiency of CPU
    b) User Services
    c) System Performances
    d) None

11. Turn amount time is

    Time to implement one interaction between user and process

    Time between submission of request by user and formulation of process response to it

    Time since in submission for processing to the time its results become available to the user

    None

12. Response time is

    Time to complete a job

    Time between submission of request by user and formulation of process response to it

    Time since in submission for processing to the time its results become available to the user

    None

13. Primary concern of batch processing is

    Avoiding CPU idle time

    Resource utilization

    Resource Sharing

    Meeting deadline

14. Spooling is introduced in

    Batch OS

    Multi Programming OS

    Real Time OS

    Distributed OS

15. Time sharing is associated with

    Batch OS

    Time Sharing OS

    Real Time OS

    None

16. Resource sharing across the network is concerned with
    a) Batch OS
    b) Time Sharing OS
    c) Real Time OS
    d) Distributed OS

17. Turn around time of any job in a Batch OS does not include

    Time until a batch Comes

    Time spent in executing all jobs of a batch

    Time spent in printing & sorting results belonging to different jobs

    Own execution time

18. ____ system call causes MS-DOS to reserve the space occupied by TSR

    fork system call

    exec system call

    terminate and stay resident system call

    exit

19. read, write , reposition, open, close are the system calls related to

    File Manipulation

Information Maintenance
Communication
None
20. In the layered approach of OS which of the following comes at the lowest level?
    a) User programs
    b) Device Drivers
    c) Virtual memory
    d) Hardware
21. Which is falls about virtual machine approach
    a) Virtual m/c provides interface same as base h/w
    b) Each process has a virtual copy of kernel
    c) Every user has an illusion that it has its own processor
    d) None
22. Main advantage of layered approach is
    a) Encapsulation
    b) Modularity
    c) User friendliness
    d) None
23. Shell acts as
    a) Resource locator
    b) Job controller
    c) Interpreter
    d) Providing utilities
24. _____ is not application software
    a) Word Processing
    b) UNIX
    c) Spreadsheets
    d) None
25. _____ is not a part of OS
    a) Supervision
    b) I/O Control Program
    c) Performance Monitor
    d) None

Unit 2

1. PCB is associated with
    a) Thread
    b) Program
    c) Process
    d) None
2. Waiting time is
    a) Amount of time a process waits in ready queue
    b) Interval from time of submission to time of its completion
    c) Interval from the time last character of a program is entered to the time last result appears on the terminal
    d) None
3. FCFS is
    a) Preemptive
    b) Non Preemptive

      c) Not Applicable

      d) None

4. Convey effect is shown in
   a) FCFS Scheduling
   b) SRTF Scheduling
   c) RR Scheduling
   d) Multilevel queue Scheduling

5. When time quantum is too large then RR Scheduling gets change to
   a) FCFS Scheduling
   b) SJF Scheduling
   c) Priority based Scheduling
   d) Multilevel queue Scheduling

6. Static and dynamic scheduling is a part of
   a) Hard RT Scheduling
   b) Soft RT Scheduling
   c) Multiple Processor Scheduling
   d) None

7. _____is not and algorithmic evaluation method?
   a) Deterministic Modeling
   b) System Modeling
   c) Queuing Modeling
   d) Simulations Modeling

8. _____Selects from among the processes that are spooled to disc for execution?
   a) Long term scheduler
   b) Short term scheduler
   c) Medium term scheduler
   d) None

9. _____ is not used during process termination?
   a) exit
   b) wait
   c) abort
   d) fork

10. Which is false about threads?
    a) Basic unit of CPU utilization
    b) A thread must be in exactly one task
    c) Threads are depended on one another
    d) each thread has its own stack and PC

11. Which threads are faster to switch among them
    a) user level thread
    b) kernel level thread
    c) shared threads
    d) None

12. Mail boxes are associated with
    a) Direct communication
    b) Indirect communication
    c) Both a) and b)
    d) None

13. Synchronization of type "rendezvous" is found in the queue having

   a) Zero capacity
   b) Bounded capacity
   c) Unbounded capacity
   d) None

.14. Preemption is not dell
   a) By Allowing System calls to be preemptible
   b) By making entire kernel preemptive
   c) Inserting preemption points at safer places
   d) None

15 Dispatch Latency is
   a) Time to dispatch a process after been executed
   b) Waiting time plus turn around time
   c) Time from the moment process becomes runnable to the moment it actually begins to run
   d) None

16. RMA (Rate Monotic Algorithm) is
   a) Dynamic preemptive scheduling Algorithm
   b) Based on static priority
   c) Based on task priority
   d) All of these

17. EDF (Earliest Deadline First) is
   a) Optimal Dynamic preemptive scheduling Algorithm
   b) Based on Dynamic priority
   c) Associated with hard RT Scheduling Algorithm
   d) All of these

18. Strategy of allowing processes that are logically runnable to be temporarily suspended is called
   a) Preemptive scheduling
   b) Non preemptive scheduling
   c) FCFS
   d) Non

19. Trace tapes are used in
   a) Deterministic Modeling
   b) System Modeling
   c) Queuing Modeling
   d) Simulations Modeling

20. _____is not true falls about kernel level thread (KLT)?
   a) All operations within kernel are executed by KLT
   b) KLTs are the only object scheduled within the system
   c) There exists only one KLT for each LWP
   d) Every KLT is multiplexed on the processor in the system

Unit 3

1 ___ is one that can affect or be affected by the other processes executing in the system.
   a) Thread
   b) Cooperative Process
   c) Independent Process
   d) None

2. A Critical Section is a program Segment
   a) Which should run in a certain specified amount of time

b) Which avoids deadlock

c) Where shared resources are accessed

d) Which must be enclosed by a pair of semaphore operations, P and V

3. To Solve Critical Section Problem for n Processes which of the following method is used?
   - a) Bakery Algorithm
   - b) Bankers Algorithm
   - c) Monitors
   - d) None

4. Deadlock is not characterized by:
   - a) Mutual Exclusion
   - b) Hold and wait
   - c) No Prevention
   - d) Circular Wait

5. At a particular time, the value of counting semaphore is 7 . The 20 P Operations and 15 V Operations wer complete on this semaphore .The resulting value of semaphore is :
   - a) 42
   - b) 2
   - c) 7
   - d)12

6. Consider a System having M resources of same type which are shared by 3 Processes A, B, C having Maximum demand of 3, 4, 6 respectively. For what value of M deadlock will not occur?
   - a) 7
   - b) 10
   - c) 13
   - d) 15

7. A Computer has 6 tape drives with n Processes competing for them .Each process may need 3 tape drives. The maximum value of n for which the system is guaranteed to be deadlock free.
   - a) 2
   - b) 3
   - c) 4
   - d) 1

8. The Directed graph used for deadlock detection is
   - a) Deadlock graph
   - b) Assignment graph
   - c) Wait for graph
   - d) None

9. Which of the following is not the method of recovering from deadlock?
   - a) Process Termination
   - b) Resource Preemption
   - c) Wait for graph
   - d) Segmentation

10. Spinlock is a type of
    - a) Semaphore
    - b) Critical Region
    - c) Monitor
    - d) None

11. Classical Problems of synchronization are
    - a) Producer and Consumer problem

b) Readers and Writers Problem
c) Dining – Philosophers Problem
d) All of these

12. Critical Region is represented as
   a) region when true v do S1;
   b) region : v when true do S1;
   c) region S1 when true v do S1;
   d) region v when true do S1;

13. Not True about Monitor is:
   a) High Level synchronization construct
   b) Is Characterized by a set of Programmer defined operators & declaration of variables
   c) Many processes at a time can be active within a monitor
   d) Contains Initialization Code

14. Philosopher i can be set to var state[i] =eating only if
   a) State[i mod 5] !=eating & State[i+1 mod 5] !=eating &
   b) State [i +1mod 5]! =eating & State[i+4 mod 5] !=eating &
   c) State[i mod 5] !=eating & State[i+2 mod 5] !=eating &
   d) None

15. Dining – Philosophers Problem is best solved by.
   a) Semaphore
   b) Critical Region
   c) Monitor
   d) None

16. A resource can be released only voluntarily by the process holding it, after that process has done its task this mechanism is called
   a) Mutual exclusion
   b) Hold and wait
   c) No Preemption
   d) Circular wait

17. If a P denotes a Process and R denotes Resource then in resource allocation graph
   a) Pi→Rj is called assignment edge
   b) Pi→Rj is called Request edge
   c) Rj→Pi is called Resource edge
   d) None

18. If a resource allocation graph does not has a cycle
   a) The system is deadlock free
   b) The system has deadlock
   c) The system may / may not have deadlock
   d) None

19. In bankers Algorithm which of the following data structures is not used
   a) Available
   b) Allocation
   c) Need
   d) None

20. In resource preemption which of the following issues need not to be address?
   a) Selecting a victim
   b) Rollback
   c) Starvation
   d) None

Unit 4

1. Address generated by CPU is .
    a) Logical/virtual Address
    b) Virtual**.**/Physical Address
    c) Physical/Virtual Address
    d) Virtual /Memory Address
2. Which Statement in False
    a) Memory is divided into no of fixed sized partitions
    b) Degree of multiprogramming is independently of no. of partition
    c) Each partition may contain exactly one Process
    d) None
3. Worst fit is
    a) Allocate the first hole that is big enough
    b) Allocate smallest hole that is big enough
    c) Allocate the largest hole that is big enough
    d) None
4. When free total memory space exist satisfy the request but is not contiguous then
    Internal Fragmentation occurs
    External Fragmentation occurs
    Compaction occurs
    None
5. Solution to the External Fragmentation is
    Compaction
    swapping
    Segmentation
    None
6. Logical Address is represented as
    a) <Selector, offset>
    b) <Page no, Page offset>
    c) <Segment no, offset>
    d) All of these
7. Which is not applicable for virtual memory?
    a) Virtual memory is a technique that allows execution of processes that may not be completely in memory
    b) It is a solution from memory storage limitations
    c) It is a separation of user logical memory from physical memory
    d) It is commonly implemented by swapping
8. Virtual memory is implemented using
    a) Demand paging
    b) Swapping
    c) Fragmentation
    d) None
9. Which of the following is not page replacement algorithm?
    a) FIFO
    b) LRU
    c) SRJF
    d) Optimal Algorithm

10. LFU and MFU algorithms are the schemes of
    a) LRU approximation algorithm
    b) Counting algorithm
    c) Optimal algorithm
    d) FIFO algorithm
11. To improve the I/O efficiency, I/O transfer between memory and disk are performed in units of
    a) Blocks
    b) Frames
    c) Sectors
    d) None
12. Logical file system uses
    a) Logical and physical Blocks
    b) directory structure
    c) Partitions
    d) None
13. _____ is not an allocation method
    a) Contiguous
    b) Linked
    c) Indexed
    d) Compaction
14. Clusters are introduced in
    a) Contiguous Allocation
    b) Linked Allocation
    c) Indexed Allocation
    d) Compaction Allocation
15. Unix follows
    a) Contiguous Allocation
    b) Linked Allocation
    c) Indexed Allocation
    d) None
16. Which is not recovery technique?
    a) Consistency checking
    b) Backup Store
    c) Hashing
    d) None
17. Seek time is
    a) Time for the disc are to move the had to cylinder containing desired sector
    b) Additional time waiting for the disk to rotate the desired sector to the disk head
    c) Time to seek the information from the block
    d) None
18. Disk formatting does not include
    a) Physical Formatting
    b) Logical Formatting
    c) Booting
    d) None
19. Section Slipping does not involve?
    a) An alternative to sector sparing
    b) Replacement of bad blocks
    c) Swapping of bad blocks is also called forwarding

     d) Involves some times repairing of blocks
20. Elevator Algorithm involves
     a) SSTF Scheduling
     b) SCAN Scheduling
     c) C-SCAN Scheduling
     d) LOOK Scheduling

Unit 5

1. Protection is not
     a) A mechanism for controlling the access of programs to the recourses defined by computer system.
     b) Provides means for specification of controls to be imposed
     c) Major of confidence that the integrity of a system and its data will be preserved
     d) None
2. Access matrix
     a) Is used to abstractly view the protection
     b) Rows represent objects
     c) Columns represent domains
     d) None
3. Allowing controlled change to the contents of access matrix requires the operation of
     a) Copy
     b) Owner
     c) Control
     d) All of these
4. Revocation of access rights arises which questions ?
     a) Immediate/ Delayed
     b) Selective / General
     c) Temporary/ Permanent
     d) All of these
5. _____ is a unique bit pattern that can be associated with each capability
     a) Key
     b) Block
     c) Back pointer
     d) None
6. Access Matrix is
     a) Sparse
     b) Symmetric
     c) Transitive
     d) None
7. Capability system that extends protection to user defined software objects
     a) UNIX
     b) MULTICS
     c) HYDRA
     d) None
8. Powerful protection kernel is being provided by
     a) HYDRA
     b) MS- DOS
     c) OS/2
     d) None

9. Program threats are
   a) Trojan Horses
   b) Trap Door
   c) 1) and 2) both.
   d) None
10. Grappling hook is a part of
    a) Worms
    b) Viruses
    c) Trojan Horse
    d) None
11. Virus
    a) is a complete & standalone program that detoriates system performance
    b) spawns copies of itself, using system resources and may lock out system use by all other processes
    c) is a fragment of code embedded in legitimate program
    d) None
12. Encryption of message M is defined as
    a) $E_k(D_k(M))=M$
    b) $D_k(E_k(M))=M$
    c) $E_{k1}(E_{k2}(M))=M$
    d) None
13. Which System call is not used to create a new process?
    a) fork
    b) exec
    c) execve
    d) None
14. Which is not Linux File System?
    a) VFS File System
    b) NFS File System
    c) Ex2fs File System
    d) POC File System
15. Networking in Linux kernel is implemented by
    a) Socket Interface
    b) Protocol drivers
    c) N/W Device Drivers
    d) All of these
16. set uid system call
    a) Provides super user privileges
    b) Provides authentication
    c) Allows a program to run with privileges different from those of the user running the program
    d) None
17. Which File System is provided by Windows NT?
    a) VFS File System
    b) NFS File System
    c) Ex2fs File System
    d) POC File System
18. In NTFS, All File System data structure updates are performed inside
    a) Blocks

    b) Partitions
    c) Transactions
    d) None
19. Stripeset is called
    a) RAID level 0
    b) RAID level 1
    c) RAID level 2
    d) None
20. PPTP is a protocol
    a) Is used to communicate between remote access server modules running on NT machines that are connected over the Internet.
    b) Used for PC LANs
    c) To access IBM mainframes & HP Printers connected directly to N/W.
    d) None

[Part I: Medium Answer Type Questions]

UNIT 1

1. What do you mean by an Operating System? What are the main functions of an Operating System?
2. Discuss a Brief comparison among Batch Processing, Multiprogramming, Time Sharing, Real Time and Distributed Operating System..
3. What do you mean by spooling? How it is different from buffering?
4. Discuss five major activities of an operating system in regard to process, file and resource management.
5. How virtual machines are useful in designing a system?
6. What are interrupts? Explain their significance. Also discuss the differences between Trap & Interrupts.
7. Why system calls are important in an interactive system? What is the use of fork() and exec() system calls?
8. Explain how protection is provided for the hardware resources by the operating system..
9. What do you mean by Microkernel? Explain its significance.
10. Define the term Process. **"A process is a passive entity."** Give your views about the statement with justification of your answer.
11. Briefly describe the various states a process can have? Also discuss the state transition diagram.
12. Write a short note on Process Control Block (PCB) by explaining its utility in process management.
13. What are the typical elements of a process image?
14. List at least 4 reasons for process termination. Also discuss the need for the suspend state?
15. Explain when a transition from Blocked state to Blocked/Suspend state occurs and vice versa. Also explain when a transition does from Ready state to Ready / Suspend state.

UNIT 2

1. What are schedulers? Discuss the various types of schedulers ?

2. Briefly discuss the criteria for CPU scheduling. Differentiate preemptive and non preemptive scheduling. What is dispatcher?
3. Explain following scheduling algorithms with the help of examples along with their advantages & disadvantages:
   a) First Come First Served (FCFS)
   b) Shortest Job First(SJF)
   c) Priority Scheduling
   d) Round Robin Scheduling
   e) Multilevel Feedback Queue Scheduling

4. .

	Arrival Time	Execution Time
P1	0	8
P2	0.4	4
P3	1	1

   Find Average Wait Time and Turnaround Time in FCFS, preemptive and non-preemptive SJF Scheduling.

5. .

	Arrival Time	Execution Time
P1	0	7
P2	2	4
P3	4	1
P4	5	4

   Find Wait Time and Turnaround Time in
   a) Preemptive and non-preemptive SJF Scheduling
   b) Round Robin Scheduling with Time Quantum=3
6. Consider the following set of Processes, with the Execution Times

Process	Execution Time
P1	10
P2	1
P3	2
P4	1
P5	5

   Processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.
   a) Draw Gantt charts illustrating the execution of these processes using FCFS, RR (quantum=3) scheduling.
   b) What is the turnaround time of each process in FCFS and RR scheduling algorithms?
   c) Which of the schedules results in the minimal average waiting time (over both the processes)?
7. What is meant by context switching in an OS?
8. What are threads? What is a lightweight process? What is a heavyweight process?
9. How different is a thread from a process?
10. What resources are used when a thread is created? How do they differ from those when a process is created?
11. Explain in detail the single thread and multithread process model with diagrams.

12. Compare user level and kernel level threads with necessary diagrams.

UNIT 3

1. What do you mean by Inter Process Communication?
2. Discuss the logical properties a communication link should have?
3. Give the major differences between Direct and Indirect Communication?
4. What is the concept of mailbox? Explain the role played by it in indirect communication.

5. What is race condition? How process synchronization is helpful to guard against race condition?
6. what are the requirements to solve the critical section problem?
7. Discuss bakery algorithm for multiple process solutions.
8. How special hardware instructions are useful in solving the critical section problem in multiprocessor environment?
9. What are Semaphores? How they are used in process synchronization?
10. Discuss Bounded Buffer problem of process synchronization.
11. Write short notes on the following:
    (i) Critical Region   (ii) Monitors
12. What is deadlock? Give necessary conditions which can arise deadlock situation in a system.
13. Explain the following in terms of deadlock avoidance:
    (i) Safe-state   (ii) Resource-Allocation graph algorithm
14. What is the difference among the dead lock avoidance, prevention and detection?
15. Discuss mutual exclusion and hold and wait conditions in context to deadlock Prevention.
16. Discuss How Deadlock can be detected If each resource has single instance and many instances?

UNIT 4

What do you mean by address binding? Differentiate logical address and physical address.
Consider a logical address space of 8 pages of 1024 words mapped onto a physical memory of 32 frames.
    a) How many bits are in the logical address
    b) How many bits are in the physical address
What is swapping in memory management? Why address binding is used in swapping?
Briefly describe first fit, best fit and worse fit strategies as memory allocation scheme. Which scheme should be used when by explaining their advantages & dissadvantages
What is the role of paging in memory management scheme?
Explain Belady's Anomaly.
Explain the concept of Reentrancy.
Write short notes on the following:
    (i) Virtual Memory   (ii) Demand Paging
9. Consider the following page reference string: (Assume 3 Frames set)
    1,2,3,4,2,1,5,6,2,1,2,3,7,6
    How many page fault would occur for LRU page replacement algorithm?

10. Consider the following page reference string: (Assume 4 Frames set)
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1
How many page faults would occur for FIFO page replacement algorithm?
What is the difference between indexed and indexed sequential file?
Explain the various directory structures.
What are the various file allocation methods ? Explain in detail?
What is mounting? Explain its significance?
Explain the layered organization of File System.

UNIT 5

What is Polling? Explain its significance.
What is DMA? Explain the steps followed during DMA transfer.
Discuss the Life-cycle of an I/O request.
What is Disk Scheduling? How seek time & rotational latency play a significant role in it?
Compare the performance of C-SCAN and SCAN scheduling, assuming a uniform
distribution of requests. Consider the average response time (the time between the
arrival of a request and the completion of the request's service), the variation in
response time, and the effective bandwidth. How does performance depend on the
relative sizes of seek time and rotational latency?
Briefly describe the goals of protection in an operating system.
What is the role of access matrix?
Explain the various schemes for revocation of access rights .
What are Bad Blocks? Explain the Schemes of OS to handle the bad blocks.
State the advantages of language based Protection approach in an operating system.
Discuss the levels of security measures for protecting the system.
Write short notes on the following:
(i) Password Vulnerabilities   (ii) One-Time Passwords
Discuss common program threats.
Briefly describe worms and viruses in terms of system threats.
Give a short note on Signature based detection and anomaly detection.
Briefly describe system call monitoring.
What is encryption? Briefly discuss the various encryption techniques for data
security.

[Part II: Long Answer Type Questions]

UNIT 1

Explain symmetric multiprocessing architecture. Describe differences
between symmetric and asymmetric multiprocessing.
Define the essential properties of the following operating systems:
a) Batch System   b)Time sharing   c)Real time
d)Distributed   e)Multiprogramming   f) Parallel
Explain in detail how interrupts are processed.
What are the system components of an operating system and explain them?
Explain various types of system calls used in an operating system.
A process completes its work and exits. What basic operations are needed to cleanup and
continue with another process?

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UNIT 2

What is the objective of time sharing? Explain scheduling queues in terms of CPU utilization.

Explain the various reasons involved in process creation and termination.

Discuss in detail the various techniques for evaluating CPU algorithms.

Discuss synchronization and buffering of messages in message-passing system.

Discuss in detail different type of multithreading models.

Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, A non preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.

b) What is the turnaround time of each process for each of the scheduling algorithms in part a?

c) What is the waiting time of each process for each of the scheduling algorithms in Part a?

d) Which of the schedules in part a result in the minimal average waiting time (over all processes)?

UNIT 3

What is critical section problem and explain two process solutions and multiple process solutions?

Explain usage and implementation of Semaphores in process synchronization.

What is the role of critical regions in process synchronization. Explain the solution of dining-philosopher problem by using monitors.

Discuss the Banker's Algorithm for deadlock-avoidance (specify both Safety algorithm and Resource-Request Algorithm).

Consider a system with a total of 150 units of memory, allocated to three processes as shown:

Process	Max	Hold
1	70	45
2	60	40
3	60	15

Apply banker's algorithm to determine it would be safe to grant each of the following requests.If yes, indicate a sequence of terminations that could be guaranteed possible.If no, show the reduction of the resulting allocation table.

a)A fourth process arrives with maximum memory need of 60 and initial need of 25 units.

b) A fourth process arrives with maximum memory need of 60 and initial need of 35 units.

Consider the following snap shot of a system having 5 processes (P0-P4) and 4
  resource types A, B, C,D

	Allocation A B C D	Max A B C D	Available 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 Banker's Algorithm:-
a) What is the content of matrix Need?
b) If a request from P1 arrives for (0, 4, 2, 0), Can the request be granted immediately?
   Give reasons.

UNIT 4

1. Explain the importance of memory protection. Discuss internal and external
   Fragmentation.
2. Explain the principles of combined paging and segmentation scheme.
3. Consider the following segment table:

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?
a) 0, 430   b) 1, 10
c) 2, 500   d) 3, 400
e) 4, 112
4. Explain the schemes for defining the logical structure of a directory.
5. 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 following replacement algorithms,
   assuming five frames? Remember all frames are initially empty, first unique pages
   will all cost one fault each.
   • LRU replacement
   • FIFO replacement
   • Optimal replacement
6. Discuss the relative merits of sector sparing and sector slipping.

UNIT 5

Suppose that a disk drive has 5,000 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?

a) FCFS
b) SSTF
c) SCAN
d) LOCK
e) C-SCAN
f) C- LOOK

How does DMA increase system concurrency? How does it complicate the hardware design?
Explain the various methods of implementing Access Matrix in an operating system.
Discuss the importance of language-based protection system. Describe compiler based enforcement under language based protection scheme.
Describe various types of user authentication techniques.
Explain in detail the various Computer- Security Classifications.

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