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QUESTION BANK (DESCRIPTIVE)

Subject with Code : Fundamentals of Operating Systems(18CI0601) **Course & Branch:** B.Tech – CSIT
Year & Sem: II- B.Tech&II-Sem **Regulation:** R18

UNIT –I

OPERATING SYSTEMS OVERVIEW , SYSTEM STRUCTURES

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| 1.a) Explain the various types of System calls with an example for each? | 5M |
| b) Discuss about the functionality of system boot with respect to operating system? | 5M |
| 2.a) Explain the operating system structures? | 6M |
| b) Difference between Monolithic kernel and Micro kernel? | 4M |
| 3.a) Explain the important services of an operating system? | 7M |
| b) Write a short note on system boot? | 3M |
| 4. Describe in detail about computing environments with neat diagram? | 10M |
| 5. Explain in detail about open source operating systems? | 10M |
| 6.a) Discuss about User and Operating System Interface? | 5M |
| b) Write a short note on System programs. | 5M |
| 7. What is operating system? Explain different types of operating system in detail? | 10M |
| 8. Explain how operating system services are provided by systemcalls? | 10M |
| 9. a) Discuss in briefly about Protection and Security? | 5M |
| b) Explain operating system operations? | 5M |
| 10.a) Difference between Kernel and Operating System. | 3M |
| b) Describe briefly the layers of operating system structures? | 7M |

1. What is an Operating system?
2. Define Kernel?
3. What are Batch systems?
4. How Dual- Mode Operation works?
5. What is meant by Time-sharing Systems?
6. What are the advantages of Multiprogramming?
7. What are Multiprocessor Systems & give their advantages?
8. List the services provided by an Operating System?
9. Define system calls.
10. What is Virtual Machine?

UNIT-II

PROCESS, THREADS ,CPU SCHEDULING

1. Discuss the different multithreading models along with their Issues? 10M
2. Consider the following five processes, with the length of CPU burst time given below:

Process	Burst Time	Priority
P1	8	4
P2	6	1
P3	1	2
P4	9	2
P5	3	3

10M

i) Consider a Gantt chart illustrating the execution of these jobs using FCFS, RR (quantum=1), non-preemptive priority & SJF CPU scheduling. Calculate the average waiting time and average turnaround time for each of the above scheduling algorithms.

3. Explain different types of CPU scheduling algorithms with an example? 10M

4.a) Discuss about the process concept in detail? 7M

b) Consider the following five processes, with the length of CPU burst time given below:

Process	Burst Time
P1	24
P2	3
P3	3

3M

i) Consider a Gantt chart illustrating the execution of these jobs using FCFS CPU scheduling.

ii) Calculate the average waiting time and average turnaround time.

5.a) Explain the process control block with a neat diagram. 4M

b) Describe the inter-process communication in client-server systems? 6M

6. Consider the following processes, with the length of CPU burst time given below:

Process	Burst Time	Priority
P1	6	3
P2	3	2
P3	9	4
P4	4	1

10M

i) Consider a Gantt chart illustrating the execution of these jobs using FCFS, non-preemptive priority & SJF CPU scheduling. Calculate the average waiting time and average turnaround time for each of the above scheduling algorithms.

7. Consider the following processes, with the length of CPU burst time given below:

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

10M

i) Consider a Gantt chart illustrating the execution of these job using FCFS, SJF, non-preemptive priority & Round Robin (quantum=1), CPU scheduling. Calculate the average waiting time and average turnaround time for each of the above Scheduling algorithm.

- 8. a) Explain in detail about operations of process? 5M
- b) What is CPU scheduling? Explain types of Scheduling and Scheduling Criteria in detail? 5M
- 9. a) What are Threads? Write about Types of Threads? 4M
- b) Discuss about Multilevel Queue Scheduling and First come First Serve with example? 6M
- 10. Discuss briefly about the Process scheduling? 10M

2MARKS:

1. Define process?
2. What is meant by the state of the process?
3. Define schedulers?
4. What requirement is to be satisfied for a solution of a critical section problem?
5. What is the sequence of operation by which a process utilizes a resource?
6. What are the types of scheduler?
7. Define Thread.
8. Define Time slice.
9. What does PCB contain?
10. What are the 3 different types of scheduling queues?

UNIT-III**PROCESS SYNCHRONIZATION ,DEADLOCKS**

- 1 a) Describe the banker's algorithm? 5M
- b) Consider the following snapshot of a system.

Process	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				

5M

Answer the following questions using banker's algorithm:

- 1) What is the content of the matrix used?
 - 2) Is the system in a safe state?
- 2 a) Explain in detail about Deadlock Avoidance ? 6M
- b) What are the Strategies for handling Deadlock? 4M
- 3 a) Discuss briefly about Deadlock Characterization. 5M
- b) Explain the methods for handling deadlocks. 5M
- 4 a) Explain the Deadlock Detection. 5M
- b) Explain about the Recovery from deadlock. 5M
- 5 Considering a system with five processes P₀ through P₄ and three resources of type A, B, C. Resource type A has 10 instances, B has 5 instances and type C has 7 instances. Suppose at time t₀ following snapshot of the system has been taken:

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

10M

- i) What will be the content of the Need matrix?
- ii) Is the system in a safe state? If Yes, then what is the safe sequence?

6	Explain in detail Classical problems of synchronization?	10M
7	a) What is Process synchronization? Explain Critical-section problem with solution?	5M
	b) Explain about Synchronization Hardware?	5M
8	a) Explain the solution for Dining-Philosophers Problem?	7M
	b) What is Semaphores and types of semaphores?	3M
9	a) Explain in detail about producer consumer problem?	7M
	b) Write the properties and limitations of semaphores?	3M
10	Explain Dead lock detection with Example?	10M

2 MARKS:

1. Define deadlock?
2. Give the condition necessary for a deadlock situation to arise?
3. Define race condition
4. What are the requirements that a solution to the critical section problem must satisfy?
5. Define Starvation in deadlock?
6. Define semaphores.
7. Name dome classic problem of synchronization?
8. Define ‘Safe State’?
9. What is critical section problem?
10. Define busy waiting and spinlock

UNIT-IV

MEMORY MANAGEMENT ,VIRTUAL MEMORY

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| 1. | Consider the following page reference string:1,2,3,4,2,1,5,6,1,2,3,7,6,3,2,1,2,3,6.How many page faults would occur for the LRU,FIFO,LFU and Optimal page replacement algorithms, assuming two and five frames. | 10M |
| 2. | a) Explain any two page replacement algorithms? | 5M |
| | b) Explain the concept of segmentation in detail? | 5M |
| 3. | a) Write about Contiguous memory allocation? | 5M |
| | b) Explain about demand paging? | 5M |
| 4. | What is Page replacement? Explain page replacement algorithms with example? | 10M |
| 5. | What do you mean by paging? Discuss in detail about structure of page tables with appropriate examples. | 10M |
| 6. | Difference between paging and segmentation? | 10M |
| 7. | Difference between External fragmentation and Internal fragmentation? How to solve the fragmentation problem using paging? | 10M |
| 8. | a) Consider the following page reference string 1,2,3,4,1,2,5,1,2,3,4,5.How many page faults would occur for the following replacement algorithms , assuming 3 frames?
i) LRU replacement ii) FIFO replacement iii) Optimal replacement | 6M |
| | b) Discuss swapping memory management? | 4M |
| 9. | What is paging? Explain in detail about paging? | 10M |
| 10. | a) Explain Structure of page table? | 6M |
| | b) Explain the concept of Virtual memory? | 4M |

2 MARKS:

1. Define Swapping
2. What is External Fragmentation?
3. What is Internal Fragmentation?
4. What are Pages and Frames?
5. What is the use of Valid-Invalid Bits in Paging?
6. What is the basic method of Segmentation?
7. What is Virtual Memory?
8. What is Demand Paging?
9. What is the basic approach of Page Replacement?
10. What is the various Page Replacement Algorithms used for Page Replacement?

UNIT-V

MASS-STORAGE STRUCTURE, FILE SYSTEM INTERFACE, FILE SYSTEM IMPLEMENTATION

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|-----|---|-----|
| 1. | Explain the different disk scheduling algorithms with neat diagrams. | 10M |
| 2. | 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 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?
i) FCFS ii) SSTF iii) SCAN iv) LOOK v) C-SCAN and vi) C-LOOK. | 10M |
| 3. | a) Compare the C-LOOK and C-SCAN disk scheduling algorithms. | 6M |
| | b) Write an elaborate note on RAID. | 4M |
| 4. | Consider a disk queue with requests for I/O to blocks on cylinders in the following order: 98,183,37,122,14,124,65,67 .The disk head is initially at cylinder 53.Discuss how the FIFO,SSTF,SCAN,C-SCAN,LOOK and C-LOOK disk scheduling algorithms will work for the data set. Compute the total head movement for each algorithm . | 10M |
| 5 | Write short notes on | |
| | a) File attributes | 3M |
| | b) File Operations | 3M |
| | c) File sharing | 4M |
| 6. | Discuss about directory structures with examples | 10M |
| 7. | a) Write short note on Disk attachment? | 6M |
| | b) Write about the File operations? | 4M |
| 8 | a) Explain File access methods in detail? | 5M |
| | b) What is Directory? Explain Directory implementation? | 5M |
| 9. | Explain in detail about File system Allocation methods with neat diagram? | 10M |
| 10. | What is File?Explain File concept in detail. | 10M |

2 MARKS:

- 1.What is a File?
2. List the various File Attributes
3. What are the various File Operations?
4. What is the information associated with an Open File?
5. What are the different Accessing Methods of a File?
6. What is Directory?
7. What are the operations that can be performed on a Directory?
8. What are the most common schemes for defining the Logical Structure of a Directory?
9. Define UFD and MFD
10. What is a Path Name?

