

QUESTION BANK 2022 SCHEME

Important Questions

Subject Name: Operating Systems

Subject Code: BCS303

Sem: III

website: vtucode.in

Module -1 Questions.

1. Explain layered approach. Mention its advantages and disadvantages. 5m
2. Explain microkernel approach .What are its benefits 5m
3. Explain the ‘graceful degradation ‘ and ‘fault tolerant’ in a multiprocessor system
4. Define virtual machine .With a neat diagram explain the working of virtual machine.
5. What Are the benefits of virtual machine. 10m
6. Define the essential properties of the following type of operating system
a)time sharing b)distributed c)real time d)multiprogramming 10m
7. What is the difference between hard real time and soft real time system 5m
8. Explain the different services that an operating system provides. 10m
9. What are the 5 major activities of an operating system with regard to process Management 5m
10. What are the main purposes of operating system 5m
11. Explain the multiprocessor system 5m
12. Describe the difference between symmetric and asymmetric multiprocessing 5m
13. Explain the distinguishing feature of 1)real time system 2)multiprocessor system 10m
14. Explain the function of memory management. 5m
15. What is the purpose of system calls 5m

Module-2

1) Describe the structure of PCB 5m

2) Explain the following 5m

1)short term 2)medium term 3)long term scheduler

3)Explain shortest job first (SJF) algorithm.

4) Explain priority algorithm

5) For the following example calculate average waiting time and average turnaround time for the following algorithm.

1)FCFS 2)preemptive SJF 3)round robin(quantum 1 unit)

Process	arrival time	burst time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

6)What is a process? With a state diagram explain states of a process.Also write the structure of process control block. 10m

7). consider following process with cpu burst time given in milliseconds. 10 m

Process	burst time	priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Processes are arrived in P1,P2,P3,P4,P5 order of all at time 0.

1)Draw gantt charts to show execution using FCFS,SJF,non preemptive priority(smaller number implies higher priority.) and round robin(quantum = 1) scheduling.

2)Also calculate turnaround time for each scheduling algorithm.

3)What is the waiting time of each process for each one of the above scheduling algorithm.

8) Explain the cpu scheduling criteria 5m

9)Explain the round robin scheduling algorithm 5m

- 10) What are the benefits of multithreaded programming 05m
- 11) 4 batch jobs P1,P2,P3,P4 arrive at computer center at most the same order .The estimated running times are 10,8,2,4 ms.The priorities are 3,4,1,2. Time quantum is 2 ms.Draw gantt chart and compute average waiting time and average turnaround time to following algorithm
- 1)FCFS 2)SJF(non preemptive),3)priority 4)Round robin 10
- 12) Compare the user level thread and kernel level thread 5
- 13) Explain the multithread model 5
- 14) For the following set of processes find the average waiting time and average L6 turnaround time using gantt chart for 1)SJF 2)Priority scheduling(Smaller number implies higher priority) 10
- | Process | burst time | priority |
|---------|------------|----------|
| P1 | 5 | 5 |
| P2 | 3 | 4 |
| P3 | 8 | 3 |
| P4 | 2 | 1 |
| P5 | 1 | 2 |
- 15)Explain the non preemptive and preemptive scheduling. 5m
- 16)discuss multilevel queue scheduling 5m
- 17) discuss multilevel feedback queue scheduling 5m
- 18)Explain RR,FCFS,SJF and priority scheduling algorithms with suitable example 10m
- 19)write shortnotes on 1)real time scheduling 2)CPU scheduling 3)dispatcher4)preemptive Sjf 10m

Module-3

1) Explain semaphores.State the dining philosopher problem and give the solution for the same using semaphores. 10M

2) Describe the bounded buffer problem and give the solution for the same using semaphores.Write the structure of producer and consumer process. 10 m

3) explain in brief race condition. 5 m

4) Define the term critical section?what are the requirements for critical section problems.

5) Give the solution for readers/writers problem using semaphore. 10 m

6) Explain Petersons algorithm 5m

7) The operating system contains 3 resources .the number of instances of each resource type are 7,7,10 .The current resource allocation state is as shown below. 10M

Process	current allocation			maximum need		
	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8
P2	2	0	3	4	3	3
P3	1	2	4	3	4	4

1)Is the current allocation in safe state.

2)can the request made by process P1(1,1,0) be granted.

8) Explain deadlock prevention methods in detail. 10m

9) consider the following snapshot 10 m

PROCESS	ALLOCATION		MAX		AVAILABLE	
	R1	R2	R1	R2	R1	R2
P1	1	2	4	2	1	1
P2	0	1	1	2		
P3	1	0	1	3		
P4	2	0	3	2		

1)What is the need matrix.

2)Check whether system is safe or unsafe.

10) consider the following snapshot of a system

10 marks

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				

Answer the following questions using bankers algorithm.

- 1)What is the content of need matrix,
 - 2)determine If system is in safe state.
 - 3)If a request from process P1 arrives for (0,4,2,0)can the request be granted immedietly.
- 11) For resource types A,B, C maximum instances present in the system are A=10,B=5,C=7
- 1)calculate need matrix.

10 m

- 2)check whether system is safe or not .

	ALLOCATION			MAX			AVAILABLE		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

12) Explain deadlock detection and deadlock recovery in detail 10 m

13) Describe the Bankers algorithm for deadlock avoidance. 10m

14) what are the necessary conditions for deadlock to occur 10m

15) Explain the resource allocation graph. 10m

16) State the dining philosopher problem and give the solution for the same using monitors 10m

Module-4

- 1) Explain shared pages? 5marks
- 2) Explain hashed page table 5marks
- 3) Explain segmentation . Compare paging and segmentation 6m
- 4) Explain the concept of swapping. Why is it required? 6m
- 5) Explain best fit and first fit algorithm for dynamic partitioned memory management 6M
- 6) Explain internal and external fragmentation with a neat diagram. 05m
- 7) What is paging? Explain with a neat diagram 10m
- 8) Explain Translation lookaside buffer (TLB) with a neat diagram 10m
- 9) Explain inverted page table with a diagram 5m
- 10) Explain segmentation with neat diagram 5m
- 11) Describe the following allocation algorithms 8m
 - 1) first fit 2) best fit 3) worst fit
- 12) With a diagram discuss the steps involved in handling a page fault 10m
- 13) Explain thrashing. 5m
- 14) Consider the following page reference string
2,3,2,1,5,2,4,5,3,2,5,2
How many page faults would occur in case of
a) LRU b) FIFO c) optimal page replacement algorithms assuming 3 frames. Note that initially all frames are empty 10m
- 15) Explain the different page replacement algorithms 10m
- 16) Explain demand paging. Give advantage and disadvantage of demand paging 05m
- 17) write a note on virtual memory 5m

Module-5

- 1) Explain different file access methods 10m
- 2) Describe the working of following allocation methods 10 M
 - 1)contiguous 2)linked
- 3) With a neat diagram describe 1)tree structured directory 2)Acyclic graph directory 10m
- 4) What do you mean by free space list?With suitable examples explain any 2 methods of implementation of free space list. 10m L5
- 5) With suitable examples explain different methods of implementation of free space list 10 m
- 6)List the common file types along with its extentions and functions 05m
- 7)Explain in detail file attributes 05m
- 8)Describe the working of following allocation methods
 - 1)contiguous 2)indexed 10m
- 9) Explain the various directory structures. 10m
- 10) what are the operations possible on file 5m
- 11) Explain access matrix method of system protection with domain as objects and its implementation. 10 m
- 12) consider a disc queue with requests for I/O to blocks on cylinder
98,183,37,122,14, 124,65,67
If the disc head is start at 53,then find out the total head movement with respect to
FCFS,SSTF,SCAN,C-SCAN, and LOOK scheduling 10 m
- 13) Suppose that a disc drive has 5000 cylinders , numbered 0 through 4999.The drive is serving a request at cylinder 143.The queue of pending requests in FIFO order is
86,1470,913,1774,948,1509,1022,1750,130 starting from the head position.What is the total distance (in cylinders) that the disc arm moves to satisfy all the pending requests for each of the following disc scheduling algorithms ? FCFS,SSTF,SCAN,LOOK,C-SCAN,C-LOOK 10m
- 14) Explain in detail about overview of mass storage structure. 10 m
- 15) Explain SCAN,CSCAN and LOOK scheduling techniques. 10 m
- 16) Explain the various disc scheduling algorithm with example. 10 m