Operating System Question Bank

S.No.	Question
1	Define Operating Systems and discuss its role from different perspectives.
2	Explain fundamental difference between i) N/w OS and distributed OS ii) web based and embedded computing.
3	What do you mean by cooperating process? Describe its four advantages.
4	What are the different categories of system programs? Explain.
5	List out different services of Operating Systems and explain each service.
6	Explain the concept of virtual machines. Bring out its advantages.
7	Distinguish among following terminologies i) Multiprogramming systems ii) Multitasking Systems iii) Multiprocessor systems.
8	What is distributed operating system? What are the advantages of distributed operating system?
9	What are system calls? Explain different categories of system calls with example?
10	What are the 3 main purposes of an Operating System?
11	Explain the concept of virtual machines.
12	Explain the distinguishing features of i). Real time system ii) Multiprocessor system
13	What is the purpose of command interpreter? Why is it usually separate from the Kernel?
14	What is an Operating System? Explain considering different possible views.
15	What is operating system? What are functions of operating system?
16	What are multiprocessor systems? Give advantages.
17	What is the main difficulty that a programmer must overcome in writing an operating system for real time environment?
18	Define spooling and the need for it. Explain its working with necessary diagrams.
19	Explain the following terms and their working with diagram a) Buffering b) Spooling c) Time sharing d) Distributed system e) Real-time
20	Compare tightly coupled systems with loosely coupled systems.
21	Describe differences between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor systems?
22	Explain distinguished features of i) Time Sharing System ii) Parallel Processing
23	Write a brief note on different operating system structures
24	Explain different sub components of an operating system.
25	Bring out the requirements of i) Real time operating systems (ii) Distributed operating systems
26	Justify the statement "Operating System can be viewed as a government, resource allocator and a control program".

27	Define essential properties of the following types of Operating system:
	    i) Batch operating system
	    ii) Interactive operating system
	    iii) Time sharing operating system
	    iv) Real time operating system
	    v) Distributed operating system

28	Distinguish among the following terminologies associated with the operating system and explain each of them in detail. Multiprogramming systems, Multitasking systems, Multiprocessor systems.
29	Define a virtual machine (VM). With a neat diagram, explain the working of a VM. What are the benefits of a VM?
30	Explain the 'graceful degradation' and 'fault tolerant' in a multiprocessor system.
31	Write and explain the sequence of system calls for copying a file to another (new) file.
32	What are system calls? Explain the different categories of the system calls

S.No.	Question
1	What do you mean by PCB? Where is it used? What are its contents? Explain.
2	Explain direct and indirect communications of message passing systems.
3	Explain the difference between long term and short term and medium term schedulers
4	What is a process? Draw and explain process state diagram
5	Define IPC. What are different methods used for logical implementations of message passing Systems.
6	Discuss common ways of establishing relationship between user and kernel thread.
7	Explain multithreading models.
8	List out services provided by the Operating Systems?
9	What are client server systems & Peer-to-Peer systems?
10	What is the purpose of the system calls & system programs?
11	Explain the layered approach of the operating system
12	Describe process states with the help of process transition diagram
13	Give difference between Job-scheduling & CPU-scheduling.
14	What is the main difficulty that a programmer must overcome in writing an operating System for real time environment?
15	Give difference between Job-scheduling & CPU-scheduling.

16	Distinguish between
	    i) Process and Program
	    ii) Multiprogramming and multiprocessing
	    iii) Job scheduling and CPU scheduling

17	What are the five major activities of an operating system in regard to file management

18	What are the five major activities of an operating system in regard to process management?
19	What are the three major activities of an operating system in regard memory management?
20	What are the three major activities of an operating system in regard to secondary storage management
21	What is the purpose of command interpreter? Why is it usually separate from kernel?
22	What are different differences between user level threads & Kernel supported threads?
23	What is Scheduler? What is a dispatcher?
24	Give the information that is kept in process control block?
1	What are threads?
2	What are semaphores? Explain two primitive semaphore operations. What are its advantages?
3	Explain three requirements that a solution to critical–section problem must satisfy.
4	Explain solution to producer-consumer problem using semaphores
5	State dining philosopher's problem and give a solution using semaphores. Write structure of philosopher.
6	5. What do you mean by binary semaphore and counting semaphore? With C struct, explain implementation of wait () and signal.
7	What is synchronization? Explain its hardware.
8	What are semaphores? Explain solution to producer-consumer problem using semaphores
9	Write short note on CPU scheduling criteria.
10	Explain different types of CPU Schedulers.
11	i) Preemptive and non preemptive scheduling ii) I/O bound and CPU bound iii) Scheduler and dispatcher
12	Differentiate Pre-emptive and Non-preemptive scheduling giving the application of each of them.
13	What is the criterion used to select the time quantum in case of round-robin scheduling algorithm? Explain it with a suitable example.
14	Explain the concept of 'process'. also describe the contents of a process control block(PCB)
15	Define the actions taken by a kernel to context switch: a. Among threads b. Among processes
16	What are co-operating processes? Describe the mechanism of inter process communication using shared memory in a producer-consumer problem
17	Explain how process are created and terminated.
18	For the following set of process find the average waiting time using Gantt chart

	for i> SJF ii> Priority scheduling process

		Burst time	Priority
	p1	5	5
	p2	3	4
	p3	8	3
	p4	2	1
	p5	1	2

The process has arrived in the order p2, p1, p4, p3 and p5.

19	What is the difference between a preemptive and non-preemptive scheduling algorithms? Explain FCFS scheduling algorithm. Find the average turnaround time and average waiting time for the processes given in the table below.

Process	CPU burst time(in ms)
P1	24
P2	3
P3	3

20	Consider the following data with burst time given in milliseconds:

i> SJF   ii> Priority scheduling

process	Burst time	Priority
p1	10	3
p2	1	1
p3	2	3
p4	1	4
p5	5	2

The process has arrived in the order p1, p2, p3, p4, p5 all at time 0.
a. Draw Gantt charts for the execution of these processes using
FCFS, SJF, a nonpreemptive priority and RR (quantum=1)
scheduling.
b. What is the turnaround time and waiting time of each
process for each of the scheduling algorithm.

21	What 2 advantages do threads have over multiple processes? What major disadvantages do they have? Suggest one application that would benefit from the use of threads.

22	Suppose the following jobs arrive for processing at the times indicated, each job will run the listed amount of time.

Job	arrival time	burst time
1	0.0	8
2	0.4	4
3	1.0	1

i) Give a Gantt chart illustrating the execution of these

	jobs using the non preemptive FCFS and SJF scheduling algorithms. ii) what is turn around time and wait time of each job for the above algorithms? iii) compute average turn around time if the CPU is left idle for the first 1 unit and then SJF scheduling is used.(job q and job 2 will wait during this time)`
23	Consider the following set of processes with their arrival and burst times as shown Process A.T B.T P0 0 10HR P1 0 05HR P2 1 02HR P3 2 01HR Compute the turn around time and waiting time of each job using the following scheduling algorithms.

24	For the following set of processes, find the average waiting time & average turn around time using GANTT Chart for
	      I > FCA
	      II> SJF preemptive.
	      III> SJF non-preemptive.
	
	Process Arrival time (in sec) Burst Time(in sec)
	P1 0 4
	P2 1 2
	P3 2 5
	P4 3 4

25	Five batch jobs A,B,C,D and E arrive at a computer centre at almost at the same time. They have estimated running times of 10,6,2,4 and 8 minutes. Their priorities are 3,5,2,1 and 4 respectively, with 5 being the highest priority. For each of the following scheduling algorithm determine the turn around time of each process and waiting time of each process. Ignore process switching overhead. Mention which algorithm results in minimal average waiting time.
	      1. Round Robin
	      2. Priority scheduling
	      3. First come first served
	      4. Shortest job first.
	For case i) assume that system is multiprocessing and each job gets its fair share of the CPU.(time quantum 2 minutes0. For cases (ii),(iii) and (iv) assume that only one job runs at a time, until it finishes. All jobs are completely CPU bound.

26	Consider the following set of rocesses, with the len of CPU burst in milliseconds.
	Process PI P2 P3 P4 P5
	Arrival time 00 02 03 06 30
	Burst time 10 12 14 16 05
	Draw a Gantt chart that illustrates the execution of these processes using the preemptive shortest job first (SJF) algorithm. Hence find the average waiting time. Draw a Gantt chart that illustrate the execution of these processes using preemptive priority scheduling algorithm. Given priority of each process is PI = 4, P2=3, P3=5, P4= 1 and P5= 1. Also find the average waiting time
27	What are semaphores? Explain how it can be used to implement mutual exclusion
28	Explain the terms critical section and mutual exclusion.
29	What is critical section? What requirement should be satisfied for a solution to the critical section problem?
30	Explain the readers/writers problem
31	What is the term busy waiting? What other kinds of waiting are there in an OS? Can busy waiting be avoided altogether? Explain.
32	Describe the Bounded - buffer problem and give a solution for the same using semaphores. Write the structure of producer and consumer processes.
33	What is critical section problem and what are the requirements that need to be satisfied by any solution to critical section problem? Give a solution to a 2 process critical section problem.

1	Why is deadlock state more critical than starvation? Describe resource allocation graph with a deadlock, with a cycle but no deadlock.
2	What are two options for breaking deadlock?
3	Describe necessary conditions for a deadlock situation to arise.
4	Explain different methods to handle deadlocks.
5	Explain the resource allocation graph
6	Explain the methods for deadlock prevention
7	Given 3 processes A,B and C, three resources x,y and z and following events,
	a. A requests x ii) A requests y iii) B requests y iv) B requests z
	v) C requests z vi) C requests x vii) C requests y
	Assume that requested resources should always be allocated to the request process if it is available. Draw the resource allocation graph for the sequences. And also mention whether it is a deadlock? If it is, how to recover the deadlock.
8	What is deadlock? Explain the necessary conditions for its occurrence.

1	What is paging and swapping?
2	With a diagram discuss the steps involved in handling a page fault.
3	What is address binding? Explain the concept of dynamic relocation of addresses.
4	Define external fragmentation. What are the causes for external fragmentation?
5	What is paging? Explain the paging hardware?
6	Memory partitions of 100kb,500 kb,200 kb,300kb,600 kb are available how would

	best, worst, first fit algorithm to place processes 212,417,112,426 in order. Which is the best algorithm?
7	Differentiate between internal and external fragmentation.
8	Consider the reference stream 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults while using FCFS and LRU using 2 frames?
9	What are the methods of handling the page faults?
10	What is thrashing? What are the causes for thrashing?
11	What is virtual memory? Explain Suppose we have a demand paged memory. The page table is held in registers. it takes 8ms to service a page fault if an empty page is available or the replaced page is not modified, and 20ms if the replaced page is modified. memory access time is 100ns. Assume that the page to be replaced is modified 70% of the time. what is the maximum acceptable page fault rate for an effective access time of no more than 200ns?
12	What is demand paging? Explain
13	What is segmentation? Explain. what is demand segmentation?
14	What are the different access methods? Explain.
15	Explain the difference between Physical and logical address
16	Explain with neat diagram internal and external fragmentation.
17	Describe the action taken by the operating system when a page fault occurs.
18	Write short notes on swap space management.
19	What is dynamic storage allocation problem? Mention the names of different methods used to solve the above problem
20	Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames. how many bits are there in the logical address? How many bits are there in the physical address?
21	Explain in detail the implementation of paging
22	What is fragmentation? Explain its types and disadvantages
23	Write a note on file types and file structures
24	What is virtual memory and give its advantages
25	Explain the tem locality of reference and elaborate on its usefulness in presenting thrashing.
26	List the operations that can be performed on directory
27	What is page fault and how it is handled?
28	Describe the SSTF disk scheduling algorithm using the following data. The dist head is initially at position-cylinder 53.the cylinder sequence of requests is 98, 183, 37, 122, 14, 124, 65. 67. find the total head movement.
29	Describe the LRU page replacement algorithm, assuming there are 3 frames and the page reference string is 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

		Find the number of page faults.
30		Explain with the help of supporting diagram how TLB improves the performance of a demand paging system.
31		Differentiate between the following a) Paging and Segmentation b) Page table and segment table
32		Explain any two page replacement algorithms
33		Explain the best fit, first fit and worst fit algorithm
34		Discuss the following page replacement algorithm with an example. i> Optimal ii>LRU
35		Differentiate between global and local replacement algorithms
36		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 Find out the number of page faults if there are 4 page frames, using the following page replacement algorithm i) LRU ii) FIFO iii) Optimal
37		Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. the drive currently services a request at cylinder 143, and the previous request was at cylinder 125. the queue of pending request in FIFO order is 86,1470,913,1774,948,1509,1022,1750,130 Starting from the current position, what is the total distance(in cylinders) that the disk arm moves to satisfy all pending requests, for each of the following algorithms i)FCFS ii) SSFT iii) SCAN iv) LOOK v) C-SCAN.
38		Explain segmented memory management
39		What are the different disk scheduling algorithms explain
40		Explain paging scheme of memory management. What hardware support is needed for its implementation?
41		The queue of requests in FIFO is 86,147,91,177,94,150,102,175,130 What is the total head movement needed to satisfy the requests for the following Scheduling algorithms FCFS, SJF, SCAN, LOOK, C-SCAN
42		Differentiate between protection and security in file system. How they are implemented?
43		Explain the following i) file types ii) file operation iii) file attributes.
44		Explain the method used for implementing directories.
45		Describe various file access methods.
46		Explain file system mounting operation.
47		Mention the different file attributes and file types.
48		How free space is managed? Explain.
49		What are the three methods for allocating disk space? Explain.
50		Discuss the following page replacement algorithm with an example i) Optimal ii) LRU
51		Name the different file allocation methods. Explain the linked allocation of file implementation with merits and demerits.
52		What is disk scheduling? Explain FCFS and SCAN disk scheduling algorithms.
53		The available space list of a computer memory is specified as follows:

	Start address block address in words 100 50 200 150 450 600 1200 400 Determine the available space list after allocating the space for the stream of requests consisting of the following block sizes: 25,100,250,200,100,150 Use i) FIRST FIT ii) BEST FIT and iii) WORST FIT algorithms.
54	A virtual memory system has the following specification: Size of the virtual address space=64k Size of the physical address space=4k Page size=512 Virtual page# physical frame# 0 0 3 1 7 2 4 3 10 4 12 5 30 6 31 7 i)find all the virtual addresses that will generate a page fault compute the main memory addresses for the following virtual addresses. 24,3784,10250,30780
55	A process references 5 pages A, B , C, D, E in the following order A, B, C, D, A, E, B, C, E, D Assuming that the replacement algorithm is LRU and FIFO, find out the number of page faults during the sequence of references, starting with an empty main memory With 3 frames.
56	Suppose that the head of moving head disk with 200 tracks numbered 0 to 199 is currently serving the request at track 143 and has just finished a request at track 125. If the queue request is kept in FIFO order, 86, 147, 91, 177 , 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for i) FCFS II) SSTF disk scheduling algorithm.
57	What do you mean by a address binding? Explain with the necessary steps, the binding Of instructions and data to memory addresses.
58	What do you mean by a copy-on-write? Where is it used? Explain in brief.
59	Consider the following page reference string 7,0, 1,2,0,3,0,4,2,3,0,3,2, 1,2,0, 1, 7,

	0, 1. How many page faults would occur for FIFO page replacement algorithm, assuming three frames?
60	Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) how Would each of the first fit, best fit and worst fit algorithms work place processes of 212 K, 417K, 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory?
61	Explain the following disk scheduling algorithm with examples. i)SSTF ii) SCAN iii)LOOK Comment on the selection of these scheduling methods.

1	Describe the access matrix model used for protection purpose.
2	Explain various disk scheduling algorithms?
3	Explain the access matrix structure employed in protection domain?
4	What are protection goals and principles?
5	What is Security in OS and Different Types of security in OS?
6	Write a short note on Revocation of access rights.
7	Explain the terms 'WORMS' and 'VIRUSES' with reference to system threats
8	Briefly explain the various kinds of program threats and system threats.
9	Explain different methods used to solve the problem of security at the operating system level