

## Operating System Question Bank

- Q1. What is an Operating System? Discuss the main Services of the operating system.
- Q2. Discuss the differences between a time sharing system and real time system.
- Q3. Discuss the objectives of the Multiprocessor systems.
- Q4. What do you mean by Kernel? Explain monolithic kernel and microkernel.
- Q5. Explain the following:
1. Multitasking
  2. Multithreading.
- Q6. Write an algorithm to explain the producer/consumer using semaphores.
- Q7. Compare and contrast the use of monitors and semaphores operations.
- Q8. What is Critical Section? Discuss.
- Q9. Discuss one classical problem related to the process synchronization.
- Q10. Explain the need for Process Control Block (PCB).
- Q11. Discuss the performance criteria for CPU scheduling.
- Q12. Describe the necessary condition for deadlock to occur.
- Q13. In the respect of Banker's Algorithm discuss whether system is safe or unsafe. If a system is safe, show how it is possible for all users to complete:

	Current loan	Maximum need
user (1)	2	6
user (2)	4	7
user (3)	5	6
user (4)	0	2

- Q14. Explain the following scheduling algorithm :
1. Multilevel feedback queues scheduling
  2. First In First Out (FIFO) scheduling.
- Q15. What do you understand by fragmentation? What are the different techniques to remove fragmentation in Case of multiprogramming with fixed partitions and variable partitions? Discuss.
- Q16. Define virtual memory concepts and also discuss page replacement algorithms in brief.
- Q17. Write short note on :-
1. Thrashing
  2. Cache memory organisation.
- Q17. What are the different file organizations? Discuss access mechanisms.
- Q18. Explain the following:
1. Directory System
  2. File Protection
- Q19. Discuss the disk scheduling algorithms.

- Q20. Write down the advantages of batch processing system.
- Q21. What are the major functions of operating system?
- Q22. Explain the main features of real time operating system.
- Q23. Draw the layered structure of an operating system.
- Q24. Discuss the evolution of operating system.
- Q25. Write down about the following in brief:  
 (a) System protection  
 (b) System components
- Q26. Write down the methods for deadlock prevention.
- Q27. Discuss about Multiprocessor scheduling in brief.
- Q28. How the recovery from deadlock is done using combined approach?
- Q29. Discuss the paging system for memory management in details. Also give it, advantages and disadvantages.
- Q30. What do you understand by Page replacement? Name the algorithm available for Page replacement.
- Q31. How many Page faults occur for optimal Page replacement algorithm with following reference string for four page frames :  
 1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2
- Q32. What is an Operating System? Discuss the main components of an O.S.
- Q33. What do you mean by distributed systems? Discuss its advantages.
- Q34. What is difference between system program and application program? Explain with examples.
- Q35. Discuss the main features of the following types of OS :  
 (I) Batch Processing Operating System  
 (II) Multi programmed Operating System.
- Q36. What do you understand by term Spooling? Discuss.
- Q37. Explain the following:  
 (i) Real-Time System  
 (ii) Direct Memory Access.
- Q38. Explain how "readers writers" problem can be solved using semaphores.
- Q39. What is critical section? How can we obtain a solution to the critical section problem?
- Q40. Explain process control block (PCB). Discuss each component of PCB.
- Q41. Discuss the following with suitable examples:  
 (i) Inter process communication  
 (ii) Context switching.
- Q42. Discuss the functioning of multi level feedback queue scheduling.
- Q43. Consider the following four processes with the length of the CPU burst time in milliseconds:

Process	Arrival time	Burst time
PI	0	11

P2	2	7
P <sub>3</sub>	3	12
P4	4	8

Find which of the following algorithms gives the least average waiting time:

- (i) FCFS
- (ii) RR (Slice = 5 ms)
- (iii) SRT.

Q44. States the four necessary conditions that hold when deadlock occur. Give a brief argument for the reason. Each individual condition is necessary.

Q45. In the deadlock prevention method, the system grants resources on an "all or none" basis to processes.

Discuss its pros and cons.

Q46. How many page faults would occur for the following replacement algorithms assuming three page frames

(Initially all frames are empty) :

- (i) FWO
- (ii) LRU
- (iii) OPTIMAL.

Q47. Discuss the similarities and differences between paging and segmentation.

Q48. What is thrashing? How can it be overcome?

Q49. What do you understand by fragmentation? Explain each in brief.

Q50. What are the essential goals of disk scheduling? Why is each important? Compare the throughput of C-SCAN with that of SCAN.

Q51. Discuss various types of file directory structure with relevant diagram.

Q52. Discuss about blocking and non-blocking I/O.

Q53. Explain threads. Differentiate between heavyweight and lightweight processes.

Q54. What is meant by Process Control Block? Draw and explain different fields of PCB. Explain Context Switch by giving an example.

Q55. State and explain various memory management techniques.

Q56. Suppose the head of moving-head disk with 200 tracks, numbered 0 to 199 is Currently serving a request at track 143 and has just finished a request at track 125. If the Queue of requests is kept in the FIFO order  
86, 147, 91, 177, 94, 150, 100, 175, 130

Q57. What is total head movement to satisfy these requests for the following disk scheduling Algorithms?

- i) FCFS
- ii) SSTF
- iii) C-SCAN

Q58. What is thrashing? How it can be prevented?

Q59. What advantages do threads have over multiple processes? What major disadvantages do they have?

Q60. Explain differences between Logical and physical address. Internal and external fragmentation.

Q61. Write an algorithm to implement a semaphore using:-  
The Swap instruction  
The Test and set instruction.

Q62. What is the race condition?

Q63. Consider the following page reference string  
A,B,C,D,B,A,E,F,A,B,C,G,F,C,F. How many page faults would occur for the following page replacement algorithm assuming three and four frames? Remember all frames are initially empty:  
FIFO  
Optimal  
LRU

Q64. Give memory partition of 100K,500K,200K,300K and 600K(in order).How  
Would each of the first fit, best fit and worst fit algorithm place process of 212k, 417k, 112k, and 426k  
(in order)? Which algorithm makes the most efficient use of memory?

Q65. State and explain the necessary condition that lead to deadlock situation.

Q66. What is purpose of resource allocation graph?

Q67. Explain the combined approach to deadlock handling.

Q68. Why is it difficult to protect a system in which users are allowed to do their own I/O?

Q69. What is meant by semaphore? What are the drawbacks of semaphore?

Q70. For the file extensions given below indicate the corresponding file type and the usually associated purpose.

- a. BAT , exe, zip, au
- b. bin, lib, tex, gif, ar

Q71. Describe the file system organization. What is the short cut to move up one level from current directory? What happens when you give a command: touch a\_file?

Q72. Define a file system. What are various components of a file system? State and explain commonly used operations on file.

Q73. Draw and explain Layered File System.

Q74. Explain advantages and disadvantages of following file allocation methods:-

- i) Contiguous Allocation
- ii) Linked Allocation
- iii) Indexed Allocation

Q75. What is an Operating System? Discuss the main Services of the operating system.

76. Define critical section. What are the requirements to solve critical-section Problem?

77. Write an algorithm to implement following:-

- a. The Sleeping barber problem
- b. The dining philosopher problem.

78. Explain in detail about different interprocess communication methods.

79. 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 three and four frames? All frames are initially empty, so first unique pages will cost one fault each.

- (a) FIFO replacement

- (b) LRU replacement
- (c) Optimal replacement

80. List the control structures in shell programming and write its syntax and give example for each.
81. What do you mean by paging and segmentation? Explain. How page fault can be tracked?
82. Given memory partitions of 100KB, 500KB, 200 KB, 300KB, and 600 KB (in order), how would each of the first-fit, best-fit, worst-fit algorithms place processes of 212 KB, 417KB, 112KB , and 426KB (in order)? Which algorithm makes the most efficient use of memory?
83. How directories are created and implemented? Give brief answers.
84. What do you mean by RAID? Explain all levels of RAID with their advantage and disadvantage.
85. Suppose the head of moving-head disk with 200 tracks, numbered 0 to 199 is

Currently serving a request at track 143 and has just finished a request at track 125. if the Queue of requests is kept in the FIFO order

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What is total head movement to satisfy these requests for the following disk scheduling algorithms?

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86. Consider the following snapshot of a system:

	Allocation				Max				Available			
	R1	R2	R3	R4	R1	R2	R3	R4	R1	R2	R3	R4
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 Banker's algorithm:

- (a) What is the content of Need Matrix?
- (b) Is the System in a safe state?
- (c) If a request from P1 arrives for (0, 4, 2, 0), can the request be granted immediately?

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