GUJARAT TECHNOLOGICAL UNIVERSITY

DI -3 SEMESTER – OLD PAPER – S23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Basics of Operating System- 4330703

Unit I: Introduction of Operating System

Repeated Questions:

1. **What is an Operating System? Explain the needs of an Operating System.**
    - Appeared in: SUM 23 (Q1a, 03 marks), SUM 24 (Q1a, 03 marks)
2. **Explain Operating System Services. / Describe Operating System services as per user point of view.**
    - Appeared in: SUM 23 (Q1b, 04 marks), SUM 24 (Q1b, 04 marks)
3. **List different types of operating system. Explain multiprogramming and multitasking operating system in detail.**
    - Appeared in: WIN 23 (Q1c, 07 marks), WIN 24 (Q1c, 07 marks)
4. **List different types of operating system. Explain Time sharing and real time operating system in detail.**
    - Appeared in: WIN 23 (Q1c-OR, 07 marks), WIN 24 (Q1c, 07 marks)

Other Important Questions:

5. Define OS. Explain needs of operating system. (SUM 24 - Q1a, 03 marks)
6. Define Operating system and explain components of computer system (WIN 23 - Q1a, 03 marks)
7. Explain components of computer system (WIN 24 - Q1a, 03 marks)
8. Write Short Note on Timesharing O.S. (SUM 24 - Q1c, 07 marks)
9. Write Short Note on Multiprogramming O.S. (SUM 24 - Q1c-OR, 07 marks)
10. Write shot note on: Multiprogramming O.S and Multithreading O.S. (SUM 23 - Q1c, 07 marks)
11. Write shot note on: Multitasking O.S and Real Time O.S. (SUM 23 - Q1c-OR, 07 marks)
12. What is Operating System? Explain Services of Operating System. (4330703 - Q1a, 03 marks)
13. Enlist all types of OS. Explain Batch Operating system with advantage and disadvantage. (4330703 - Q1c, 07 marks)

14. Enlist all types of OS. Explain Multiprocessing Operating system with advantage and disadvantage. (4330703 - Q1c-OR, 07 marks)
15. Explain Batch Processing operating system with diagram. (WIN 22 - Q2a, 03 marks)
16. Explain Network operating system with diagram. (WIN 22 - Q2a-OR, 03 marks)

Unit II: Process Management

Repeated Questions:

1. **Explain Process Control Block in detail.**
    - Appeared in: 4330703 (Q1b, 04 marks), SUM 23 (Q2b-OR, 04 marks), WIN 22 (Q1c-OR, 07 marks - "Draw diagram of PCB. Explain each component of PCB.")
2. **Explain process life cycle. / Explain Process Life Cycles.**
    - Appeared in: SUM 24 (Q2a, 03 marks), SUM 23 (Q2a, 03 marks)
3. **What is deadlock? Explain conditions for deadlock to occur. / Explain four conditions for deadlock to occur.**
    - Appeared in: SUM 23 (Q2a-OR, 03 marks), WIN 23 (Q5a-OR, 03 marks), SUM 24 (Q2b, 04 marks)
4. **Differentiate between preemptive and non-preemptive scheduling algorithm.**
    - Appeared in: WIN 23 (Q2a, 03 marks), WIN 24 (Q2a, 03 marks)
5. **Calculate Average waiting time and average turnaround time for FCFS algorithm with gantt chart for given data.**
    - Appeared in: SUM 23 (Q2c, 07 marks), WIN 24 (Q2b, 04 marks), WIN 22 (Q2b, 04 marks)
    - **Example Data (SUM 23):**
        - Process: P0, P1, P2, P3
        - Arrival Time: 1, 4, 6, 7
        - Time Required for Completion: 5, 7, 2, 6
    - **Example Data (WIN 24):**
        - Process: P0, P1, P2, P3
        - Arrival Time: 0, 2, 4, 6
        - Execution Time: 5, 3, 8, 6
    - **Example Data (WIN 22):**
        - Process: P1, P2, P3, P4
        - Arrival Time: 0, 2, 3, 5
        - Burst Time: 4, 3, 2, 1
6. **Explain mutual exclusion and critical section in detail.**
    - Appeared in: WIN 23 (Q2c, 07 marks), WIN 24 (Q2c, 07 marks)

Other Important Questions:

7. Explain CPU bound process and I/O bound Process with example. (SUM 23 - Q2b, 04 marks)

8. Calculate Average waiting time and average turnaround time for RR algorithm with gantt chart for given data. (Time quantum = 4ms) (SUM 23 - Q2c-OR, 07 marks)
    - Process: P0, P1, P2, P3
    - Arrival Time: 1, 4, 6, 7
    - Time Required for Completion: 5, 7, 2, 6
9. Calculate Average turnaround time and average waiting time using Shortest Job First (SJF) algorithm. Draw Gantt. (WIN 23 - Q2b-OR, 04 marks)
    - Process: P1, P2, P3, P4
    - Arrival Time: 2, 0, 4, 6
    - Execution Time: 4, 3, 6, 7
10. Differentiate between CPU bound and I/O bound process. (WIN 23 - Q2a-OR, 03 marks)
11. List strategies for dealing with deadlocks and explain any two of them. (WIN 23 - Q2c-OR, 07 marks)
12. Draw State Transition diagram and explain all states with its possible transition scenario. (4330703 - Q2c, 07 marks)
13. Differentiate Preemptive scheduling with Non-preemptive scheduling. Give at least 3 differences. (4330703 - Q2a, 03 marks)
14. Calculate Average Waiting time and Average TAT Using FCFS algorithm for given schedule: (4330703 - Q2b, 04 marks)
    - (The specific table from 4330703.pdf is not fully clear, but it is a numerical problem for FCFS).
15. Explain context switch in brief. (4330703 - Q2a-OR, 03 marks)
16. Calculate Average Waiting time and Average TAT Using Round Robin algorithm for given schedule: (Time Quantum: 2 sec) (4330703 - Q2b-OR, 04 marks)
    - Process: P0, P1, P2, P3
    - Arrival Time: 0, 1, 2, 3
    - Execution Time: 5, 3, 8, 6
17. Write a short note on Deadlock. Explain necessary conditions for Deadlock to occur. (4330703 - Q2c-OR, 07 marks)
18. Calculate Average Waiting time and Average TAT Using Shortest Job Next algorithm for given schedule: (WIN 22 - Q2b-OR, 04 marks)
    - Process: P1, P2, P3, P4
    - Arrival Time: 0, 2, 3, 5
    - Burst Time: 4, 3, 2, 1
19. Enlist all the condition for deadlock to happen and describe Race condition with example. (WIN 22 - Q2c, 07 marks)

20. Differentiate between process and program (WIN 24 - Q2a-OR, 03 marks)
21. Calculate Average turnaround time and average waiting time using Shortest Job First (SJF) algorithm. Draw Gantt. (WIN 24 - Q2b-OR, 04 marks)
    - Process: P0, P1, P2, P3
    - Arrival Time: 0, 2, 4, 6
    - Execution Time: 5, 3, 8, 6
22. What is Deadlock? Explain necessary and sufficient deadlock conditions. (WIN 24 - Q2c-OR, 07 marks)
23. Describe race condition in process management. (SUM 24 - Q2b-OR, 04 marks)
24. Calculate Average waiting time and average turnaround time for Round Robin algorithm with gantt chart for following data. (time quantum = 2ms) (SUM 24 - Q2c, 07 marks)
    - Process: P0, P1, P2, P3
    - Arrival Time: 0, 2, 3, 4
    - Time required for completion: 5, 2, 3, 1
25. Calculate Average turnaround time and average waiting time using First come first serve (FCFS) algorithm. Draw Gantt. (SUM 24 - Q2c-OR, 07 marks)
    - Process: P0, P1, P2, P3
    - Arrival Time: 0, 2, 3, 4
    - Time required for completion: 5, 2, 3, 1

Unit III: Memory Management

Repeated Questions:

1. **Differentiate: External fragmentation Vs Internal Fragmentation.**
    - Appeared in: SUM 23 (Q4b, 04 marks), WIN 23 (Q5b-OR, 04 marks)
2. **Explain address translation in paging.**
    - Appeared in: WIN 23 (Q3a, 03 marks), SUM 23 (Q4c, 07 marks)
3. **Explain Multiprogramming with Fixed (static) partition with figure.**
    - Appeared in: WIN 23 (Q3c, 07 marks), WIN 24 (Q3c, 07 marks)
4. **Write short note on swapping.**
    - Appeared in: WIN 23 (Q3a-OR, 03 marks), SUM 24 (Q3b-OR, 04 marks)
5. **Solve the example using first fit and best fit algorithm. Consider multiprogramming with fixed partition having memory partition of 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB.**
    - Appeared in: WIN 23 (Q3b, 04 marks), WIN 24 (Q3b, 04 marks)
    - **Example Data (WIN 23):**
        - Process: P1, P2, P3, P4
        - Memory Request: 375K, 210K, 468K, 291K
    - **Example Data (WIN 24):**
        - Process: P1, P2, P3, P4
        - Memory Request: 375K, 210K, 468K, 491K

Other Important Questions:

6. Explain Mutual Exclusion in detail. (SUM 23 - Q3a-OR, 03 marks)
7. Explain Race Condition. (SUM 23 - Q3a, 03 marks)
8. Explain long term, medium term and short term schedulers. (SUM 23 - Q3b, 04 marks)
9. What is thread? Explain Benefits of using threads. (SUM 23 - Q3b-OR, 04 marks)
10. Write a short note on memory relocation and protection. (SUM 23 - Q3c, 07 marks)
11. What is swapping? Explain with example. (SUM 23 - Q3c-OR, 07 marks)
12. Describe mutual exclusion in detail. (SUM 24 - Q3a, 03 marks)
13. Differentiate between external fragmentation and internal fragmentation. (SUM 24 - Q3b, 04 marks)
14. Explain Page replacement algorithm with suitable example. (SUM 24 - Q3c, 07 marks)
15. Differentiate between long term and short term schedulers. (SUM 24 - Q3a-OR, 03 marks)
16. Explain swapping in brief with example. (SUM 24 - Q3b-OR, 04 marks)

17. Write short note on Memory relocation and protection. (SUM 24 - Q3c-OR, 07 marks)
18. Consider page reference string 1, 3, 0, 3, 5, 6, 3 with 3 page frames. Find the number of page faults. (WIN 23 - Q3b-OR, 04 marks)
19. Explain Multiprogramming with Dynamic partition with figure. (WIN 23 - Q3c-OR, 07 marks)
20. Explain address translation in segmentation. (WIN 24 - Q3a, 03 marks)
21. Consider page reference string 1, 3, 0, 3, 5, 6, 3 with 3 page frames. Find the number of page faults using FIFO algorithm. (WIN 24 - Q3b-OR, 04 marks)
22. Explain Multiprogramming with Dynamic partition with figure. (WIN 24 - Q3c-OR, 07 marks)
23. Define Short Term and Long Term Scheduler. (4330703 - Q3a, 03 marks)
24. Write short note on segmentation (4330703 - Q3b, 04 marks)
25. What is paging? Explain TLB with diagram. (4330703 - Q3c, 07 marks)
26. Give difference between Process and Thread. (4330703 - Q3a-OR, 03 marks)
27. Write a short note on Fragmentation. (4330703 - Q3b-OR, 04 marks)
28. Enlist all partition selection strategies and explain it with example. (4330703 - Q3c-OR, 07 marks)
29. Differentiate Preemptive scheduling with Non-preemptive scheduling. Give at least 3 differences. (WIN 22 - Q3a, 03 marks)
30. Write short note on segmentation. (WIN 22 - Q3b, 04 marks)
31. Describe what is paging? Explain TLB with diagram. (WIN 22 - Q3c, 07 marks)
32. Explain context switch in brief. (WIN 22 - Q3a-OR, 03 marks)
33. Write short note on Fragmentation. (WIN 22 - Q3b-OR, 04 marks)
34. Enlist all partition selection strategies and explain it with example. (WIN 22 - Q3c-OR, 07 marks)

Unit IV: File Management System

Repeated Questions:

1. **Explain various file operations in detail. / Explain file operation in details.**
    - Appeared in: SUM 23 (Q5a, 03 marks), WIN 23 (Q4b, 04 marks), 4330703 (Q4a, 03 marks)
2. **Explain SCAN and CSCAN disk scheduling algorithm with example.**
    - Appeared in: SUM 24 (Q4c-OR, 07 marks), WIN 23 (Q4c-OR, 07 marks - "Explain C-SCAN algorithm with example")

Other Important Questions:

3. Enlist various file types with their extension. (SUM 24 - Q4a, 03 marks)
4. Explain Worst fit allocation technique with example (SUM 24 - Q4b, 04 marks)
5. Describe Allocation methods of directory system. (SUM 24 - Q4c, 07 marks)
6. Explain various file operations in brief. (SUM 24 - Q4a-OR, 03 marks)
7. Write short note on paging. (SUM 24 - Q4b-OR, 04 marks)
8. Explain Multiprogramming with Fixed Partitions. (SUM 23 - Q4a, 03 marks)
9. Differentiate: External fragmentation Vs Internal Fragmentation. (SUM 23 - Q4b, 04 marks)
10. Explain address translation in paging. (SUM 23 - Q4c, 07 marks)
11. Explain Multiprogramming with Dynamic Partitions. (SUM 23 - Q4a-OR, 03 marks)
12. Explain Physical structures of Hard disk. (SUM 23 - Q4b-OR, 04 marks)
13. Write a short not on the disk space allocation method. (SUM 23 - Q4c-OR, 07 marks)
14. Explain components of Linux operating system/Architecture of Linux OS. (WIN 23 - Q4a, 03 marks)
15. Explain SCAN algorithm with example of 200 tracks and disk request sequence is 98,183,37,122,14,124,65,67, head pointer starting at 53.Find number of head movement in cylinder. (WIN 23 - Q4c, 07 marks)
16. Explain features of Linux operating system. (WIN 23 - Q4a-OR, 03 marks)
17. Explain various attributes of file. (WIN 23 - Q4b-OR, 04 marks)
18. Explain C-SCAN algorithm with example of 200 tracks and disk request sequence is 98,183,37,122,14,124,65,67, head pointer starting at 53.Find number of head movement in cylinder. (WIN 23 - Q4c-OR, 07 marks)
19. Explain file operation in details. (4330703 - Q4a, 03 marks)
20. Differentiate: External fragmentation Vs Internal Fragmentation. (4330703 - Q4b, 04 marks)
21. Enlist all disk scheduling algorithm and explain FCFS with example. (4330703 - Q4c, 07 marks)
22. Describe physical structure of Disk. (4330703 - Q4a-OR, 03 marks)

23. Explain Multiprogramming with Fixed Partitions. (4330703 - Q4b-OR, 04 marks)
24. Explain address translation in paging. (4330703 - Q4c-OR, 07 marks)
25. Describe physical structure of Disk. (WIN 22 - Q4a, 03 marks)
26. Explain multiple programming with fixed size partition. Implement it using example. (WIN 22 - Q4b, 04 marks)
27. Enlist all disk scheduling algorithm and explain FCFS with example. (WIN 22 - Q4c, 07 marks)
28. Describe logical structure of Disk. (WIN 22 - Q4a-OR, 03 marks)
29. Explain multiple programming with dynamic size partition. Implement it using example. (WIN 22 - Q4b-OR, 04 marks)
30. Enlist all disk scheduling algorithm and explain Elevator algorithm with example. (WIN 22 - Q4c-OR, 07 marks

Unit V: Linux Basics

Repeated Questions:

1. **Explain Linux architecture in detail.**
   - Appeared in: SUM 24 (Q5a, 03 marks), SUM 23 (Q5a-OR, 03 marks)
2. **Write a shell script to find the maximum out of three numbers.**
   - Appeared in: 4330703 (Q5c, 07 marks), SUM 23 (Q5c, 07 marks)
3. **Explain following Linux commands: cat, wc, ls**
   - Appeared in: SUM 24 (Q5b, 04 marks - "sort,cmp,mv,vi" also included), 4330703 (Q5b-OR, 04 marks - "cat, echo, wc"), SUM 23 (Q5b-OR, 04 marks - "chmod, ls, wc & cat")

Other Important Questions:

4. Explain following linux commands: sort,cmp,mv,vi (SUM 24 - Q5b, 04 marks)
5. Write a shell script to find factorial of given number. (SUM 24 - Q5c, 07 marks)
6. Enlist directory related command. explain any one in detail. (SUM 24 - Q5a-OR, 03 marks)
7. Explain following linux commands: grep,chmod,rm,wc (SUM 24 - Q5b-OR, 04 marks)
8. Write a shell script to find reverse of a given number (SUM 24 - Q5c-OR, 07 marks)
9. Explain various directory related commands in Linux. (SUM 23 - Q5b, 04 marks)
10. Write a shell script to find the maximum out of three numbers. (SUM 23 - Q5c, 07 marks)
11. Explain Linux architecture in detail. (SUM 23 - Q5a-OR, 03 marks)
12. Explain following Linux Commands: chmod, ls, wc & cat. (SUM 23 - Q5b-OR, 04 marks)
13. Write a shell script to find the sum of all digits of a given number. (SUM 23 - Q5c-OR, 07 marks)
14. Define Throughput, Turnaround time and waiting time. (WIN 23 - Q5a, 03 marks)
15. Give difference between logical address and physical address. (WIN 23 - Q5b, 04 marks)
16. Write shell script to read three numbers from user and find maximum value among them (WIN 23 - Q5c, 07 marks)
17. What is deadlock? Explain conditions for deadlock to occur. (WIN 23 - Q5a-OR, 03 marks)
18. Give difference between external fragmentation and internal fragmentation. (WIN 23 - Q5b-OR, 04 marks)
19. Write shell script to read five numbers from user and print its sum and average. (WIN 23 - Q5c-OR, 07 marks)
20. Enlist file related commands and explain cat command with example. (4330703 - Q5a, 03 marks)
21. Explain ls command with example. (4330703 - Q5b, 04 marks)
22. Write a shell script to generate and print Fibonacci series (4330703 - Q5c, 07 marks)
23. Enlist all directory related commands and explain ls command with options. (4330703 - Q5a-OR, 03 marks)
24. Explain the following Linux commands: cat, echo, wc. (4330703 - Q5b-OR, 04 marks)
25. Write a shell script to find the maximum out of three numbers. (4330703 - Q5c-OR, 07 marks)
26. Enlist all directory related commands and explain Is command with options. (WIN 22 - Q5a, 03 marks)
27. Explain GREP command with example. (WIN 22 - Q5b, 04 marks)
28. Write a shellscript to find sum of all individual digits in given 5 digit numbers. (WIN 22 - Q5c, 07 marks)
29. Enlist atleast 6 file handling commands and explain cmp command with example. (WIN 22 - Q5a-OR, 03 marks)
30. Explain CHMOD command with example. (WIN 22 - Q5b-OR, 04 marks)
31. Write a shellscript to generate prime numbers from 1 to N where N is any positive integer entered by user. (WIN 22 - Q5c-OR, 07 marks)

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