CS6401- OPERATING SYSTEM

QUESTION BANK

UNIT-I

Part-A

1. What is an Operating system?

2. List the services provided by an Operating System?

3. What is the Kernel?

4. What is meant by Mainframe Systems?

5. What is meant by Batch Systems?

6. What is meant by Multiprogramming?

7. What is meant by Time-sharing Systems?

8. What are the Components of a Computer System?

9. What are the advantages of Multiprogramming?

10. What is Multiprocessor System?

11. What are the advantages of multiprocessors?

12. What are Multiprocessor Systems & give their advantages?

13. What are the different types of Multiprocessing?

14. What is meant by clustered system?

15. What are the types of clustering?

16. What is meant by Asymmetric Clustering?

17. What is meant by Symmetric clustering?

18. What is meant by parallel clusters?

19. What is meant by Real time system?

20. What are the advantages of distributed systems?

21. What are the applications of real-time systems?

22. What are the types of Real time systems?

23. What is meant by Hard Real time systems?

24. What is meant by soft real time system?

25. What is meant by distributed systems?

26. What are the disadvantages of distributed systems?

27. What are the modes of operation in Hardware Protection?

28. What are Operating Services?

29. What is System Programs?

30. What are System Calls?

31. What are the five major categories of System Calls?

32. What is the use of Fork and Exec System Calls?

PART-B

1. Discuss about the evolution of Virtual machines. Also explain how virtualization could be implemented in operating systems.

2. Sketch the structure of direct memory Access in detail.

3. Explain the various types of System calls with an example for each.

4. Discuss about the functionality of system boot with respect to operating system.

5. Explain the operating system structure and its component.

6. Define operating system and list out the function and component of operating system.

7. Differentiate symmetric and asymmetric multiprocessing system.

8. In what ways is the modular kernel approach similar to the layered approaches

9. Explain the various memory hierarchies with neat block diagram

UNIT-II

Part-A

1. Define process?

2. What is meant by the state of the process?

3. Define process control block contain?

4. What does PCB contain?

5. What are the 3 different types of scheduling queues?

6. Define schedulers?

7. What are the types of scheduler?

8. Define critical section?

9. What requirement is to be satisfied for a solution of a critical section problem?

10. Define semaphores.

11. Define Starvation in deadlock?

12. Name dome classic problem of synchronization?

13. Define deadlock?

14. What is the sequence of operation by which a process utilizes a resource?

15. Give the condition necessary for a deadlock situation to arise?

16. Define 'Safe State"?

17. What is the use of cooperating processes?

18. Define deadlock-avoidance algorithm?

19. What are the benefits of multithreaded programming?

20. Define deadlock detection diction?

21. Define race condition.

22. What is critical section problem?

23. Define busy waiting and spinlock.

24. What are the requirements that a solution to the critical section problem must satisfy?

25. Define entry section and exit section.

26. What are conditions under which a deadlock situation may arise?

27. What is a resource-allocation graph?

PART-B

1. What is the important feature of critical section? State the dining philosopher's problem and show how to allocate the several resources among several processes in a deadlock and starvation free manner.

2. How can deadlock be detected? Explain.

3. Write about the various CPU scheduling algorithms.

4. Write notes about multiple-processor scheduling and real-time scheduling.

5. Write about critical regions and monitors.

6. Consider the following five processes, with the length of the CPU burst time given in milli seconds.

Process Burst time

Process	Burst time
P1	10
P2	29
P3	3
P4	7
P5	12

Consider the First come First serve (FCFS), Non Preemptive Shortest Job First(SJF), Round Robin(RR) (quantum=10ms) scheduling algorithms. Illustrate the scheduling using Gantt

chart. Which algorithm will give the minimum average waiting time? Discuss.

7. 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 the following replacement algorithms, assuming three frames that all frames are initially empty?

8. i) Construct a Resource Allocation Graph for the following scenario. At time 't' Process P1 request for a resource X, process P2 requests for a resource Y. Both the resources are Available and they are allocated to the requesting process. At time t1 where t1>t2 both the processes are still holding the resources, however process P1 request for Y which is held by P2, process P2 request for X held by P1. Will there be a deadlock? f there is a deadlock discuss the four necessary conditions for deadlock, else justify there is no deadlock .

ii) With relevant example show that the implementation of a semaphore with a waiting queue

UNIT-III

Part-A

1. Define Dynamic Loading.

2. Define Dynamic Linking.

3. What are Overlays?

4. Define Swapping.

5. What do you mean by Best Fit?

6. What do you mean by First Fit?

7. How is memory protected in a paged environment?

8. What is External Fragmentation?

9. What is Internal Fragmentation?

10. What do you mean by Compaction?

11. What are Pages and Frames?

12. What is the use of Valid-Invalid Bits in Paging?

13. What is the basic method of Segmentation?

14. A Program containing relocatable code was created, assuming it would be loaded at address 0. In its code, the program refers to the following addresses: 50,78,150,152,154. If the program is loaded into memory starting at location 250, how do those addresses have to be adjusted?

15. What is Virtual Memory?

16. What is Demand Paging?

17. Define Lazy Swapper.

18. What is a Pure Demand Paging?

19. Define Effective Access Time.

20. Define Secondary Memory.

21. What is the basic approach of Page Replacement?

22. What is the various Page Replacement Algorithms used for Page Replacement?

23. What are the major problems to implement Demand Paging?

24. What is a Reference String?

25. What is virtual memory?

26. Define secondary memory.

PART-B

1. Differentiate local and global page replacement algorithm.

2. What is virtual memory? Mention its advantages.

3. What is the maximum file size supported by a file system with 16 direct blocks, single, double, and triple indirection? The block size is 512 bytes. Disk block number can be stored in 4 bytes.

4. List the steps needed to perform page replacement.

5. Differentiate external fragmentation with internal fragmentation.

6. Briefly explain and compare, fixed and dynamic memory partitioning schemes.

7. Explain with the help of examples FIFO and LRU, optical page replacement algorithms with example reference string. Mention the merits and demerits of each of the above algorithm.

8. Explain how paging supports virtual memory. With neat diagram explain hoe logical address is translated into physical address.

9. Explain memory management in Linux operating system.

10. Give the basic concepts about paging.

11. Write about the techniques for structuring the page table.

12. Explain the basic concepts of segmentation.

13. What is demand paging and what is its use?

14. Explain the various page replacement strategies.

15. What is thrashing and explain the methods to avoid thrashing?

16. Write short notes on swapping.

17. Discuss the advantages of paging memory management and the conversion of logical address into physical address with necessary

18. Consider the following page reference string: 2, 3, 4, 2, 1, 5, 6, 4, 1, 2, 3, 7, 6, 3, 2, 1 Calculate the number of page faults would occur for the following page replacement algorithm with frame size of 4 and 5.

19. Explain the page fault handling routine with diagram.

20. Explain Contiguous and Non contiguous memory allocation with example.

21. Explain page replacement algorithms.

UNIT-IV

Part-A

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?

11. What is Access Control List?

12. Define Equal Allocation.

13. What is the cause of Thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?

14. If the average page faults service time of 25 ms and a memory access time of 100ns.Calculate theeffective access time.

15. What is Belady's Anomaly?

16. What are the types of Path Names?

17. What is meant by Locality of Reference?

18. Define Seek Time and Latency Time.

19. What are the Allocation Methods of a Disk Space?

20. What are the advantages of Contiguous Allocation?

21. What are the drawbacks of Contiguous Allocation of Disk Space?

22. What are the advantages of Linked Allocation?

23. What are the disadvantages of Linked Allocation?

24. What are the various Disk-Scheduling Algorithms?

25. What are the techniques used for performing I/O.

26. Give an example of an application in which data in a file should be accessed in the following order: *Sequentially, Randomly.*

27. What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location?

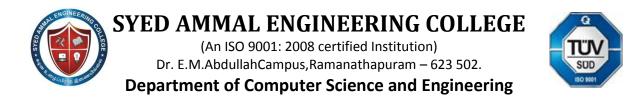28. Why must the bit map for file allocation be kept on mass storage rather than in main memory?

Part-B

1. Write briefly about file attributes, operations, types and structure.

2. Discuss in detail about file allocation methods. What are the possible structures for directory? Discuss them in detail.

3. Explain about disk scheduling and any of its two algorithms with suitable example.

4. Explain the following:

  a. RAID

  b. I/O in Linux

5. Write a detailed note on various file access methods with neat sketch.

6. Explain in detail about free space management with neat diagram.

7. a. Describe the two levels and tree type directory structures in detail.

 b. Describe the life cycle of an I/O request in detail.

8. a. Describe the Windows XP file system in detail.

 b. Explain the directory structure of Linux operating system.

9. a. Describe how the disk space from deleted files can be reused.

 b. Explain in detail the process management and file system in LINUX system.

10. Suppose that the disk drive has 5000 cylinders number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is: 86, 1470, 913, 1174, 948, 1509. 1022, 1750, 130 starting from the current head position, what is the total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the disk scheduling algorithms.

    i. SSTF

    ii. SCAN

    iii. LOOK

    iv. C-LOOK

UNIT-V

Part-A

1. What is meant by Data Striping?

2. What is meant by Boot Disk?

3. What are the Components of a Linux System?

4. What are the main supports for the Linux modules?

5. What is meant by Process?

6. What is meant by Process -ID?

7. What is meant by Personality?

8. What is meant by Buffer cache?

9. What is the Disadvantage of Static Linking?

10. What is meant by Kernel in Linux system?

11. What is meant by System Libraries?

12. What is meant by System Utilities?

13. What is the function of Module management?

14. What is the function of Driver registration?

15. What is the function of Conflict Resolution mechanism?

16. What is meant by Device drivers?

Part-B

1. Explain in detail the design principles, kernel modules, process management, scheduling in LINUX system.

2. Explain in detail the memory management in LINUX system.

3. Explain in detail the file system in LINUX system.

4. Explain in detail about I/O in LINUX system.

5. Describe about the network structure of LINUX system.

6. Explain in detail about the system administration of LINUX system and the requirements for LINUX system administrator.

7. Explain in detail about setting up a LINUX multifunction server.

8. What is virtualization? Explain its concepts in detail.

9. Illustrate the procedure for setting XEN on LINUX host and adding guest OS.

10. Give the procedure for setting VMware on LINUX host and adding guest OS.