TIME: 3.30 P.M. TO 4.30 P.M.   DATE: 09.03.2023   MAX. MARKS: 20

CO1 - Comprehend the techniques used to implement the process manager

CO3 - Design and develop file system and I/O system

ANSWER ALL QUESTIONS

1. What are the functions performed by the file management module in OS? (CO3)

2. What is virtualization? Explain its role in Multimode system. (CO1)

3. Describe the working of the following system calls: i) Delete; ii) Fork. (CO1)

4. What are the thread execution states? What are the operations that are needed to change state of a thread? (CO1)   (4 * 3 = 12)

5. In software solutions for mutual exclusion, why a single shared variable does not satisfy the requirements? Explain how Peterson's algorithm satisfies the requirements. (CO1)

6. Consider the following set of processes with the length of the CPU-burst time given in milliseconds:

Process No.	Arrival Time	CPU Burst time
1	0	8
2	2	4
3	4	2
4	5	4

Find the schedule of the processes using the following scheduling policies: Shortest Remaining Time (SRT); Round Robin (RR) with TQ = 2 units and compute the Average Turnaround Time and Average Waiting Time. (CO1)

(2 * 4 = 8)

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TIME: 9.30 A.M. TO 10.30 A.M.   DATE: 12.04.2023   MAX. MARKS: 20

CO1 – Comprehend the techniques used to implement the process manager

CO2 – Comprehend virtual memory abstractions in operating systems

CO3 - Design and develop file system and I/O system

ANSWER ALL QUESTIONS

1. What is a semaphore? What are its types? What are the operations that can be performed on semaphores? What are its drawbacks?   [CO1]

2. Assume a process has four pages 1, 2, 3, 4 and the number of page frames allotted is 3. All frames are initially empty. Consider the following page reference string.

   1 2 3 2 4 2 1 2 3 4 3 2 1 2

   How many page faults would occur for the following replacement algorithms?

   i)LRU ii) FIFO   [CO2]

                                       (2 * 4 = 8)

3. How deadlocks are detected and avoided using Resource Allocation Graph? [CO1]

4. Why paging is referred as noncontiguous memory management scheme? Explain the address translation process in paging scheme.   [CO2]

5. What is a path name? Write the steps in a path lookup.   [CO3]

6. Compare Create and Delete operations of files and directories.   [CO3]

                                       (4 * 3 = 12)

TIME: 9.30 AM TO 12.30 PM   DATE: 10.05.2023   MAX. MARKS: 100

ANSWER ALL QUESTIONS

CO1- Comprehend the techniques used to implement the process manager

CO2 - Comprehend virtual memory abstractions in operating systems

CO3 - Design and develop file system and I/O system

CO4 - Apply various mechanisms in storage management

CO5 - Design and develop OS modules for Distributed Environment

1a. What is the difference between user mode and kernel mode? Explain using the execution of a single instruction.

 b. What is a Virtual machine? What are its types? What are its advantages and disadvantages?

 c. What is Multithreading? Explain how requests are processed in a multithreaded server. Supposing the client reads a file through the normal blocking system call, which type of thread (User level or Kernel level) is suitable for implementing server? Why?   (CO1) (6, 7, 7)

2a. Assume there are five batch jobs (P1 – P5). All arrive at the same time. Their estimated run times are 8, 6, 4, 10, and 2 minutes respectively. The priorities of the jobs are 4, 3, 2, 5, and 1 and the highest priority is 5. Calculate the average turnaround time and average waiting time for the following scheduling policies:

 i)   Round Robin (TQ = 3)

 ii)   FCFS

 iii)   SJF

 b. In Reader- Writer Problem, what happens when a reader or a writer becomes ready to access the database, and what happens when a process completes reading / writing, if

 i) Readers have higher priority

ii) Readers and Writers alternate. (CO1) (12, 8)

3a. In a static partitioning memory management scheme, what are the advantages of using unequal size partitions? What are the strategies that are used for partition allocation? What are the problems that are associated with static allocation? ᵧ ,ᐟ

b. A 1 MB block of memory is allocated using the Buddy system. Demonstrate the allocation process for the following sequence: Request 150K (A); Request 200K (B); Request 50K (C); Release A; Request 250K (D); Release (B); Release (C); Request 450K (E).

c. Explain how address translation is done in a virtual memory which uses both segmentation and paging management schemes. (CO2) (7, 7, 6)

4a. What are the different ways of implementing free space list? Explain.

b. Consider a disk with 200 tracks and the disk head is initially located at track 50. The requested tracks, in the order received by the disk scheduler, are 178, 23, 39, 50, 75, 100, 65 and 88. Find the number of tracks traversed for FCTS, SSTF, SCAN and LOOK scheduling algorithms.

c. Compare Access control lists and Capabilities. (CO3, CO4) (6, 8, 6)

5a. What are the various of solving mutual exclusion problem in distributed systems? Explain.

b. Differentiate: Caching and Replication in distributed systems. What are the issues related to caching in distributed file systems? (CO5) (10, 10)

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