SARDAR VALLABHBHAI PATEL INSTITUTE OF TECHNOLOGY, VASAD

Computer Engineering - 4th Semester

Questions Bank for Mid Semester Examination

**OPERATING SYSTEM (3140702)**

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|  | What do you mean by Deadlock Avoidance? Explain the use of Banker’s Algorithm for Deadlock Avoidance with illustration |
|  | What is Deadlock? List the conditions that lead to deadlock. How Deadlock can be prevented? |
|  | Explain the following allocation algorithms: 1) First-fit 2) Best-fit 3) Worst-fit |
|  | What is Deadlock? When it occurs? How to recover from it |
|  | Explain the differences between deadlock, live lock and starvation. Give an example of deadlock detection |
|  | Write short note on algorithm which deals with multiple resource allocation |
|  | Explain the use of Banker’s Algorithm for multiple resources for Deadlock  Avoidance with illustration. |
|  | What are the 4 conditions that create a deadlock? |
|  | Explain the use of resource allocation graph |
|  | How can the hold and wait condition be prevented? |
|  | How deadlock are recovered? |
|  | What is fragmentation? What is the need of fragmentation? Explain the difference between internal and external fragmentation |
|  | Give the features of Real Time OS- and Time-Sharing OS. |
|  | **Explain the following in brief**.  (i) Contiguous and Linked List Allocation for implementing File System.  (ii) Distributed Operating Systems. (iii) Interrupt Service Routine  (iv) Elevator Algorithm (v) Device Driver  (vi) Multiprogramming with Fixes Partitions and Multiprogramming with Variable Partitions  (vii) Explain operating system structure of windows 2000 in brief. |
|  | Compare Optimal, LRU and FIFO page replacement algorithms with illustration. |
|  | Explain Swapping in Detail. |
|  | **Give the functions of following UNIX commands:**   |  | | --- | | 1) grep 2) cat 3) chmod 4) head & tail 5) cut 6) cp 7) pwd 8) man 9) who  10) ls 11) rm 12) wc | |
|  | Explain various Disk Scheduling algorithms with illustration. |
|  | Explain various types of I/O devices with examples. Explain the goals of I/O software. |
|  | Draw a diagram of Direct Memory Access and explain its operation. |
|  | Explain elevator algorithm for scheduling disk requests. |
|  | Write short note on algorithm which deals with multiple resource allocation |
|  | Write short note: RAID levels., Disk caching, DMA, I/O Buffering |
|  | Explain SSTF and LOOK disk scheduling algorithms |
|  | What is the difference between logical I/O and device I/O. |
|  | Short note on I/O buffering |
|  | Explain the concept of device driver. |
|  | What is relocation? What is relocation problem? Suggest techniques to solve the same |
|  | What do you mean by logical, relative and physical addresses? |
|  | In fixed partitioning scheme, list the differences in terms of performance for equal and unequal sized partitions. |
|  | How does memory compaction work? |
|  | Explain the problem of fragmentation. |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Consider the following set of processes with the length of CPU burst time given in the milliseconds   |  |  |  |  | | --- | --- | --- | --- | | Process | Arrival Time | Burst Time | Priority | | P1 | 0 | 8 | 3 | | P2 | 1 | 1 | 1 | | P3 | 2 | 3 | 2 | | P4 | 3 | 2 | 3 | | P5 | 4 | 6 | 4 |  |  | | --- | | Calculate average turnaround time and average waiting time for First-come first served scheduling, Shortest job first scheduling and Priority scheduling algorithm. | | |
|  | Consider the following set of processes with length of CPU burst time given in milliseconds.   |  |  |  | | --- | --- | --- | | Process | Burst Time | Priority | | P1 | 10 | 5 | | P2 | 1 | 1 | | P3 | 2 | 3 | | P4 | 1 | 4 | | P5 | 5 | 2 |   Assume arrival order is: P1, P2, P3, P4, P5 at time 0,1,2,3,4 respectively and a smaller priority number implies a higher priority. Draw the Gantt charts for pre-emptive and non-pre-emptive priority scheduling. Calculate Average Turnaround Time and Average Waiting Time. |
|  | Five batch jobs A to E arrive at same time. They have estimated running times 10,6,2,4 and 8 minutes. Their priorities are 3,5,2,1 and 4 respectively with 5 being highest priority. For each of the following algorithm determine mean process turnaround time. Ignore process swapping overhead. Round Robin, Priority Scheduling, FCFS, SJF. |
|  | For the following set of process find the avg waiting time using Gantt chart for  1) SJF 2) 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, P5.  (small priority number implies higher priority) |
|  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Consider the Following set of Processes, with the length of the CPU-burst time given in milliseconds:   |  |  |  | | --- | --- | --- | | Process | Burst Time | Priority | | P1 | 10 | 3 | | P2 | 1 | 1 | | P3 | 2 | 3 | | P4 | 1 | 4 | | P5 | 5 | 2 |   The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time=0.  a). Draw Four Gantt charts illustrating the execution of these processes using FCFS, SJF, non-pre-emptive Priority (a small priority number implies a higher priority) , and Round Robin (quantum =1 ) scheduling.  b.) What is the average waiting time of all processes for each of the scheduling algorithms in part a?  c.) What is the average Turnaround time of all processes for each of the scheduling algorithms in part a? | |
|  | Five jobs A through E arrive at a computer centre with following details   |  |  |  | | --- | --- | --- | | Process | Arrival Time | CPU Time | | A | 0 | 9 | | B | 1 | 5 | | C | 2 | 2 | | D | 3 | 6 | | E | 4 | 8 |   Calculate the Turnaround Time and Waiting Time for all processes applying (i) First Come First Serve (ii) Shortest Job First and (iii) Round Robin (with Time Quanta=3) algorithms. |
|  | Suppose that the following processes arrive for the execution at the times indicated. Each process will run the listed amount of time. Assume pre-emptive scheduling.   |  |  |  | | --- | --- | --- | | Process | Arrival Time | CPU Time | | P1 | 0.0 | 8 | | P2 | 0.4 | 4 | | P3 | 1.0 | 1 |   What is the turnaround time for these processes with Shortest Job First scheduling algorithm? |
|  | Draw the Gantt chart and calculate waiting, turnaround time for following method  1) FCFS 2) Non-pre-emptive SJF 3) Pre-emptive SJF   |  |  |  | | --- | --- | --- | | Process | Arrival Time | Burst Time | | A | 0 | 3 | | B | 1 | 5 | | C | 3 | 2 | | D | 9 | 5 | | E | 12 | 5 | |
|  | Draw the Gantt chart and calculate waiting, turnaround time for following method  1) FCFS 2) pre-emptive SJF 3) RR ( 1 time unit) 4) Non-pre-emptive SJF   |  |  |  | | --- | --- | --- | | Process | Arrival Time | Burst Time | | P1 | 0 | 8 | | P2 | 1 | 4 | | P3 | 2 | 9 | | P4 | 3 | 5 | | P5 | 4 | 6 | |
|  | For the following set of process find the avg waiting time using Gantt chart for  1) SJF 2) Priority Scheduling 3) FCFS 4) RR (quantum time=1)   |  |  |  | | --- | --- | --- | | Process | Burst Time | Priority | | P1 | 5 | 5 | | P2 | 3 | 4 | | P3 | 8 | 3 | | P4 | 2 | 1 | | P5 | 1 | 2 |   The process have arrived in the order P1, P2, P3, P4, P5 all at time 0(zero).  (Higher priority number implies higher priority) |
|  | For the following set of process find the avg waiting time using Gantt chart for  1) Pre-emptive 2) Non-pre-emptive   |  |  |  |  | | --- | --- | --- | --- | | Process | Arrival Time | Burst Time | Priority | | P1 | 0.0 | 6 | 4 | | P2 | 3.0 | 5 | 2 | | P3 | 3.0 | 3 | 6 | | P4 | 5.0 | 5 | 3 | | P5 | 6.0 | 5 | 7 |     (Higher priority number implies higher priority) |
|  | Given memory partition of 100K, 500K, 200K, 300K, and 600K in order, how would each of the First-fit, Best-fit and Worst-fit algorithms place the processes of 212K, 417K, 112K and 426K in order? Which algorithm makes the most efficient use of memory? Show the diagram of memory status in each case |
|  | Disk requests come into the disk for cylinders 10, 22, 20, 2, 40, 6 and 38. A seek  takes 6 msec per cylinder move. How much seek time is for Closest cylinder next algorithm? Initially arm is at cylinder 20.  what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling (i) FCFS (ii) SCAN (iii) SSTF (iv) C-SCAN (v) LOOK (vi) C-LOOK |
|  | Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, are  86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130  Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling (i) FCFS (ii) SCAN (iii) SSTF (iv) C-SCAN (v) LOOK (vi) C-LOOK |
|  | Consider a swapping system in which memory consists of the following hole sizes in memory order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB, 9 KB, 12 KB, and 15 KB. Which hole is taken for successive segment requests of?  (a) 12 KB  (b) 10 KB  (c) 8 KB  For First Fit, Best Fit, Worst Fit. |
|  | Five jobs A through E arrive at a computer centre with following details   |  |  |  | | --- | --- | --- | | Job | Arrival | CPU time | | A | 0 | 9 | | B | 1 | 5 | | C | 2 | 2 | | D | 3 | 6 | | E | 4 | 8 |   Calculate the Turnaround Time and Waiting Time for all processes  applying (i) First Come First Serve (ii) Shortest Job First and (iii) Round  Robin (with Time Quanta=3) algorithms. |
|  | Suppose that a disk drive has 5000 cylinders, numbered 0 to4996. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86,1470,913,1774,948,1509,1022,1750,130 starting from the current head position, what is the total distance(in cylinder) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling algorithm?  FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK |
|  | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Find average waiting time for Shortest job first scheduling, and Round robin scheduling algorithm.   |  |  | | --- | --- | | **Process** | **Burst Time** | | P1 | 6 | | P2 | 8 | | P3 | 5 | | P4 | 2 | | | CPU burst time is given in millisecond and time quantum is 4. | |
|  | Describe the Banker’s Algorithm. Consider a system with five processes and three resource types and at time T0, the following of the system has been taken:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | ALLOCATION | | | MAXIMUM | | | AVAILABLE | | | | P0 | 0 | 1 | 0 | 7 | 5 | 3 | 3 | 3 | 2 | | P1 | 2 | 0 | 0 | 3 | 2 | 2 |  | | | | P2 | 3 | 0 | 2 | 9 | 0 | 2 | | P3 | 2 | 1 | 1 | 2 | 2 | 2 | | P4 | 0 | 0 | 2 | 4 | 3 | 3 |   Show that the system is in safe state. Find the sequence which satisfies the safety criteria. |
|  | Consider a system that supports the strategies of continuous, linked and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | ALLOCATION | | | MAXIMUM | | | AVAILABLE | | | |  | R1 | R2 | R3 | R1 | R2 | R3 | 7 | 7 | 10 | | P1 | 2 | 2 | 3 | 3 | 6 | 8 |  | | | | P2 | 2 | 0 | 3 | 4 | 3 | 3 | | P3 | 1 | 2 | 4 | 3 | 4 | 4 | |