Operating System Important Questions.

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| **UNIT-I** | |
| **1** | Explain various Operating System Services. |
| **2** | What is a System Call? Categorize major groups of System Calls in detail. |
| **3** | Define an Operating System. Explain the concept of Operating-System Generation |
| **4(a)** | Identity the working concept of Single Processor, Multi-Processor and Clustered Systems. |
| **(b)** | Distinguish Multi Media Systems with Handheld Systems. |
| **5** | List the functions provided by operating systems |
| **6(a)** | Summarize the importance of Real time operating systems |
| **(b)** | Model the structure of Operating system in form of  Micro Kernel Structure. |
| **7** | Construct with an example to describe the essential properties of the Multiprogramming and Multi-tasking operating systems |
| **8(a)** | Analyse how operating system layered approach in system structure works |
| **(b)** | Explain about the importance of protection and security in operating systems. |
| **9** | Distinguish the differences between a tightly coupled and loosely coupled systems with examples |
| **10 (a)** | Identify the system calls used in Process Management and Memory Management functionalities of OS |
| **(b)** | Identify the system calls used in File Management and I/O Management and Protection-Security functionalities of OS |
| **11(a)** | Summarize the significance of Distributed Systems with example |
| **(b)** | Explain the role of Operating System in view of User and System |
| **12** | Survey the concept of Single Processor, Multi-Processor and Clustered Systems with neat diagrams. |

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| **UNIT-II** | |
| **1** | Define Process. Explain Various Process States and PCB with a neat diagram. |
| **2** | What is Inter-Process Communication? Compare and Contrast Shared Memory Systems with Message Passing Systems? |
| **3** | Identify the benefits of Multi-Threaded Programming and build the available Multi-Threading Models in OS |
| **4(a)** | Summarize the differences between Pre-emptive or Non-Pre-emptive Scheduling schemes |
| **(b)** | Analyse the working of Round Robin Scheduling Algorithm with suitable example by generating a Gantt chart and waiting and turnaround times |
| **5** | Consider the following process, with 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 |   Process arrived in P1,P2,P3,P4,P5 order at time 0  Apply FCFS, SJF, Non-pre-emptive priority algorithms to Draw Gantt charts. Calculate the waiting time and turnaround time for each scheduling algorithms. |
| **6** | Consider we have the process arrival time chart as given below   |  |  |  |  | | --- | --- | --- | --- | | Process | Arrival Time | Burst Time | Priority | | P1 | 0 | 16 | 1 | | P2 | 0 | 6 | 2 | | P3 | 6 | 10 | 3 | | P4 | 7 | 4 | 4 | | P5 | 8 | 10 | 5 |   Apply FCFS, Priority and Round Robin algorithms to Draw Gantt charts. Calculate the waiting time and turnaround time for each scheduling algorithms. |
| **7 (a)** | Classify the available Process states with process state Life cycle diagram. |
| **(b)** | Distinguish the role of long term scheduler with short term scheduler |
| **8 (a)** | Explain context switch with the help of a neat diagram |
| **(b)** | Outline in brief the difference between different types of schedulers. |
| **9 (a)** | Identify the implementation issues in single threaded and multi-threaded process models with suitable diagrams |
| **(b)** | Dissect the differences between shared memory and message queues |
| **10** | Utilize the following phrases to highlight the working of Scheduling Queues, Schedulers and Content Switch with examples. |
| **11** | Compare and contrast any process scheduling algorithms and its scheduling evaluation criteria that fit in both pre-emptive and non-pre-emptive scheduling algorithms. |
| **12 (a)** | Illustrate the with example when a process Starvation with happen in process scheduling algorithms |
| **(b)** | Infer the working system threads with user threads |

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| **UNIT-III** | |
| **1** | What is a Semaphore? Explain the usage and implementation of semaphores. |
| **2** | Define Independent and Cooperative Processes and Illustrate the importance of Critical Section Problems. |
| **3** | List the three classic problems of synchronization with examples |
| **4(a)** | How to Solve Critical Section Problem with Peterson’s solution? |
| **(b)** | Relate how a Hardware based Synchronization is used to solve Critical Section Problems. |
| **5** | Explain in detail how process synchronization is useful in operating system. |
| **6 (a)** | Identify the difference between binary semaphore and counting semaphore? Explain |
| **(b)** | Build a model that can justify Semaphores can be used to achieve mutual exclusion. |
| **7 (a)** | Inspect how Dining Philosophers Problem give solution using Monitors. |
| **(b)** | Make use of process synchronization and construct a solution for the Readers Writers Problem |
| **8 (a)** | Inspect how Dining Philosophers Problem give solution using Semaphores. |
| **(b)** | Make use of process synchronization and construct a solution for the Producer Consumer Problem |
| **9 (a)** | Demonstrate briefly about the instructions TestAndSet(), Swap() |
| **(b)** | Choose an algorithm that sues test and set() instruction to satisfy all the critical section requirements. |
| **10.** | Distinguish the differences between Independent and Cooperative Processes with examples in detail |
| **11.** | What is a Monitor? Explain the usage and implementation of Monitors |
| **12.** | Demonstrate Hardware based Synchronization for Critical Section Problem |

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| **UNIT-IV** | |
| **1** | What is a Deadlock? Explain all the features that characterize the Deadlocks |
| **2** | Identify how Safe Sequence is derived with Bankers’ Algorithm towards Deadlock Avoidance |
| **3** | Dissect the role of Mutual Exclusion, Hold & Wait, No Preemption and Circular Wait methods towards Deadlock Prevention |
| **4(a)** | Outline the Safe State of Deadlock Avoidance. |
| **(b)** | Relate how Deadlock Avoidance can be represented with Resource-Allocation-Graph Algorithm. |
| **5 (a)** | Outline the Safe State of Deadlock Avoidance. |
| **(b)** | Explain Deadlock Avoidance with Resource-Allocation-Graph Algorithm. |
| **6** | Inspect the available Methods that are used to Recover from a Deadlock. |
| **7** | Illustrate Deadlock Detection – Algorithm Usage and explain different methods to handle deadlocks. |
| **8** | Experiment with an example and derive a safe sequence, resource-allocation by make use of Bankers’ Algorithm |
| **9** | The operating system contains 3 resources, the number of instances of each type are 10, 5, 7. The current resource allocation state is as follows.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | Allocation | | | Max | | | |  | A | B | C | A | B | C | | **P0** | 0 | 1 | 0 | 7 | 5 | 3 | | **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 |   Build a model to justify current allocation in a safe state? Identify can a request for (3,3,0) by P4 be granted? |
| **10 (a)** | Explain Detection Methods with Single Instance of Resources. |
| **(b)** | Outline the Detection Methods with Several Instance of Resources. |
| **11** | Dissect the available Methods that are used to Recover from a Deadlock. |
| **12** | Inspect the conditions that must satisfy for Deadlock Occurrence and explain them. |

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| **UNIT-V** | |
| **1** | Experiment with the following reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 over the MMU algorithms FIFO, LRU, and Optimal Page Replacement. Identify the outcomes of each Algorithms for 3 frames. |
| **2** | Compare and contrast Fragmentation with Paging with examples |
| **3** | List what are the differences between Segmentation and Virtual Memory |
| **4** | Summarize the various Memory Allocation Methods with examples. |
| **5** | Consider the following page reference string: 1,2,3,4,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.  Analyse how many page faults would occur for the FIFO and LRU replacement algorithm for 3 frames? |
| **6** | Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3.  Experiment with Optimal Page Replacement, FIFO Page Replacement and LRU Page Replacement Algorithms to find out the number of page faults |
| **7 (a)** | Explain what is Thrashing? Describe various causes of thrashing |
| **(b)** | Illustrate the importance of Virtual Memory and its influence on memory management? |
| **8** | Outline the significance of Virtual Memory in memory management unit of OS. |
| **9 (a)** | Identify the areas where Swapping techniques is used in memory management |
| **(b)** | Classify in brief the importance paging and swapping |
| **10 (a)** | Identify the memory management unit techniques that make use of Non-Contiguous Memory Allocation |
| **(b)** | Compare and Contrast in detail about the internal and external Fragmentation |
| **11** | Summarize what is demand paging? Discuss in detail the steps in handling a page fault. Explain about performance of demand paging in detail. |
| **12 (a)** | Outline what is segmentation? Describe in detail about general method with hardware implementation of segmentation |
| **(b)** | Dissect the need of paging and its function towards page replacement? Discuss the basic method of paging in detail. |

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| **UNIT-VI** | |
| **1** | Survey with an example how Free-Space Management in file and disk management. |
| **2** | Develop a disk scheduling example which can model solutions for working of FCFS SSTF SCAN C-SCAN methods. |
| **3** | Outline the importance of Directory Implementation towards Contiguous Allocation and Link Allocation Methods |
| **4** | Compare and contrast Sequential Access with Direct Access Methods |
| **5 (a)** | Inspect the available directory structure in various operating systems |
| **(b)** | List in detail the significant aspects of tree level and acyclic level directory |
| **6** | Identity the various directory implementation used by OS in file system. |
| **7** | Summarize about the variety of techniques used by OS to improve the efficiency and performance of secondary storage. |
| **8 (a)** | Demonstrate with examples about the various allocation methods used by OS in organizing the file system. |
| **(b)** | Model the advantages of linked allocation over contiguous allocation method |
| **9** | Inspect the relations of the file attributes, file operations and file structure in the file system? |
| **10 (a)** | Relate how indexed allocation fits in Directory structures |
| **(b)** | Identity in detail about the various types of file types. |
| **11** | Explain about the utilization of monitoring system in file system, remote system and distributed information systems. |
| **12** | Distinguish the usage of directory implementation towards continuous and linked allocation methods. |

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