Code No:A109211901

R09

SET-1

B.Tech II Year - I Semester Examinations, December 2011
FUNDAMENTALS OF OPERATING SYSTEMS
(ELECTRONICS AND COMPUTER ENGINEERING)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks

1.a)   What are the main purposes of an Operating System.
  b)   Explain the properties of the following types of an OS
       i) Distributed Systems.   ii) Real Time Systems.   [15]

2.a)   Describe the differences among Short-term, Medium-term & Long-term Scheduling.
  b)   Write short notes on Multilevel Queue Scheduling & Multilevel Feedback Queue
       Scheduling.   [15]

3.a)   What is Critical Section? Explain the requirements for Critical Section problem to be
       solved?
  b)   Explain Readers –Writers Problem with its appropriate solution.   [15]

4.a)   Explain the differences between Internal & External Fragmentation.
  b)   Consider the following page reference string:
            1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6.
       How many page faults would occur for the following replacement algorithms?
       Note: All frames are initially empty.
       i) LRU replacement.
       ii) FIFO replacement.
       iii) Optimal replacement.   [15]

5.a)   Explain how Deadlock can be Prevented.
  b)   Write short notes on DMA Transfer.   [15]

6.a)   Explain how Protection is provided for files & Directories.
  b)   Discuss on Directory implementation.   [15]

7.   Discuss on Swap-Space management & Tertiary storage structure.   [15]

8.a)   Discuss the concept of Protection domain.
  b)   Explain why Authentication is required for providing security.   [15]

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FUNDAMENTAL SOF OPERATING SYSTEMS
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Answer any five questions
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1.a) Describe the differences between Symmetric & Asymmetric Multiprocessing. What are the advantages & disadvantages of Multiprocessor Systems?
  b) What is the purpose of Command Interpreter? Why is it usually separate from the Kernel? [15]

2.a) Explain different Inter Process Communication (IPC) mechanisms.
  b) Distinguish between a Thread & a Process. What resources are used when a thread is created? How do they differ from those used when a process is created? [15]

3.a) What is a Semaphore? Explain how a semaphore provides a solution to Critical Section Problem.
  b) Explain Dining Philosophers Problem giving its solution through the Synchronization tool MONITOR. [15]

4.a) Explain the following allocation algorithms with a suitable example.
    i) First Fit   ii) Best fit   iii) Worst fit.
  b) Explain the concept of segmentation in detail. [15]

5.a) What is Deadlock ? Explain the necessary conditions for Deadlock to arise.
  b) Explain the lifecycle of an I/O request with a block diagram. [15]

6. Explain the different types of Directory Structures. [15]

7. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, & the previous request was at 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 cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk-scheduling algorithms?
    i) FCFS   ii) SSTF   iii) SCAN
    iv) LOOK   v) C-SCAN. [15]

8.a) How does Cryptography works as a Security tool?
  b) Write short notes on Access Matrix. [15]

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1.a) Explain the five major categories of System Calls provided by an Operating System.
 b) Write short notes on Protection & Security provided by an OS.   [15]

2.a) Define the difference between Preemptive & Non-Preemptive Scheduling.
 b) Explain the different Scheduling criteria.
 c) Discuss on Thread Scheduling.   [15]

3.a) Explain the concept of Bounded-buffer problem & how it is solved.
 b) Show that Two-Phase locking Protocol ensures conflict serializability.   [15]

4.a) Given memory partitions of 100K, 500K, 200K, 300K & 600K (in order), how would
      each of the First-fit, Best-fit, Worst-fit algorithms place processes of 212K, 417K, 112K
      & 426K (in order)? Which algorithm makes the most efficient use of memory?
 b) When do Page faults occur? Describe the actions taken by the operating system when a
      page fault occurs.   [15]

5.a) Explain about Bankers algorithm.
 b) Discuss the services provided by the Kernel I/O subsystem.   [15]

6.a) Explain different file access methods in detail.
 b) Discuss all file allocation methods.   [15]

7.   Discuss in detail on RAID Structures.   [15]

8.a) Explain how does a firewall helps to protect the system & network.
 b) Describe the different implementations of Access Matrix.   [15]

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1.a) Distinguish between User mode & Monitor mode. Explain how does it provides protection for hardware.
  b) Explain in detail about the system structure of MS-DOS & UNIX OS.   [15]

2.a) 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.
i) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF, a non-preemptive priority (a smaller priority number implies a higher priority), & RR (quantum = 1) scheduling.
ii) What is the turnaround time of each process for each of the scheduling algorithms mentioned above?
iii) What is the waiting time of each process for each of the scheduling algorithms?
  b) Explain different Threading models.   [15]

3.a) Explain the concept of Transaction atomicity.
  b) Show that, if the **wait** and **signal** operations are not executed atomically, then mutual exclusion may be violated.   [15]

4.a) Discuss all the Page Replacement algorithms with a suitable example.
  b) What is Demand Paging? Explain how to improve the performance of Demand Paging.   [15]

5.a) Discuss how a deadlock can be avoided. Explain how to recover from a deadlock.
  b) Write short notes on
  i) Polling   ii) Blocking & Non-Blocking I/O.   [15]

6.a) Explain the file system implementation in UNIX & WINDOWS OS.
  b) Discuss on File attributes, file operations, file types, and file structures.   [15]

7. Explain about Disk structure & Disk Scheduling algorithms.   [15]

8.a) Write short notes on Revocation of Access Rights.
  b) Discuss on System & network Threats.   [15]

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