

Code.No: 07A51504

R07

SET-1

**III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**  
**OPERATING SYSTEMS**  
**(COMMON TO CSSE, E.COMP.E)**

**Time: 3hours****Max.Marks:80**

**Answer any FIVE questions**  
**All questions carry equal marks**

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- 1.a) Enumerate three advantages of the multiprocessor systems. Depict the symmetric multiprocessing architecture diagram. Contrast the symmetric mode and asymmetric mode with respect to the clustered systems and the multiprocessor systems?
- b.) Depict the diagrams for the following
  - i) Abstract view of the components of a computer system
  - ii) Storage device hierarchy. [8+8]
- 2.a) Enumerate the issues related to SMP systems under multiprocessor scheduling. Contrast multilevel queue scheduling and multilevel feedback scheduling with diagrams.
- b) Describe deterministic modeling for CPU scheduling algorithm evaluation. [12+4]
- 3.a) What is critical section problem? What are the requirements its solution must satisfy? What are the approaches generally applied to handle critical sections in operating systems? Contrast.
- b) Give pseudocodes for the following:
  - i) Lock-based solution for critical section problem.
  - ii) Mutual-exclusion implementation with TestAndSet()
  - iii) Mutual-exclusion implementation with the Swap() instruction.
  - iv) The structure of a process in Peterson's solution. [8+8]
4. Explain any 4 page replacement algorithms with diagrams. [16]
- 5.a) Enumerate the conditions that characterize a deadlock? Explain resource-allocation-graph algorithm for deadlock detection with relevant diagrams.
- b) Enumerate the methods for handling a deadlock. What are safe state and safe sequence? [12+4]
- 6.a) Explain the free space management methods.
- b) Compare and contrast the file systems with respect to the following:  
UNIX, Linux, Windows.
- c) Explain any two schemes for improving the efficiency and performance of secondary storage. [6+6+4]
7. Explain the RAID levels and their applications with diagrams. [16]
- 8.a) Enumerate system protection goals. Contrast protection vs. security. Depict by diagram how there can be a system with many domains of protection.
- b) What issues arise with respect to access rights revocation?
- c) Enumerate any four methods for implementing security defenses? [8+4+4]

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1. Enumerate the activities an operating system is responsible for in connection with the following?  
 i) Process Management.  
 ii) Memory Management.  
 iii) File Management.  
 iv) Disk management. [16]
2. Contrast FCFS and SJF algorithms with typical Gantt charts. Contrast the CPU scheduling in Unix vs. Linux vs. Windows. [16]
- 3.a) Give pseudocodes for the following:  
 i) Definitions of wait ( ) and signal( )  
 ii) Mutual exclusion implementation with semaphores  
 iii) Deadlock in implementing semaphore.  
 b) Give “C” codes for the following: (i) definition of a semaphore (ii) definitions of wait ( ), signal( ). [8+8]
- 4.a) Explain segmentation, its basic method and hardware support with diagrams.  
 b) Contrast hashed page tables with inverted page tables. [12+4]
5. Explain the data structures needed for the Banker’s algorithm. Explain the safety algorithm and the resource-request algorithm. [16]
- 6.a) Depict the diagrams for the following:  
 i) A typical file-system organization  
 ii) Single-level directory  
 iii) Two-level directory  
 b) Contrast the disk space allocation methods with diagrams for the following: linked Vs. indexed. [10+6]
- 7a) Explain about Swap-Space Use, Swap-Space location and Swap-Space management.  
 b) Explain following tertiary-storage devices  
 i) Removable disks  
 ii) Tapes. [8+8]
- 8.a) Explain the access matrix model of protection. Depict by diagram how domains could be objects.  
 b) Explain the three implementation methods of access matrix.  
 c) Explain RBAC. [7+6+3]

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SET-3

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- 1.a) Explain about the special-purpose computer systems.  
 b) Enumerate any 8 operating system services as follows:  
 i) As functions that are helpful to the user  
 ii) For ensuring the efficient operation of the system itself. [8+8]
- 2.a) Depict the process state diagram and the process control block diagram.  
 b) Explain the following CPU scheduling evaluation methods.  
 i) Queuing Models.  
 ii) Simulations. [8+8]
3. Give pseudo codes or “C” codes for any four of the following 5 processes:  
 i) The structures of the producer and consumer processes in the bounded-buffer problem  
 ii) The structures of the reader and writer processes in the Readers-Writers Problem.  
 iii) The structure of philosopher process in the Dining philosophers problem. [16]
4. Explain paging, its basic method, hardware support and protection with diagrams. [16]
5. a) Explain the Banker’s algorithm for deadlock avoidance illustratively.  
 b) Explain: Polling, DMA, Buffering, Caching. [8+8]
- 6.a) Depict the diagrams for the following:  
 i) Tree-structured directory structure  
 ii) Acyclic-graph directory structure.  
 iii) General graph directory.  
 b) Depict the schematic view of a virtual file system. [8+8]
7. Explain the following disk scheduling algorithms with illustrative diagrams.  
 i) FCFS ii) SSTF iii) SCAN iv) C-SCAN v) C-LOOK. [16]
- 8.a) Enumerate the schemes that implement the revocation for capabilities w.r.t. revocation of access rights.  
 b) Explain system and network threats by diagrams where possible. [6+10]

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1. What are the types of operating systems? Enumerate the structure and the related system calls for each type. [16]
2. Enumerate the CPU scheduling criteria. Contrast priority scheduling and round-robin algorithms with typical Gantt charts. [16]
3. Compare and contrast the process synchronization in Unix, Linux and Windows. [16]
- 4.a) What is dynamic storage allocation problem? Explain the solution strategies. Contrast internal vs. external fragmentation problems and their solutions.  
b) Explain about hierarchical paging. [12+4]
- 5.a) Explain the deadlock recovery methods and related issues.  
b) Enumerate the steps in the deadlock detection algorithm  
c) Depict the interrupt-driven I/O cycle diagram. [6+6+4]
- 6.a) Explain any four access methods for information in a file with diagrams for any two.  
b) Contrast tree-structured directory vs. Acyclic Graph directory with diagrams. [12+4]
- 7.a) Explain the two disk storage access methods with diagrams. Explain about SAN with diagram.  
b) Define: seek time, rotational latency time, and disk bandwidth. [12+4]
- 8.a) Distinguish protection and security.  
b) Define secure system. Explain program threats. [5+11]

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