

III B. Tech I Semester Regular Examinations, November - 2015

OPERATING SYSTEMS

(Common to CSE and IT)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answering the question in **Part-A** is compulsory3. Answer any **THREE** Questions from **Part-B**

PART -A

- 1 a) Define Operating System. List the objectives of an operating system. [3M]
- b) With a neat diagram, explain various states of a process. [4M]
- c) Give the Peterson's solution to the Critical section problem. [4M]
- d) Distinguish between Logical and Physical address space. [3M]
- e) What are the necessary conditions for the occurrence of deadlock? [4M]
- f) What are the various attributes that are associated with an opened file? [4M]

PART -B

- 2 a) With a neat diagram, explain the layered structure of UNIX operating system. [8M]
- b) What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices? [8M]
- 3 a) What is a process? Explain about various fields of Process Control Block. [8M]
- b) What are the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain. [8M]
- 4 a) What is a Critical Section problem? Give the conditions that a solution to the critical section problem must satisfy. [8M]
- b) What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors. [8M]
- 5 a) What is a Virtual Memory? Discuss the benefits of virtual memory technique. [8M]
- b) What is Thrashing? What is the cause of Thrashing? How does the system detect Thrashing? What can the system do to eliminate this problem? [8M]
- 6 a) What is a deadlock? How deadlocks are detected? [8M]
- b) Explain the Resource-Allocation-Graph algorithm for deadlock avoidance. [8M]
- 7 a) Briefly explain about single-level, two-level and Tree-Structured directories. [8M]
- b) Explain and compare the SCAN and C-SCAN disk scheduling algorithms. [8M]

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PART -A

- 1 a) Explain how multiprogramming increases the utilization of CPU. [3M]
- b) What are the advantages of inter-process communication? Also explain various implementations of inter-process communication. [4M]
- c) What is a Semaphore? Also give the operations for accessing semaphores. [4M]
- d) What is the purpose of Paging and Page tables? [3M]
- e) What are the various methods for handling deadlocks? [4M]
- f) Briefly explain the indexed allocation method. [4M]

PART -B

- 2 a) Explain the Dual-Mode operation of an operating system. [8M]
- b) Mention the objectives and functions of Real-Time Embedded systems. [8M]
- 3 a) With a neat sketch, explain the process state diagram. [8M]
- b) What are the criteria for evaluating the CPU scheduling algorithms? Why do we need it? [8M]
- 4 a) What is a semaphore? List the types of semaphores and Show that, if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated. [10M]
- b) Discuss the Bounded-Buffer problem. [6M]
- 5 a) What is a page fault? Explain the steps involved in handling a page fault with a neat sketch. [8M]
- b) Consider the following page reference string: [8M]
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 optimal page replacement algorithm, assuming three frames and all frames are initially empty.
- 6 a) Write about deadlock conditions and bankers algorithm in detail. [10M]
- b) Discuss various techniques to recover from the deadlock. [6M]
- 7 a) Write in detail about file attributes, operations and types and structures. [8M]
- b) Explain in detail about various ways of accessing disk storage. [8M]

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PART -A

- 1 a) What are the various security issues that arise in multiprogramming and time shared systems? [3M]
- b) Describe the differences among short-term, medium-term, and long-term scheduling. [4M]
- c) Briefly explain the Readers-Writers problem. [4M]
- d) What are the disadvantages of single contiguous memory allocation? [3M]
- e) Explain the various ways of aborting a process in order to eliminate deadlocks. [4M]
- f) What is the drawback of Network-attached storage systems? [4M]

PART -B

- 2 a) With a neat sketch, describe the services that an operating system provides to users, processes and other systems. [8M]
- b) Distinguish between client-server and peer-to-peer models of distributed systems. [8M]
- 3 a) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created? [8M]
- b) Explain the Round Robin scheduling algorithm with a suitable example. [8M]
- 4 a) State the Critical Section problem. Illustrate the software based solution to the Critical Section problem. [8M]
- b) How does the signal() operation associated with monitors differ from the corresponding operation defined for semaphores. [8M]
- 5 a) What are the disadvantages of single contiguous memory allocation? Explain. [6M]
- b) Discuss the hardware support required to support demand paging. 10M
- 6 a) How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail. 10M
- b) Is it possible to have a deadlock involving only a single process? Explain. [6M]
- 7 a) Explain the various methods for free-space management. 10M
- b) Discuss various issues involved in selecting appropriate disk scheduling algorithm. [6M]

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