



BHARATI VIDYAPEETH'S

INSTITUTE OF COMPUTER APPLICATIONS & MANAGEMENT (BVICAM)
(Affiliated to Guru Gobind Singh Indraprastha University, Approved by AICTE, New Delhi)
A-4, Paschim Vihar, Rohtak Road, New Delhi-110063, Visit us at: <http://www.bvicam.in/>

Course Code: MCA-102

Course Name: Data and File Structures

Class Test - I

Time: 1 Hour

Max Marks: 20

A. State true or false.

(0.5×5 = 2.5)

- (1) The analysis of algorithms is concerned primarily with determining the memory and time requirements of an algorithm. [True] [False]
- (2) In linked list representation of binary tree, there is more number of NULL pointers than actual pointers. [True] [False]
- (3) Undo-mechanism in any text editor is implemented with stack. [True] [False]
- (4) Divide and conquer algorithms have exponential growth rate. [True] [False]
- (5) A parity bit is an extra bit included with a message to make the total numbers of 1's transmitted either odd or even. [True] [False]

B. Fill in the blanks with appropriate answer.

(0.5×5 = 2.5)

- (1) A is a region of memory used to temporarily hold data while it is being moved from one place to another.
- (2) AVL tree checks the height of the left and the right sub-trees and assures that the difference is not more than
- (3) B-trees are commonly used in
- (4) Intraversal, the left subtree is visited first, then the root and later the right sub-tree.
- (5) The density of data is measured in per track.

C. Choose the correct option.

(0.5×10 = 5)

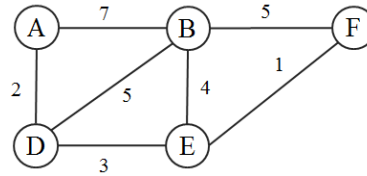
- (1) How many pointers need to be modified in deleting an element from the end of a linear linked list?
 - a) 1
 - b) 2
 - c) 3
 - d) 4
- (2) What is the run time complexity of binary search?
 - a) $O(\log n)$
 - b) $O(n \log n)$
 - c) $O(n)$
 - d) None of the above

- (3) If several elements are competing for the same bucket in the hash table, what is it called?
- Diffusion
 - Replication
 - Collision
 - Duplication
- (4) What is the search complexity in direct addressing?
- $O(n)$
 - $O(\log n)$
 - $O(n \log n)$
 - $O(1)$
- (5) Which of the following data structures is implemented to traverse a graph using breadth first search?
- Queue
 - Stack
 - Heap
 - None of the above
- (6) Which of the following is not an in-place sorting algorithm?
- Selection sort
 - Heap sort
 - Quick sort
 - Merge sort
- (7) What is the slack of head event for critical activity?
- 0
 - 1
 - 1
 - Depends upon the project
- (8) Which of the following is a valid statement for critical path?
- Critical path will always have all activities with positive slack.
 - Critical path cannot be delayed or else the entire project will be delayed.
 - Critical path will be the path with the most number of activities.
 - Critical path must have at least three activities.
- (9) In sequential file organization, records are stored according to value of
- record's entry
 - record's elimination
 - search key
 - function
- (10) In disk access, data are transferred between disk and main memory in
- units of blocks
 - units of segments
 - units of sectors
 - units of cluster

D. Answer the following questions.

(2×5 = 10)

- (1) Write a function to remove all duplicate elements from a linear linked list.
- (2) Discuss the divide and conquer problem solving approach. List the name of searching and sorting techniques which follow divide and conquer principle
- (3) Construct a B-tree of order 3 by inserting numbers from 1 to 10.
- (4) Apply Kruskal's algorithm to construct the minimum cost spanning tree for the following graph:



- (5) Compare text file with binary file. Give examples of each.