

THIRD SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2015

(CUCBCSS – UG)

Core Course

BCA 3B 04—DATA STRUCTURES USING C++

Time : Three Hours

Maximum : 80 Marks

Part A

Answer **all** questions.
Each question carries 1 mark.

1. The number of elements in an array $a[l : u]$ could be determined by :
(a) $(u + l + 1)$. (b) $(u + l + 2)$.
(c) $(u - l + 1)$. (d) $(u - l + 2)$.
2. Sparse matrices have :
(a) No zero. (b) Many zeroes.
(c) Higher dimension. (d) None of the above.
3. Which of the following data structure can't store the non-homogenous data elements :
(a) Records. (b) Arrays.
(c) Files. (d) Linked lists.
4. A data structure where elements can be added or removed at either end but not in the middle :
(a) Stack. (b) Queue.
(c) Linked list. (d) Dequeue.
5. Which of the following is a two-way list :
(a) Singly linked list. (b) Circular list.
(c) Linked list with head node. (d) None of the above.
6. Node which is of degree zero is called :
(a) Root node. (b) Terminal node.
(c) Non-terminal node. (d) None of the above.
7. You can remove an element from a queue's _____
(a) Top. (b) Front.
(c) Bottom. (d) Rear.

Turn over

8. The maximum number of nodes in a binary tree of depth k is :
- (a) $2k - 1$. (b) $2k^{-1}$.
 (c) $2 * (k - 1)$. (d) $2k^{-2}$.
9. Which of the following is useful in traversing a graph in breadth first search :
- (a) Stack. (b) Queue.
 (c) Linked list. (d) Tree.
10. Adjacency lists are used for _____
- (a) Stack representation. (b) Queue representation.
 (c) Graph representation. (d) Array representation.

(10 x 1 = 10 marks)

Part B

*Answer **all** questions.
 Each question carries 2 marks.*

11. What is an abstract data type ?
 12. What is time complexity ?
 13. Discuss about pointer arrays.
 14. What are the applications of queues ?
 15. Discuss indexed searching.

(5 x 2 = 10 marks)

Part C

*Answer any **five** questions.
 Each question carries 4 marks.*

16. Discuss the various approaches to algorithm design.
 17. Explain recursion with an example.
 18. Discuss array as an abstract data type.
 19. Explain the way to represent a sparse matrix using arrays.
 20. What is a queue ? What are its applications ?
 21. Explain the bubble sort technique.
 22. Describe the different methods to represent binary tree in memory.
 23. Explain binary search.

(5 x 4 = 20 marks)

Part D

*Answer any **five** questions.
 Each question carries 8 marks.*

24. What is an algorithm ? Explain the performance analysis of algorithms.
 25. Differentiate between static and dynamic data structures.

26. What is an array data structure ? Explain the representation of arrays in memory.
27. What is a stack ? Write a program to implement a stack using array.
28. What is a circular queue ? Write the algorithms for insertion and deletion operations on a circular queue.
29. Discuss the application of graph structures. What are the different methods to traverse graphs ?
30. Write a program to implement heap sort. Explain.
31. What is hashing ? Explain the different hash functions.

(5 × = 40 marks)