

2015

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA-203

(Data Structures Using C)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 50)

*The figures in the margin indicate full marks
for the questions*

1. (a) What do you understand by DMA?
Explain the difference between malloc()
and realloc(). 6
- (b) Explain the time and space efficiency of
an algorithm. 4
- Or
- (c) What do you understand by data
structure? Explain the different types of
data structure with a neat diagram. 6
- (d) What is a pointer? How do you initialize
and access a variable through its
pointer? Explain. 4

(2)

2. (a) What is searching? Explain the different types of searching technique with an appropriate example. 6

(b) Write a C program to search a list using binary search. 4

Or

(c) Write a C program to sort a given list using merge sort. 4

(d) Explain the working of heapsort with a suitable example. 6

3. (a) Explain the following stack operations : 7

(i) Stack overflow

(ii) Push

(iii) Pop

(b) Evaluate the following expressions : 3

(i) $x*(c+d) + (j/k)*n + m*p$

(ii) $123 + *783/-$

Or

(c) What is a deque? Explain with a neat diagram. 4

(d) Write a C program to insert and delete the elements in a queue. 6

4. (a) Explain insertion and reverse operation in a singly linked list. 7

(b) Explain any three applications of linked list. 3

Or

(c) What is a doubly linked list? Write a C program to implement doubly linked list. 10

5. (a) What is a binary search tree? Explain in detail how an element is inserted and searched. 5

(b) Write a C program to insert an element in a binary tree. 5

Or

(c) Explain the differences between the following : 10

(i) Adjacency list and Adjacency matrix

(ii) Depth first search and Breadth first search

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA-203

(Data Structures Using C)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(Marks : 15)

- 1. Tick (✓) the correct answer in the brackets provided :**
1×10=10

(a) From the given options, which one is not a stack application?

- (i) Recursion ()**
- (ii) Reverse string ()**
- (iii) Template ()**
- (iv) Conversion of number ()**

(b) Time complexity of quicksort is

- (i) $O(n)$ ()**
- (ii) $O(\log n)$ ()**
- (iii) $O(n \log n)$ ()**
- (iv) $O(n \log_2 n)$ ()**

- (c) Which of the following is a pointer to the starting node?
- (i) Rear pointer ()
 - (ii) Null pointer ()
 - (iii) Internal pointer ()
 - (iv) External pointer ()
- (d) Data values of different types are grouped as
- (i) homogenous data structure ()
 - (ii) non-homogenous data structure ()
 - (iii) dynamic data structure ()
 - (iv) static data structure ()
- (e) When a circular queue is full, and if one element is removed, the next element is stored at
- (i) first location ()
 - (ii) last location ()
 - (iii) intermediate location ()
 - (iv) None of the above ()
- (f) Which of the following enables bidirectional traversing?
- (i) Singly linked list ()
 - (ii) Circular linked list ()
 - (iii) Priority linked list ()
 - (iv) Doubly linked list ()

- (g) Which of the following is a link or a reference to data structure?
- (i) Pointer ()
 - (ii) Structure ()
 - (iii) Logical ()
 - (iv) None of the above ()
- (h) Records must be sorted before applying which of the following sorting technique?
- (i) Linear search ()
 - (ii) Binary search ()
 - (iii) Selection search ()
 - (iv) None of the above ()
- (i) When every non-leaf node in binary tree is filled with left and right sub-trees, the tree is called
- (i) strictly binary tree ()
 - (ii) complete binary tree ()
 - (iii) extended binary tree ()
 - (iv) None of the above ()
- (j) When a degree of node is zero, then the node is called
- (i) pendant node ()
 - (ii) minimal node ()
 - (iii) group node ()
 - (iv) isolated node ()

(4)

2. State whether the following statements are *True (T)* or *False (F)* by a Tick (✓) mark : 1×5=5

(a) The prefix notation is also known as reverse polish notation.

(T / F)

(b) In bubble sort, the sorting is done with comparing first and last elements.

(T / F)

(c) A graph is linked if there is a pathway between any two nodes of the graph.

(T / F)

(d) In the list of elements, for any location n , $n - 1$ is predecessor and $n + 1$ is successor.

(T / F)

(e) The information of adjacent nodes can be stored in the matrix.

(T / F)

(5)

SECTION—B

(Marks : 10)

3. Answer the following questions :

2×5=10

(a) Differentiate between FIFO and LIFO.

(6)

(b) What do you understand by internal searching?

(7)

(c) Describe spanning tree.

(8)

(d) What is an array of pointers?

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(e) What is a linked list? Explain with an appropriate example.
