

2015

(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.

(b) What do you understand by internal searching?

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(7)

(c) Describe spanning tree.

(8)

(d) What is an array of pointers?

(9)

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

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. (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

(3)

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

III/BCA/301 (OC)

2015

(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-301 (OC)

(Data Structure Using C)

(Old Course)

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 is a data structure? Write the primitive and non-primitive data structures. 3
- (b) What is an array? Explain arrays of pointers. 3

Or

- (a) What do you mean by malloc and calloc functions? Explain. 4

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(Turn Over)

- (b) What is a pointer? How is a pointer initialized? 2
2. (a) What is a stack? What are the basic operations performed on a stack? 3
- (b) Explain the following terms : 3
- (i) Infix expression
 - (ii) Postfix expression
 - (iii) Prefix expression

Or

- (a) Convert the expression of $A + B / C - D$ to postfix form. 3
- (b) Convert the expression of $A * B + C$ to prefix expression. 3
3. (a) Write a C program for the insertion and deletion operations performed on queue. 5
- (b) How is the queue different from the stack? 2

Or

- (a) Write a C program for the insertion and deletion operations performed on the circular queue. 5
- (b) What is dequeue? 2

(3)

4. What is a linked list? Explain briefly the different types of linked list. 10

Or

Write a C program to concatenate two singly linked lists.

5. (a) Explain sequential search. 3
(b) Sort the following numbers using merge sort operation : 4

8, 3, 2, 9, 7, 1, 5, 4

Or

- (a) What is binary search? 3
(b) Sort the following numbers using selection sort : 4

89, 45, 68, 90, 29, 34, 17

6. What is a binary tree? Write the types of binary tree. Explain complete binary tree. 7

Or

- (a) What is threaded binary tree? 3
(b) Explain three binary tree traversals. 4

(4)

7. (a) What is spanning tree? 3
(b) Describe breadth-first traversal (BFS)
and depth-first traversal (DFS). 4

Or

Explain briefly Kruskal's and Prim's
algorithms. 7

III/BCA/301 (OC)

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(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-301 (OC)

(Data Structure using C)

(Old Course)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(Marks : 15)

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

1. Which of the following is not a dynamic memory allocation?

(a) Malloc ()

(b) Calloc ()

(c) Realloc ()

(d) Dalloc ()

2. What will be the output of the following?

```
Main()  
{ char *p;  
  P = "BCA"  
  Printf ("%cn", *&*p)
```

(a) BCA ()

(b) B ()

(c) CA ()

(d) A ()

3. Stack is useful in implementing

(a) radix ()

(b) BFS ()

(c) recursion ()

(d) DFS ()

4. The minimum number of fields with each node of double linked list is

(a) 1 ()

(b) 2 ()

(c) 3 ()

(d) 4 ()

(3)

5. Which of the following is not an operation on queue?

(a) Insert ()

(b) Rear End ()

(c) Delete ()

(d) Display ()

6. A circular list can be used to represent

(a) stack ()

(b) queue ()

(c) tree ()

(d) All of the above ()

7. Which of the following sort methods is stable?

(a) Insertion sort ()

(b) Heap sort ()

(c) Bubble sort ()

(d) Quick sort ()

8. The data for which you are searching is called the

(a) search argument ()

(b) sorting argument ()

(c) deletion argument ()

(d) binary argument ()

9. The number of nodes in a binary tree of level 1 is

(a) 1 ()

(b) 2 ()

(c) 3 ()

(d) 4 ()

10. The time required to find shortest path in a graph with n vertices and e edges is

(a) $O(e)$ ()

(b) $O(n)$ ()

(c) $O(e^2)$ ()

(d) $O(n^2)$ ()

II. Tick (✓) whether the following statements are True (T) or False (F) : 1×5=5

1. The free function is used to de-allocate the previously allocated memory using malloc or calloc functions.

(T / F)

2. The first end of the queue is called front and the later is called rear.

(T / F)

3. A tree may be traversal in a non-recursive.

(T / F)

4. For a null graph, adjacency matrix is a null matrix.

(T / F)

5. Spanning tree algorithms are Prim's and Kruskal's.

(T / F)

(6)

SECTION—II

(Marks : 10)

III. Answer the following questions : 2×5=10

1. Distinguish between LIFO and FIFO.

(7)

2. What are the operations of singly linked list?

(8)

3. What is heap sort?

4. What are the applications of stack?

(9)

5. What is graph?
