

2012  
 (DECEMBER)  
**BACHELOR OF COMPUTER APPLICATIONS**  
 Paper No. 301  
 (Data Structure Using 'C')  
 Full Marks : 75

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

(Part B : Objective)  
 (Marks:25)  
 Time: 3 hrs.  
**SECTION-I**

1. 1. Tick (✓) the correct answer : (1x10=10)

(a) Which of the following is correct for the following segment of code?

```
main()
{ int n[25];
  n[0]=100, n[24]=20;
  printf("n %d %d", *n, *(n+24)+*(n+0)); }
```

- |       |     |     |         |
|-------|-----|-----|---------|
| (i)   | 100 | 300 | (     ) |
| (ii)  | 100 | 200 | (     ) |
| (iii) | 300 | 100 | (     ) |
| (iv)  | 200 | 100 | (     ) |

(b) malloc() returns pointer to:

- |       |           |         |
|-------|-----------|---------|
| (i)   | integer   | (     ) |
| (ii)  | character | (     ) |
| (iii) | void      | (     ) |
| (iv)  | structure | (     ) |

(c) In a linked list the logical order of elements

- (i) Is not necessarily equivalent to their physical arrangement. ( )
- (ii) Is same as their physical arrangement. ( )
- (iii) Is determined by their physical arrangement ( )
- (iv) none of the above ( )

(d) The  $n$ th node in singly linked list is accessed via (where  $n > 1$ )

- (i) the head node ( )
- (ii) the tail node ( )
- (iii)  $(n-1)$  node ( )
- (iv) none of the above ( )

(e) The initial configuration of queue is a, b, c, d ('a' is at the front) to get the configuration d, c, b, a one needs a minimum of

- (i) 2 deletions and 3 additions ( )
- (ii) 3 deletions and 2 additions ( )
- (iii) 3 deletions and 3 additions ( )
- (iv) 3 deletions and 4 additions ( )

(f) Evaluate the following prefix expression:  $- * 6 3 - 4 1$

- (i) 25 ( )
- (ii) 15 ( )
- (iii) 23 ( )
- (iv) 12 ( )

(g) This sort inserts each elements  $A(k)$  into proper position in the previously stored subarray  $A(1), \dots, A(k-1)$

- (i) insertion sort ( )
- (ii) radix sort ( )
- (iii) bubble sort ( )
- (iv) merge sort ( )

(h) For sorting contiguous list of records quicksort may be preferred over merge sort because

- (i) it requires less time always. ( )
- (ii) it does not require extra space for an auxiliary storage ( )
- (iii) it requires more and more programming effort ( )
- (iv) some programming language does not support recursion. ( )

(i) Which of the following statements is true in view of a complete binary tree?

- (i) The number of nodes at each level is 1 less than some power of 2. ( )
- (ii) The outdegree of every node is exactly equal to 2 or 0. ( )
- (iii) The total number of nodes in the tree is always some power of 2 ( )
- (iv) All of the above statement are corrects. ( )

(j) If a binary tree is threaded for an inorder traversal order, NULL left link of any node is replaced by the address of its:

- |                       |         |
|-----------------------|---------|
| (i) successor         | (     ) |
| (ii) Predecessor      | (     ) |
| (iii) root            | (     ) |
| (iv) all of the above | (     ) |

2. State whether the following statement is true or false:

(1x5=5)

- (a) In linked list successive elements need not occupy adjacent space in memory. (     )
- (b) The number of elements in a queue, at any time is :  $q.rear - q.front - 1$ . (     )
- (c) For stack and queue, arbitrary amount of memory can be allocated.. (     )
- (d) Radix search algorithms work with bits or components of the keys instead of the complete keys. (     )
- (e) A binary tree is threaded according to particular traversal order. (     )

## SECTION-II

3. Answer the following questions.

(a) Define time and space complexity.

(2)

(b) Write short note on dequeue.

(2)

2)

(c) Mention the advantages of linked list over array. (2)

(d) Sort the numbers ie. 345, 123, 78, 1579 by using shell sort. (2)



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(e) What are the different operations on binary tree

(2)

\*\*\*\*\*IIBCA-301\*\*\*\*\*

2012  
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**BACHELOR OF COMPUTER APPLICATIONS**  
Paper No. 301  
(Data Structure Using 'C')  
Full Marks : 75  
(Part B : Descriptive)  
(Marks:50)  
*Time: 3 hours*

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

**Answer the following questions:**

1. (i) What is Dynamic Memory Allocation? (2)  
(ii) Explain pointer and function with appropriate program. (4)

**OR**

What are linear and nonlinear data structure and explain them in brief. (6)

2. What is an ascending and descending of priority queue? Explain how a priority queue can be implemented. Mention its applications. (6)

**OR**

Apply the evaluation algorithm, trace for the valid postfix expression: (6)

A B + C - B A + C \$ - for given value a=1, B=2, C=3.

3. Write a C program to perform the following operation on circular queue: (8)  
(i) Insert (ii) delete (iii) display

**OR**

Write the prefix and post fix expression form of the following infix expressions: (8)

- (i)  $(A+B-D)/(E-F)+G$   
(II)  $(A*(B+D)/E-F*(G+H/K))$   
(ii)  $((A+B*C-(D-E))$(F+G))$
4. Enlist the advantages and disadvantages of double linked list over singly linked list. Also write the function to insert a number in a given position in double linked list. (4+6=10)

**OR**

What is stack? Write a C program to implementing stack as a linked list. Also develop the function to perform following operation on stack as a linked list. (1+9=10)

- (i) Insertion  
(ii) deletion  
(iii) display

5. (i) Write a C Program to sort the given numbers by using merge sort. (5)  
(ii) Mention the merits and demerits of insertion and shell sort. (2)

**OR**

Show the steps to sort the following elements in ascending order using (7)

19 13 05 27 01 26 31 16 02 09 11

(i) Selection Sort

(ii) Bubble Sort

6. (i) Define the following terms: (2+2=4)

(a) Internal and external node of tree

(b) Complete binary tree

- (ii) What are the different applications of binary tree? (2)

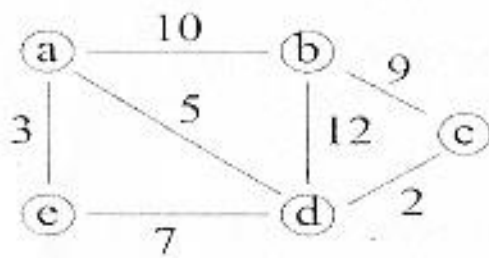
**OR**

Write the insertion and deletion function of binary search tree. (6)

7. Write the algorithm of DFS. Explain with an example.(7)

**OR**

Considering the following graph and calculate the minimum spanning tree by using Kruskal's algorithm. Show each steps. (7)



\*\*\*\*\*III/BCA/301\*\*\*\*\*