

2014

(3rd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-301

(Data Structures using C)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(Marks : 15)

1. Tick (✓) the correct answer of the following : 1×10=10

(a) The proper choice of data structure allows major improvement in program

(i) efficiency ()

(ii) coding style ()

(iii) understanding ()

(iv) All of the above ()

(b) int refers to which one of the following statements as true regarding the expression $((\text{char}^*)p)++$?

- (i) It gives the first byte of the value pointed by p and increments p by 1 ()
- (ii) It increases p by 1 ()
- (iii) This expression is not portable ()
- (iv) It increments the first byte of the value pointed by p by 1 ()

(c) The following sequence of operations performed on a stack push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop. The sequence of popped out values is

- (i) 2, 2, 1, 1, 2 ()
- (ii) 2, 2, 1, 2, 2 ()
- (iii) 2, 1, 2, 2, 1 ()
- (iv) 2, 1, 2, 2, 2 ()

(d) The initial configuration 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 ()

- (e) Linear order in linked list is provided through
- (i) index number ()
 - (ii) the implied position of the node ()
 - (iii) pointer ()
 - (iv) All of the above ()
- (f) Inserting a node in a doubly linked list after a given node requires
- (i) one-pointer change ()
 - (ii) four-pointer change ()
 - (iii) two-pointer change ()
 - (iv) three-pointer change ()
- (g) Which of the following sorting methods works in $O(n \log n)$ time in the average case?
- (i) Bubble sort ()
 - (ii) Quick sort ()
 - (iii) Selection sort ()
 - (iv) Insertion sort ()

(h) Which of the following sorts inserts each elements $A(k)$ into its proper position in the previously sorted subarray $A(1), \dots, A(k-1)$?

(i) Radix sort ()

(ii) Insertion sort ()

(iii) Merge sort ()

(iv) Bubble sort ()

(i) Breadth first search

(i) scans all incident edges before moving to other vertex ()

(ii) scans adjacent unvisited vertex as soon as possible ()

(iii) is same as backtracking ()

(iv) All of the above ()

(j) An adjacency matrix representation of a graph cannot contain information of

(i) nodes ()

(ii) edges ()

(iii) direction of edges ()

(iv) parallel edges ()

(5)

2. State whether the following statements are True (T) or False (F) : 1×5=5

(a) Dynamically allocated memory can only be accessed using pointers.

(T / F)

(b) A priority queue is implemented using an array of stacks.

(T / F)

(c) In circular header list, successive elements need not occupy adjacent space in memory.

(T / F)

(d) A radix sort requires each phase to be stable.

(T / F)

(e) The in-degree of a vertex is the number of edges leaving it.

(T / F)

(6)

SECTION—II

(Marks : 10)

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

(a) How do you declare and initialize pointer?

(7)

(b) What is priority queue? (4)

(c) What is balanced binary tree?

(8)

(c) How is linked list efficient than array?

(9)

(d) Write a note on bubble sort.

(e) What is treaded binary tree?

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BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-301

(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 mean by dynamic memory allocation? Mention the different functions used for this. Explain the function that is used for allocating the required size of memory with example. 6

Or

- (b) What are linear and nonlinear data structures? 2
- (c) Write a program to illustrate pointer and function. 4

G15—280/200a

(Turn Over)

2. (a) Explain different types of queue with appropriate diagram.

7

Or

- (b) Show the detailed contents of the stack for given postfix expression to evaluate

$6\ 2\ 3\ +\ -\ 3\ 8\ 2\ /\ +\ * \ 2\ \$\ 3\ +$

3. (a) Write a C program to perform the following operations on stack using an array :

7

- (i) Push
- (ii) Pop
- (iii) Display

Or

- (b) What are the postfix and prefix of the following?

- (i) $((A + B * C - (D - E)) \$ (F + G))$
- (ii) $A * (B + D) / E - F * (G + H / K)$

4. (a) What is singly linked list? Write a C program to insert an element after a given node in a singly linked list.

10

Or

- (b) Write a C program to simulate the working of a queue of integers using linked list. Provide the following operations :

- (i) Insert
- (ii) Delete
- (iii) Display

5. (a) What is searching? Write a program of binary search. 6

Or

- (b) Sort the following number by using
(i) selection sort, (ii) shell sort and
(iii) insertion sort :

120 17 96 4 28 41

6. (a) Write the algorithm of preorder, inorder and postorder of binary traversal method. 7

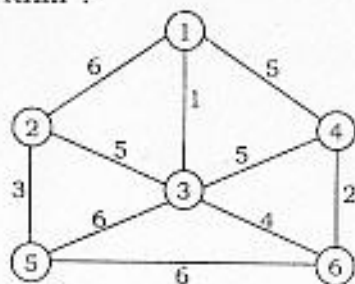
Or

- (b) A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequences of nodes :

Inorder	D	G	B	A	H	E	I	C	F
Preorder	A	B	D	G	C	E	H	I	F

Draw the binary tree.

7. (a) What is minimal spanning tree? For the following graph, calculate the minimal spanning tree by using Kruskal's algorithm : 7



(4)

Or

(b) What is DFS? Consider the following graph to find the DFS :

