

QUESTION 2016

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following:

i) The most appropriate matching for the following pairs:

X. Bubble Sort 1. $O(\log_2 n)$

Y. Linear Search 2. $O(n^2)$

Z. Binary Search 3. $O(n)$

X Y Z

a) 1 2 3

b) 3 1 2

c) 3 2 1

✓ d) 2 3 1

ii) The best data structure to evaluate an arithmetic expression (in postfix form) is

a) queue

✓ b) stack

c) tree

d) linked list

iii) The tree traversal technique in which the root is traversed after its children is known as

✓ a) post-order traversal

b) pre-order traversal

c) in-order traversal

d) none of these

iv) Let q be the queue of integers defined as follows:

```
# define MAX 10
```

```
struct queue
```

```
{ int data [MAX];
```

```
int rear, front;
```

```
} q;
```

To insert an element into the queue, we may write operation

a) $++q.data[q.rear] = x;$

b) $q.data[q.rear]++ = x;$

✓ c) $q.data[++q.rear] = x;$

d) none of these.

v) A linear collection of data elements where the linear node is given by means of pointer is called

✓ a) linked list

b) node list

c) tree

d) none of these

vi) Adjacency matrix for an undirected graph is

a) unit matrix

✓ b) symmetric matrix

c) asymmetric matrix

d) none of these

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vii) An adjacency matrix representation of a graph cannot contain information of

- a) Nodes
- b) Edges
- c) Direction of edges
- ✓ d) Parallel edges

viii) Which of the following data structures may give overflow error, even though the current number of elements in it, is less than its size?

- ✓ a) Simple queue
- b) Circular queue
- c) Stack
- d) None of these

ix) Number of possible binary trees with 4 node is

- ✓ a) 14
- b) 34
- c) 24
- d) none of these

x) Number of nodes in a complete binary tree of depth k is

- a) $2k$
- b) 2^k
- ✓ c) $2^k - 1$
- d) none of these

xi) Time complexity of insertion sort algorithm in the best case is

- ✓ a) $O(n)$
- b) $O(n \log_2 n)$
- c) $O(n^2)$
- d) none of these

xii) The following sequence of operations is performed on a stack:

push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop.

The sequence of popped values is

- a) 2, 2, 1, 2, 1
- ✓ b) 2, 2, 1, 1, 2
- c) 2, 1, 2, 2, 1
- d) 2, 1, 2, 2, 2

xiii) Which of the following traversal techniques lists the nodes of binary search tree in ascending order?

- a) Post-order
- ✓ b) In-order
- c) Pre-order
- d) None of these.

xiv) The most appropriate matching for the following pairs:

- | | |
|-----------------------|----------|
| X. First in First Out | 1. Tree |
| Y. Depth First Search | 2. Queue |
| Z. In-order Traversal | 3. Graph |

- | | | | |
|------|---|---|------------|
| X | Y | Z | |
| a) 1 | 2 | 3 | b) 3 1 2 |
| c) 3 | 2 | 1 | ✓ d) 2 3 1 |

xv) p is a pointer to a structure. A member x of that structure is referenced by

✓ a) $(*p).x$

b) $p \rightarrow x$

c) $*(p.x)$

d) none of these

Group – B

(Short Answer Type Questions)

2. What do you mean by 'Abstract Data Type'? Explain with an example.

See Topic: INTRODUCTION, Short Answer Type Question No. 1.

3. What are the advantages of linked list over array?

See Topic: LINKED LIST, Short Answer Type Question No. 1.

4. What is stack? Explain with an example.

See Topic: ARRAYS, STACKS & QUEUES, Long Answer Type Question No. 4.

5. How is a binary tree different from binary search tree?

See Topic: TREES & GRAPHS, Long Answer Type Question No. 2(a).

6. Write an algorithm/C-function for preorder traversal of a binary tree.

See Topic: TREES & GRAPHS, Short Answer Type Question No. 16.

7. How does binary search give benefit over linear search?

See Topic: SEARCHING & SORTING, Long Answer Type Question No. 1(b).

8. What will be the complexity (best case) for the following operations?

Question is incomplete

9. What are the uses of Depth First Search?

See Topic: TREES & GRAPHS, Short Answer Type Question No. 1.

Group – C

(Long Answer Type Questions)

10. a) What is a linked list? What are its advantages over arrays? Also state its disadvantage over array.

b) Write a c-function to delete a node from a given linked list.

c) What are the advantages of doubly linked list over singly linked list?

a) See Topic: LINKED LIST, Short Answer Type Question No. 2.

b) See Topic: LINKED LIST, Long Answer Type Question No. 1.

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c) See Topic: LINKED LIST, Short Answer Type Question No. 5.

11. a) Write a C-function to implement 'push' and 'pop' operations in a stack.

b) What is a circular queue? What advantage do we get from circular queue over ordinary queue?

a) See Topic: ARRAYS, STACKS & QUEUES, Short Answer Type Question No. 2.

b) 1st part: See Topic: ARRAYS, STACKS & QUEUES, Long Answer Type Question No. 3.

2nd part: See Topic: ARRAYS, STACKS & QUEUES, Long Answer Type Question No. 1(a).

12. a) Convert the following infix expression to corresponding postfix expression:

$$4 + 3 * 10 / 6 + 7 - 4 / 2 + 5 \wedge 3$$

See Topic: ARRAYS, STACKS & QUEUES, Short Answer Type Question No. 4.

b) Write a complete C program or algorithm for insertion sort.

See Topic: SEARCHING & SORTING, Long Answer Type Question No. 3.

13. a) What is binary search tree?

b) Construct the binary search tree if the elements are in the order:

60, 75, 25, 66, 50, 55, 45, 40, 35, 57, 30

c) Delete the following nodes in order and show each step:

i) Node with 55

ii) Node with 66

iii) Node with 50

d) Consider the following sequence of a binary tree traversals:

Inorder: B C E D F A G H

Preorder: A B C D E F G H

Construct the tree.

a) See Topic: TREES & GRAPHS, Short Answer Type Question No. 7.

b) & c) See Topic: TREES & GRAPHS, Long Answer Type Question No. 3.

d) See Topic: TREES & GRAPHS, Long Answer Type Question No. 4.

14. Write short notes on any three of the following:

a) Graph and their representation in computer

See Topic: TREES & GRAPHS, Long Answer Type Question No. 25(k).

b) Non-linear data structure

See Topic: INTRODUCTION, Long Answer Type Question No. 1(b).

c) Quick sort

See Topic: SEARCHING & SORTING, Long Answer Type Question No. 4.

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d) Breadth first search

See Topic: TREES & GRAPHS, Long Answer Type Question No. 25(j).

e) Prim's Algorithm.

See Topic: TREES & GRAPHS, Long Answer Type Question No. 25(l).