BRAINWARE UNIVERSITY

Term End Examination 2022
Programme – MCA-2022
Course Name – Data Structures and Algorithms
Course Code - MCA101
(Semester I)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) State that Finding the location of the element with a given value of an array is called
a) Traversal b) Search
c) Sort d) None of these

(ii) Identify the blank space from the options _____ is something very useful in situations where data needs to store and then retrieved in reverse order.
a) Stack b) Queue
c) List d) Link list

(iii) Identify the data structure that allows deleting data elements from front and inserting at the rear
a) Stack b) Queue
c) List d) None of these

(iv) Judge the linked list from the below options that have the last node of the list pointing to the first node
a) circular doubly linked list b) circular linked list
c) circular singly linked list d) doubly linked list

(v) Identify from the options that which Data Structure is used to perform Recursion
a) Queue b) Stack
c) Tree d) Linked list

(vi) concider an array as int arr[30], identify the elements can it hold
a) 30 b) 31
c) 0 d) 1

(vii) Choose the Correct definition from the options of an internal sorting algorithm
a) Algorithm that uses tape or disk during the sort b) Algorithm that uses main memory during the sort
c) Algorithm that involves swapping d) Algorithm that is considered 'in place'

(viii) Choose the correct algorithm from the following that pays the least attention to the ordering of the elements in the input list

a) Insertion sort
b) Selection sort
c) Quick sort
d) Merge sort

(ix) Choose the correct algorithm from the following that has lowest worst case time complexity

a) Insertion sort
b) Selection sort
c) Bubble sort
d) Heap sort

(x) Select form the options: A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24 The number of the node in the left sub-tree and right sub-tree of the root, respectively, is

a) (4, 7)
b) (7, 4)
c) (8, 3)
d) (3, 8)

(xi) Select form the options to fill the blank space "_____ is a directed tree in which out degree of each node is less than or equal to two."

a) Unary tree
b) Binary tree
c) Ternary tree
d) both binary tree & Ternary tree

(xii) Choose form the options: Binary Search can be categorized into which of the following

a) Brute Force technique
b) Divide and conquer
c) Greedy algorithm
d) Dynamic programming

(xiii) Choose form the options: Degree of a leaf node is

a) 0
b) 1
c) 2
d) 3

(xiv) Adapt the correct option: Which algorithm is better for sorting between bubble sort and quicksort

a) Bubble sort
b) Quick sort
c) Both are equally good
d) None of these

(xv) Adapt the correct option: Which of the following is not a stable sorting algorithm

a) Insertion sort
b) Selection sort
c) Bubble sort
d) Merge sort

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain array with an example. (3)
3. Explain Binary Search tree (BST) in detail. (3)
4. Illustrate the differences between stack and queue. (3)
5. Evaluate Data structure. (3)
6. Discuss the differences between full binary tree and complete binary tree. (3)

OR

Discuss the difference between a PUSH and a POP? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the sorting technique of Selection Sort with the help of the given elements 77, 49, 25,12,9,33,56,81. (5)
8. Discuss the conversion of the following infix expression to post fix notation ((a+2)*(b+4)) -1 (5)
9. Discuss merge sort and write the pseudo code of merge sort (5)
10. Explain insertion and deletion of a queue with proper example. (5)
11. Define the various type of indexing (5)

12. Write down Recursion in data structure with the help of an example and appropriate algorithm. (5)

OR

Write down Circular Queue in detail with a proper algorithm and a neat diagram. (5)

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