BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-2024/B.Tech.(CSE)-AIML-2024/B.Tech.(CSE)-AIR-2024
Course Name – Data Structure and Algorithms
Course Code - BES07010 (T)
(Semester II)

Full Marks : 40 **Time : 2:0 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 10=10

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

(i) The given array is arr = {1,2,3,4,5}. (bubble sort is implemented with a flag variable)Select the number of iterations require by selection sort and bubble sort respectively

a) 5 and 4 b) 1 and 4
c) 0 and 4 d) 4 and 1

(ii) Choose the correct empty condition(underflow) of circular queue.

a) Font == -1 b) Font == Rear
c) Font > Rear d) Rear == -1

(iii) Select the sorting technique that use the term 'pivot'

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

(iv) Select the arrangement of the array elements after second pass using insertion sort for [34, 8, 64, 51, 32, 21]

a) 8, 21, 32, 34, 51, 64 b) 8, 32, 34, 51, 64, 21
c) 8, 34, 51, 64, 32, 21 d) 8, 34, 64, 51, 32, 21

(v) The post-order traversal of a binary tree is O P Q R S T. Choose the pre-order traversal

a) T Q R S O P b) T O Q R P S
c) T Q O P S R d) T Q O S P R

(vi) Select which of the following case does not exist in complexity theory-

a) Worst case b) Average case
c) Null case d) Best case

(vii) Select which of the following FIFO method-

a) Queue
b) Stack
c) Hash Table
d) Linked List

(viii) Select what is the purpose of asymptotic notations in computer science and algorithm analysis?

a) To precisely measure the execution time of algorithms
b) To provide a lower bound on the running time of algorithms
c) To classify algorithms based on their efficiency with respect to input size
d) To define algorithms in a way that minimizes their time complexity

(ix) Select the characteristic that is NOT a good algorithm.

a) Efficiency
b) Clarity
c) Simplicity
d) Inefficiency

(x) Identify expression conversion in the context of stacks.

a) Changing the format of an expression
b) Evaluating an expression
c) Converting numbers to text
d) Creating a new expression

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define asymptotic notations. (3)
3. Interpret the pseudo code to find the running time complexity? for (int i=0; i<=n; i) { if (i %2 == 0) { i = i 2; } else { i=i-2; } } (3)
4. Discuss suitability of B-Tree for scenarios like file systems and databases. (3)
5. Describe the Sparse Matrix with proper example (3)
6. Explain the concept of a push algorithm in a stack. (3)

OR

Explain the concept of a pop algorithm in a stack. (3)

Group-C

(Long Answer Type Questions) 5 x 3=15

7. Construct a binary search tree for the following numbers start from an empty binary search tree. 45,26,10,60,70,30,40. Delete keys 10,60 and 45 one after the other and show the trees at each stage. (5)
8. Describe the difference between time complexity and space complexity. (5)
9. Explain the algorithm for BFS using an example. (5)

OR

Explain the algorithm for DFS using an example. (5)

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