समानी मन्त्रः समितिः समानी

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2022

CC5-COMPUTER SCIENCE (31)

DATA STRUCTURES

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

1. Answer any ***five*** of the following: 1×5 = 5

   (a) What do you understand by data? 1

   (b) Why do we need dynamic array? 1

   (c) Is circular linked-list a linear data structure? 1

   (d) Which data structure is suitable for expression evaluation? 1

   (e) If any two of the traversal sequences of a binary tree are same, what can we say about the binary tree? 1

   (f) Which data structure is preferred to implement queue? 1

   (g) What do you understand by ADT? 1

   (h) To implement a stack using queue, how many queues will be required? 1

2. Answer any ***three*** of the following: 5×3 = 15

   (a) Establish array as an ADT. 5

   (b) When do we prefer arrays over linked list? 5

   (c) Explain complete binary tree with example. How is it different from full binary tree? 3+2

   (d) How do we classify linear and nonlinear data structures? Explain with suitable example. 5

   (e) What do you understand by a decision tree? 5

3. Answer any ***two*** of the following: 10×2 = 20

   (a) Write down an algorithm to store a 2D matrix in column major order. How to find repeated numbers in an array if it contains multiple duplicates? 5+5

   (b) Give two representations of graphs. What do you mean by in-degree and out-degree of a graph? Write an algorithm for DFS. Demonstrate DFS using suitable example. 2+2+3+3

   (c) In a complete binary tree of depth d (complete including last level), give an expression to find the number of leaf nodes in the binary tree. Write an algorithm to insert an element into a binary search tree. 3+7

   (d) Write an algorithm to represent a polynomial expression using a linked list. 10

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