'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Programme 4th Semester Examination, 2023

DSC1/2/3-P4-COMPUTER SCIENCE

DATA STRUCTURES

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

Answer any *five* questions 1×5 = 5

1. Differentiate between linear and non-linear data structure.
2. What is push and pop?
3. To implement a stack using a queue, how many queues will be needed?
4. What is the difference between full binary tree and complete binary tree?
5. What is a head node in a linked list?
6. "Is an empty linked list really empty?"— Justify.
7. What do you understand by data? What are the different data formats available?
8. Which data structure is suitable for expression evaluation?

GROUP-B

Answer any *three* questions 5×3 = 15

9. Convert the following infix expression to prefix and postfix.

$$A + B \wedge (C + D) - E * F + G$$

10. What is a simple queue? What is its disadvantage? How can it be overcome?
11. Write an algorithm for push and pop operations.
12. What are the advantages of a linked list over an array?
13. Arrange the following list of elements in ascending order using insertion sort, showing the steps involved.

    10, 1, 7, 37, 5, 26, 54, 29, 16, 7

GROUP-C

Answer any *two* questions 10×2 = 20

14. Write an algorithm for insertion of a node in a singly linked list at the following positions.

    (i) At the beginning (ii) At the end (iii) Anywhere in the middle
15. Explain the different tree traversal algorithms.
16. What is recursion? How can we find the factorial of a number using recursive as well as iterative approach?
17. Discuss the array representation and linked representation of a queue.

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