UNIVERSITY OF NORTH BENGAL

BCA Honours 3rd Semester Examination, 2020

CC5-BACHELOR OF COMPUTER APPLICATION (31)

DATA STRUCTURES

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

Answer any *two* questions from the following   20×2 = 40

1. (a) What do you understand by the term 'data structure'?   2

    (b) Define and explain the concept of Array data structure.   3

    (c) State the advantages and disadvantages of Array over linked list.   5

    (d) Write down the corresponding Array traversal and searching algorithm.   6

    (e) State the significance of sparse representation of matrices with a suitable example.   4

2. (a) State any four application of stack.   2

    (b) Define Prefix, Infix and Postfix notation of expression with some suitable example.   6

    (c) Write an algorithm to convert an expression from infix to postfix notation.   6

    (d) Convert the following infix expression using the same algorithm.   6

    $$a+b*(c \wedge d-e) \wedge (f+g*h)-i$$

3. (a) Discuss the implementation details of a stack using linked list.   5

    (b) Write algorithms to insert a node in a doubly (two-way) linked list at the following position: 9

    (i) At the Beginning

    (ii) Anywhere in the middle

    (iii) At the end

    (c) In what way, doubly linked list is better than single linked list. Give examples.   6

4. (a) Discuss the significance of queue data-structure. 5

   (b) Discuss the array and linked implementation of queue. 10

   (c) Explain the concept of De-queue. 5

5. (a) State the three laws of recursion. 6

   (b) Explain the Tower of Hanoi problem. Derive a recursive solution for this problem. 10

   (c) Explain the role of stack for solving recursive problem. 4

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