



WEST BENGAL STATE UNIVERSITY
B.A./B.Sc. Honours 2nd Semester Examination, 2020

CMAACOR03T –COMPUTER APPLICATION (CC3)

DATA STRUCTURE

Time Allotted: 2 Hours

Full Marks: 40

*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 Question Number 1 and any four from the rest

1. **Answer any four questions from the following:** 2×4 = 8
 - (a) Define an ADT. Give an example.
 - (b) Give an example of a non-linear data structure. Why is it called non-linear?
 - (c) Draw a Binary search tree which when traversed in Inorder generates the string:
E A C K F H D B G
 - (d) What are the limitations of binary search method?
 - (e) State the use of sparse matrices.
 - (f) What is meant by time complexity of an algorithm?

2. (a) “A stack is FIFO list.”– Do you agree? Give reasons. 2+6
(b) Write an algorithm for basic stack operations using an array.

3. (a) What are the advantages of a circular queue over a linear queue? Illustrate with an example. 4+4
(b) Write an algorithm for Insert operation in a circular queue.

4. (a) Write an algorithm to reverse the directions of links in singly linked list. 4+(3+1)
(b) Write a recursive algorithm for binary search method. What is its complexity?

5. (a) Show that the number of null links of a binary tree with n nodes is $n+1$. 3+5
(b) Write an algorithm for searching a given element in a binary search tree. If the element is not present, your algorithm should insert it in the tree so that it remains a binary search tree.

6. (a) Write an algorithm for selection sort. What is its complexity? 5+3
(b) Illustrate the algorithm with an example.

7. (a) What do you mean by a Height-Balanced Tree (AVL)? 2+(2+4)
- (b) What are the characteristics of a good Hash Function? Explain how collision is resolved by linear probing with Open Addressing.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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