exam
SyDS

VCD/25/10/23 S.Y.B.S.C(Data Science) SEM III Data Structures and Algorithm Using Python

2 ½ HRS 75 Marks

N.B. (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3)Answers to the same questions must be written together.
(4)Numbers to the right indicate marks.
(5)Draw neat labeled diagrams wherever necessary.
(6)Use of Non-programmable calculators is allowed

Q1. Attempt any three of the following: **15M**

a. Explain the concept of Shallow and deep copying.
b. What are the goals, principles and patterns of python programming.
c. Write a note on Recursion and backtracking
d. Write a short note on Asymptotic analysis
e. Explain ChainMaps in detail.
f. Write a short note on Ordered dictionaries

Q2. **Attempt any three of the following:** **15M**

a. Explain in detail array pointer concept.
b. Differentiate between append operation and a faster append operation.
c. Explain in detail deleting nodes in the singly linked list.
d. Explain Doubly linked list class in detail.
e. Explain append operation of circular linked list with suitable example.
f. Write a short note on Bracket-matching application

Q3. **Attempt any three of the following:** **15M**

a. Write a program to implement inorder, preorder and postorder traversal of trees.
b. Explain the stack based implementation of a queue.
c. Write a program to demonstrate Breadth-first traversal.
d. List out the benefits of a binary search tree.
e. Explain in detail Ternary search tree.
f. Explain the concept of finding the minimum and maximum nodes in the tree.

Q4. . **Attempt any three of the following:** **15M**

a. Explain different types of hashing functions.
b. Write a short note on Chaining.
c. Explain the concept of Graph traversal in detail.
d. Write a short note on Weighted graph.

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e. Explain the following terms:

i) Indegree ii)Outdegree iii)Isolated vertex iv)Source vertex v)Sink vertex

f. Explain in detail breadth first traversal in graph.

Q5. **Attempt any three of the following:** **15M**

a. Explain in detail the Quick sort algorithm.

b. Write a note on the Median of medians partitioning step.

c. Sort the elements using selection sort algorithm

4 3 2 10 12 1 5 6

d. Explain the concept of pivot selection illustrated with an example.

e. Write a short note on Brute- force algorithm

f. Explain the concept of Insertion sort algorithm with example.

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