HN-003-3042001

B. Sc. I. T. (Sem. II) (CBCS)

(W.E.F. 2022) Examination

April - 2023

CS-07 : Data Structure Using C – Language

(New Course)

Faculty Code : 003

Subject Code : 3040001

Time : **2½** Hours / Total Marks : **70**

1 (a) Attempt the following : **4**

(1) Backtracking algorithm is improvement of_____algorithm.

(2) Define algorithm.

(3) Space complexity includes _____and _____.

(4) _____Asymptotic notation is an average case analysis of an algorithm.

1 (b) Answer in Brief : (Any **One**) **2**

(1) Explain dangling pointer problem.

(2) Explain enum.

1 (c) Answer in detail : (Any **One**) **3**

(1) Explain Big – O notation.

(2) List out classes of algorithm. Explain any one.

1 (d) Write a note on following : (Any **One**) **5**

(1) Write short note on DMA.

(2) Explain time and space complexity.

2 (a) Attempt the following : 4

     (1) Merge sort algorithm is based on_____paradigm.

     (2) What is pivot in quick sort algorithm ?

     (3) What is the basic idea of shell sort ?

     (4) Write advantage of quick sort.

2 (b) Answer in Brief : (Any **One**) 2

     (1) Write bubble sort algorithm.

     (2) Write Linear search algorithm.

2 (c) Answer in detail : (Any **One**) 3

     (1) Write a program of insertion sort.

     (2) Write a program that search a value from the list using index search.

2 (d) Write a note on following : (Any **One**) 5

     (1) Explain binary search algorithm.

     (2) Write a program that arranges 10 numbers in ascending order using merge sort.

3 (a) Attempt the following : 4

     (1) Write full form of TOS.

     (2) In queue deletion is performed at which point ?

     (3) What is the main difference between Queue and Deque ?

     (4) Stack can be implemented using_____and _____.

3 (b) Answer in Brief : (Any **One**) 2

     (1) List out stack applications.

     (2) List out queue applications.

3 (c) Answer in detail : (Any **One**)   **3**

      (1) What is data structure? Explain types of data structure.

      (2) Write short note on priority queue.

3 (d) Write a note on following : (Any **One**)   **5**

      (1) Write a program that performs following operations on stack.

      push(), pop(), and display()

      (2) Write a program that performs following operations on queue.

      Insert(), delete() and display().

4 (a) Attempt the following :   **4**

      (1) In linked list first node is also known as_____.

      (2) In header linked list head node contains which types of values.

      (3) In circular linked list next of last node contains_____.

      (4) In doubly linked list node contains which type of values.

4 (b) Answer in Brief : (Any **One**)   **2**

      (1) List out application of linked list.

      (2) Write an algorithm that insert new node at first position in singly linked list.

4 (c) Answer in detail : (Any **One**)   **3**

      (1) Write a program that reverses the singly linked list.

      (2) Differentiate singly linked list and doubly linked list.

4 (d) Write a note on following : (Any **One**)   5

    (1) Write a program that performs following operations on circular linked list.

        (1) Create()   (2) Display()

        (3) Insert_last()   (4) Delete_specific()

    (2) Write a program that performs following operations on doubly linked list.

        (1) Create()

        (2) Display()

        (3) Insert_specific()

        (4) Delete_first()

5 (a) Attempt the following :   4

    (1) Define leaf node.

    (2) Define Sibling.

    (3) Define Vertex.

    (4) Another name for the directed graph is........

5 (b) Answer in Brief : (Any **One**)   2

    (1) Explain adjacency matrix with example.

    (2) Explain B-Tree.

5 (c) Answer in detail : (Any **One**)   3

    (1) Write short note on height balanced tree.

    (2) Explain depth first traversal with example.

5 (d) Write a note on following : (Any **One**)   5

    (1) Explain binary tree traversal techniques.

    (2) Write short note on minimum spanning tree.

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