# II YEAR IV SEMESTER W.E.F. 2016 - 17

# DATA STRUCTURES

### **UNIT I**

**Concept of Abstract Data Types (ADTs)-** Data Types, Data Structures, Storage Structures, and File Structures, Primitive and Non-primitive Data Structures, Linear and Non-linear Data Structures.

Linear Lists – ADT, Array and Linked representations, Pointers.

**Arrays** – ADT, Mappings, Representations, Sparse Matrices, Sets – ADT, Operations Linked Lists: Single Linked List, Double Linked List, Circular Linked List, applications

### **UNIT II**

**Stacks**: Definition, ADT, Array and Linked representations, Implementations and Applications

**Queues**: Definition, ADT, Array and Linked representations, Circular Queues, Dequeues, Priority Queues, Implementations and Applications.

### UNIT III

**Trees:** Binary Tree, Definition, Properties, ADT, Array and Linked representations. Implementations and Applications. Binary Search Trees (BST) – Definition, ADT, Operations and Implementations, BST Applications. Threaded Binary Trees, Heap trees.

# UNIT IV

**Graphs** – Graph and its Representation, Graph Traversals, Connected Components, Basic Searching Techniques, Minimal Spanning Trees

### UNIT-V

**Sorting and Searching:** Selection, Insertion, Bubble, Merge, Quick, Heap sort, Sequential and Binary Searching.

### **REFERENCE BOOKS**

- 1. D S Malik, Data Structures Using C++, Thomson, India Edition 2006.
- 2. Sahni S, Data Structures, Algorithms and Applications in C++, McGraw-Hill, 2002.
- 3. SamantaD, Classic Data Structures, Prentice-Hall of India, 2001.
- 4. Heilman G I, Data Structures and Algorithms with Object-Oriented Programming, Tata McGraw-l lill. 2002. (Chapters I and 14).
- 5. Tremblay P, and Sorenson P G, Introduction to Data Structures with Applications, Tata McGraw-Hill,

#### **Student activity:**

- 1. Create a visible stack using C-graphics
- 2. Create a visible Queue using C-graphics

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# DATA STRUCTURES USING JATALAB

LAB

- 1. Write a Program to implement the Linked List operations
- 2. Write a Program to implement the Stack operations using an array.
- 3. Write Programs to implement the Queue operations using an array.
- 4. Write Programs to implement the Stack operations using a singly linked list.
- 5. Write Programs to implement the Queue operations using a singly linked list.
- 6. Write a program for arithmetic expression evaluation
- 7. Write a program to implement Double Ended Queue using a doubly linked list.
- 8. Write a program to search an item in a given list using Linear Search and Binary Search
- 9. Write a program for Quick Sort
- 10. Write a program for Merge Sort
- 11. Write a program on Binary Search Tree operations(insertion, deletion and traversals)

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12. Write a program for Graph traversals

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### **Code No:**

### SRI VENKATESWARA UNIVERSITY: TIRUPATI B.Sc., (Computer Science) Fourth Semester Examinations DATA STRUCTURES

#### **Time: 3 Hours**

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following Questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

# PART - A

### Answer any Five of the following. All questions carry equal marks

5 x 5 = 25 Marks

1. List and discuss about the Data types?

2. What are Storage structures?

3. What is the concept of ADT?

4. Give a note on the procedure of Stack?

5. What is Binary tree? Give example

6. What is the Tree Traversal?

7. Describe in brief about Graph Searching Techniques?

8. What is the process of Searching and sorting?

### PART - B

Answer one question from each Unit. All questions carry equal marks

 $5 \ge 10 = 50$  Marks

### $\mathbf{UNIT} - \mathbf{I}$

9. Differentiate between Primitive and Non-primitive data structures

# OR

10. Write a program in Java to represent single linked list..

#### **UNIT-II**

11. Explain about stack implementations and its Applications with an example?

#### OR

12. Explain the method of DE queues and Circular Queue Representations with an illustration?

#### **UNIT-III**

13. Discuss about Heap Trees and Applications in detail?

#### OR

14. What are Binary search Trees? Explain with its Applications.

#### **UNIT-IV**

15. Explain the process of Graph Representation with connected components?

#### OR

16. Explain about Prim's Minimum spanning tree in detail?

#### UNIT-V

17. Write a program in java for selection sort for a given number by the user?

#### OR

18. Explain the process of Searching in detail with an example program?