



Marwadi University

Bachelor of Computer Application

Semester II (w.e.f. July, 2016)

Subject Code: 05BC0204

Subject Name: Data Structure using 'C'

Learning Objectives:

1. To develop proficiency in the specification, representation, and implementation of Data Types and Data Structures.
2. To analyze the algorithms.
3. To implement various searching and sorting techniques
4. To compare various searching and sorting techniques
5. To apply appropriate data structures to solve different problems.

Prerequisites:

C programming

Unit	Course Content	Hours
1	Introduction of data structure : Introduction of data and data type, introduction of data structure, primitive and non-primitive data structure, KWIC indexing	04
2	Stack and Queue: Stack – introduction, operations, applications of stack : recursion and polish notation Queue – introduction, types of queue, simple queue and its operations, circular queue and its operations, applications of queue - simulation	08
3	Linked List : Introduction, types of linked list – singly, doubly and circular, applications of linked list – polynomial manipulation and linked dictionary, Multi – linked structure – sparse matrix, stack and queue using linked list.	08
4	Tree : Basic terminologies, M-ary tree, binary tree – array and linked representation, operations and traversal, conversion of general tree to binary tree, threaded binary tree, binary search tree, AVL tree, B tree, trie structure	10
5	Graph : Basic terminologies, representations of graph – adjacency matrix and adjacency list, BFS and DFS traversal, shortest path algorithm – dijkstra's algorithm, spanning tree, minimum spanning tree – Prim's and Kruskal's algorithm, topological sort	08
6	Searching and sorting : Sorting – selection sort, bubble sort, quick sort, merge sort, insertion sort, shell sort, radix sort, heap sort Searching – linear search, binary search, indexed sequential search, hashing Collision and collision resolution techniques.	10



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Text Book(s):
1. An Introduction to Data Structures with Applications, Second edition, Tremblay Tata McGraw-Hill Education, 2001.
Reference Book(s):
1. Data structures using C, by samir kumar bandyopadhyay and kashi nath dey, pearson. 2. Reema Thareja. "Programming in C", Oxford University Press. 3. Data Structures Using C, by E Balagurusamy ,Tata McGraw-Hill Education

Lab Practical Tutorial

***** Stack *****

- 1] Write a program which performs following stack operations.
->push() -> pop() -> peep() -> update()
- 2] Write a program to find out factorial of number using stack.
- 3] Write a program to print string in reverse order using stack.
- 4] Write a tower of Hanoi program.
- 5] Write a program of dynamic stack.

***** QUEUE *****

- 1] Write a program which performs following operations using simple queue.
➔ insert() -> delete() -> display()
- 2] Write a program which performs following operations using circular queue.
➔ Insert() -> delete() -> display()
- 3] Write a program of dynamic queue.

***** LINKED LIST *****

Perform following operations :

- 1] Create
- 2] Display
- 3] Insert
 - insert first
 - insert last
 - insert desired
 - insert before desired
 - insert after desired
- 4] Delete
 - delete first
 - delete last
 - delete desired



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- delete before desired
 - delete after desired
 - 5] Search particular element
 - 6] Sort list in ascending order
 - 7] Update an element.
 - 8] Count no. of nodes
- ⇒ Write a program to perform above operations using singly linked list
- ⇒ Write a program to perform above operations using doubly linked list
- ⇒ Write a program to perform above operations using circular singly linked list
- ⇒ Write a program to perform above operations using circular doubly linked list

***** TREE AND GRAPH*****

- 1] Write a program to create a binary tree . Traverse tree in preorder , postorder and inorder.
- 2] Write a program to represent graph using linked list and implement for DFS and BFS algorithm for traversing.

***** SORTING AND SEARCHING *****

- 1] Enter N elements and arrange the elements using :
 - Selection sort
 - Bubble sort
 - Insertion sort
 - Quick sort
 - Shell sort
 - Merge sort
- 2] Enter N elements and perform search operations using :
 - Linear search
 - Binary search (with recursion, without recursion)
- 3] Write a program of indexed sequential search.
- 4] Write a program of hashing.