



DATA STRUCTURES

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UNIT 1

Introduction to Algorithm
Performance Analysis
Space Complexity
Time Complexity
Asymptotic Notations
Linear & Non-Linear
Data Structures
Single Linked List
Circular Linked List
Double Linked List
Arrays
Sparse Matrix

UNIT 2

Stack ADT
Stack Using Array
Stack Using Linked List
Expressions
Infix to Postfix
Postfix Evaluation
Queue ADT
Queue Using Array



Graph Representations



Graph data structure is represented using following representations...

1. Adjacency Matrix
2. Incidence Matrix
3. Adjacency List

Adjacency Matrix

In this representation, graph can be represented using a matrix of size total number of vertices by total number of vertices. That means if a graph with 4 vertices can be represented using a matrix of 4X4 class. In this matrix, rows and columns both represents vertices. This matrix is filled with either 1 or 0. Here, 1 represents there is an edge from row vertex to column vertex and 0 represents there is no edge from row vertex to column vertex.

For example, consider the following undirected graph representation...

Queue Using Linked List

Circular Queue

Double Ended Queue

UNIT 3

Tree - Terminology

Tree Representations

Binary Tree

Binary Tree

Representations

Binary Tree

Traversals

Threaded Binary trees

Priority Queue

Max Heap

Introduction to Graphs

Graph

Representations

Graph Traversal - DFS

Graph Traversal - BFS

UNIT 4

Linear Search

Binary Search

Hashing

Insertion Sort

Selection Sort

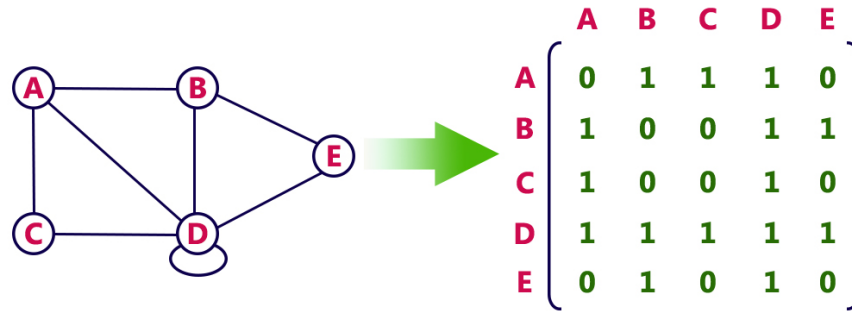
Radix Sort

Quick Sort

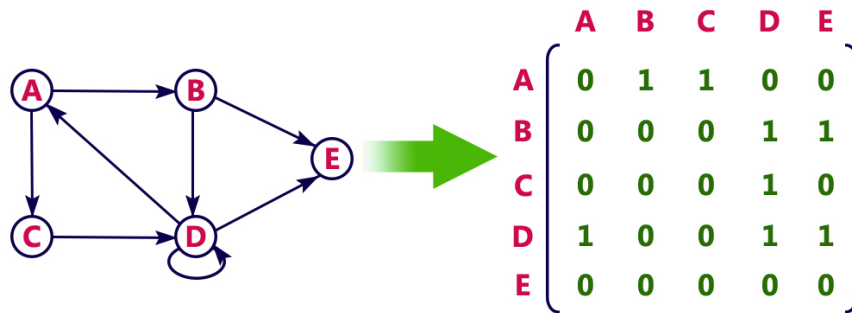
Heap Sort

Comparison of

Sorting Methods



Directed graph representation...



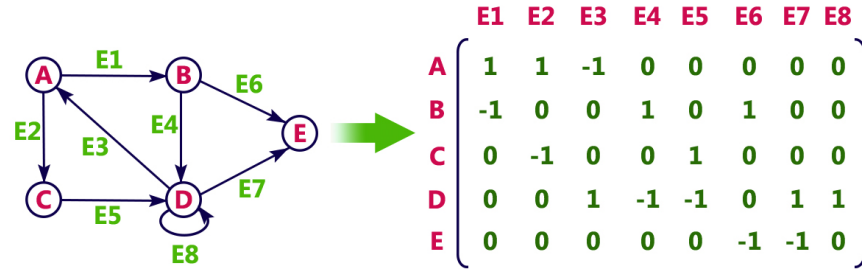
Incidence Matrix

In this representation, graph can be represented using a matrix of size total number of vertices by total number of edges. That means if a graph with 4 vertices and 6 edges can be represented using a matrix of 4X6 class. In this matrix, rows represents vertices and columns represents edges. This matrix is filled with either 0 or 1 or -1. Here, 0 represents row edge is not connected to column vertex, 1 represents row edge is connected as outgoing edge to column vertex and -1 represents row edge is connected as incoming edge to column vertex.

For example, consider the following directed graph representation...

UNIT 5

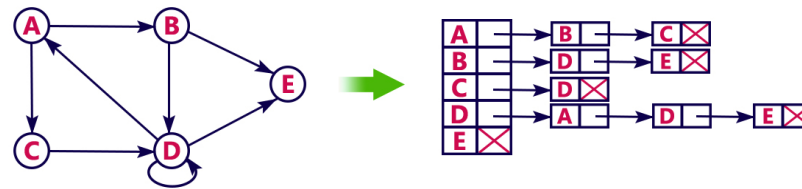
Binary Search Tree
 AVL Trees
 B - Trees
 Red - Black Trees
 Splay Trees
 Comparison of Search
 Trees
 Knuth-Morris-Pratt
 Algorithm
 Tries



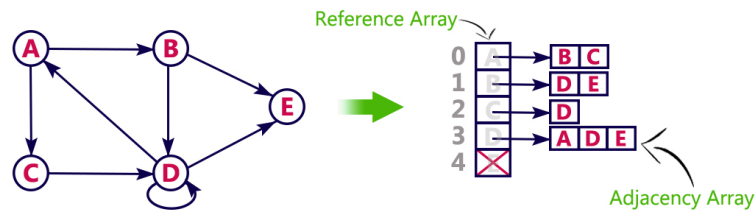
Adjacency List

In this representation, every vertex of graph contains list of its adjacent vertices.

For example, consider the following directed graph representation implemented using linked list...



This representation can also be implemented using array as follows..



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