CE205 Data Structures Week-5

Graph Data Structure and Traversals

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# CE205 Data Structures

# Week-5

### Graph Data Structure and Traversals

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### Outline

* Introduction to Graphs
* Graph Representations
* Graph Traversal
* Water Jug Problem

### Introduction to Graphs

* Vertex
* Edge

### Introduction to Graphs

* Undirected Graph
* Directed Graph
* Mixed Graph

### Introduction to Graphs

* End Vertices or Endpoints
* Origin
* Destination

### Introduction to Graphs

* Adjacent
* Incident

### Introduction to Graphs

* Outgoing Edge
* Incoming Edge

### Introduction to Graphs

* Degree
* Indegree
* Outdegree

### Introduction to Graphs

* Parallel edges or Multiple edges
* Self-loop
* Simple Graph
* Path

### Introduction to Graphs

* Btech Smart Class
  + http://www.btechsmartclass.com/data\_structures/introduction-to-graphs.html

### Graph Representations

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

* Btech Smart Class
  + http://www.btechsmartclass.com/data\_structures/graph-representations.html

### Graph Traversal - DFS

1. Depth-First Search (DFS)
2. Iterative Deepening Search(IDS) or Iterative Deepening Depth First Search(IDDFS)

* Btech Smart Class
  + http://www.btechsmartclass.com/data\_structures/graph-traversal-dfs.html

### Graph Traversal - BFS

* Breadth-First Search (BFS)
  + Btech Smart Class
    - http://www.btechsmartclass.com/data\_structures/graph-traversal-bfs.html

### Graph Traversal - DLS

* Depth-limited Search
  + Educba
    - https://www.educba.com/depth-limited-search/

### Graph Traversal

* Uniform Cost Search
  + Geeks for Geeks
    - https://www.geeksforgeeks.org/uniform-cost-search-dijkstra-for-large-graphs/

### Graph Traversal

* Bidirectional Search
  + Geeks for Geeks
    - https://www.geeksforgeeks.org/bidirectional-search/

### Graph Traversal

* Water Jug Problem
  + Geeks for Geeks
    - https://www.geeksforgeeks.org/water-jug-problem-using-bfs/
  + Tamu Edu
    - https://www.math.tamu.edu/~dallen/hollywood/diehard/diehard.htm
  + Udel Edu
    - https://www.eecis.udel.edu/~mccoy/courses/cisc4-681.10f/lec-materials/handouts/search-water-jug-handout.pdf