

PROLOG ACADEMY



DATA STRUCTURE

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□ Book followed - Data structures by Seymour Lipschutz (Schaum Series)

LET'S START!

Graph

- A graph consist of two things-
 - 1) A set V of elements called nodes
 - 2) A set E of edges such that each edge e in E is identified with a unique pair $[u,v]$ of nodes in V , denoted by $e=[u,v]$
- A cycle is a closed simple path with length 3 or more
- A graph G is said to be connected if there is a path between any two of its nodes
- A graph G is said to be complete if every node u in G is adjacent to every node v in G
- A complete graph with n nodes will have $n(n-1)/2$ edges

Multigraph

- A tree M is called a Multigraph if
 - 1) Multiple edges – Distinct edges e and e' are called multiple edges if they connect the same end points that is $e=[u,v]$ and $e'=[u,v]$
 - 2) Loops – An edge is called a loop if it has identical endpoints ie $e'=[u,u]$
- Directed graph – A directed graph G , also called as digraph or graph, is the same as a multigraph except that each edge e in G is assigned a direction.
- Weighted graph – A graph is a weighted Graph if every edge e in the graph is assigned an individual weight of the path.

Degree

- Degree of a node represented as $\deg(u)$ is the number of edges containing u .
- For a undirected graph $\deg(u)$ is simple the numbers of edges
- For Directed graph-
 - 1) Outdegree of a node u in G written $\text{outdeg}(u)$ is the number of edges beginning at u
 - 2) Indegree of a node u in G written $\text{indeg}(u)$ is the number of edge ending at u

Adjacency Matrix

- Suppose G is a simple directed graph with m nodes, and suppose the nodes of G have been ordered and are called $v_1, v_2, v_3, \dots, v_m$. Then the adjacency matrix $A = (a_{ij})$ of the graph G is the $m \times m$ matrix defined as follows:

$a_{ij} = 1$ if v_i is adjacent to v_j , i.e. if there is an edge (v_i, v_j)

0 otherwise