# Algorithm- Graph

What is graph?

In a graph, a node is an object also known as vertex or point. It is a fundamental unit of the graph.

Nodes can be connected to each other with edges.

In various applications, nodes can represent different things like cities, people, web pages etc.

## Weighted graph: In graph theory, a weighted graph is a graph in which each edge is assigned a numerical weight or cost. The weight represents a value or a measure associated with the edge, such as distance, time, capacity, or cost.

## Unweighted graph: an unweighted graph is a graph where there is no numerical value associated with the edges, other than their existence.

## Bipartite graph: In graph theory, a bipartite graph is a graph whose vertices can be divided into two disjoint sets, such that every edge in the graph connects a vertex in one set to a vertex in the other set.

## Complete graph: in graph theory, a complete graph is a graph in which every pair of distinct vertices is connected by a unique edge. In other words, a complete graph is a graph in which every vertex is adjacent to every other vertex.

Directed cyclic graph: it is a graph where the nodes are connected by directed edges that form a cycle, such that it is possible to traverse the graph and return to the starting node by following the direction of the edges.

Directed acyclic graph (DAG): it is a graph in which the nodes are connected by directed edges that do not form any closed loops.

Multi edge: in graphs, when two edge are directed towards another node then we call it multi edge.

Self-loop: In graph theory, a self-loop, also known as a self-edge or a loop, is an edge that connects a vertex to itself.

# Tree:

Tree should have no cycle and should be connected to each other and if we want to go from one node to another , it should g]have only one path. Each node in a tree may have zero or more child nodes, except for the root node which has no parent node. Example of tree is family trees, file system, organization chart etc.

Cycle: if we travel from one node to another and if travels back to the source node then it’s called cycle.

Rooted tree: rooted tree is a tree in which one node is designed as the root node. The root node is the starting point of the tree, and all other nodes are the descendants of the root node. The root node has no parent node while all other node have exactly one parent node.

Unrooted tree: An unrooted tree is a tree in which no node is designated as the root node. In other words, it is a tree without a single starting point. Instead, an unrooted tree can have any node as the starting point, and the relationships between nodes are only defined by the edges connecting them.