Graph Terminology

Graph G = (V, E) where V is a set of **vertices** and E is a set of **edges**. An edge is a pair (x, y) where x and y belong to V. If the pair is ordered the graph is a **directed graph (also called a digraph)** otherwise it is an **undirected grap**h. In an undirected graph the pairs (x, y) and (y, x) represent the same edge.

In an **undirected graph** vertices x and y are **adjacent i**ff (x,y) belongs to E

In a **digraph** y is **adjacent** to x iff (x, y) belongs to E

A **path** in a graph is a sequence of vertices v_0, v_1, ...,v_n where (v_i, v_{i+1}) belong to E for 0<= i< n

The **length of a path** is the number of edges in the path (one less than the number of vertices)

A **simple path** is a path where all the vertices are distinct

A **cycle in a digraph** is a path with a length of at least 1 where the first and last vertices are the same

An undirected graph is **connected** if there is a path between any 2 vertices

A digraph is **strongly connect** if there is a path between any 2 vertices

A digraph is **weakly connected** if there is a path between any 2 vertices in the underlying undirected graph

A **acyclic digraph** is digraph that has no cycles

An **adjacency matrix** representation for a graph with n vertices is an nXn matrix where each element (i, j) contain a 1 if (i,j) is an edge in the graph otherwise it contains a 0.

An **adjacency list** representation of a graph with n vertices contains n lists. List i is a list containing all the vertices that are adjacent to i.

A **topological sort** (also known as a topological ordering) is an ordering of vertices in a directed acyclic graph such that if there is a path from vertex i to vertex j then j appears after i in the ordering.