Graphs

A graph G is a set V of vertices (or nodes) and a set E of edges that connect them.

A rooted tree is a particular kind of graph.

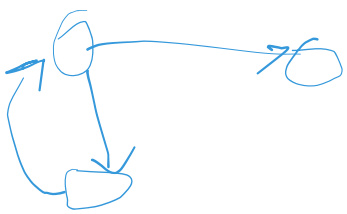
$G = (V, E)$

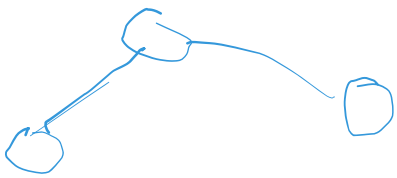
Ordered pair of a set of vertices and edges.

$T = (V, F) \Rightarrow$ T and G have same set of vertices

2 types:

* Directed (Digraphs)
* Undirected.





Digraph: Every edge e is directed from some vertex v to some other vertex w

$e = (v, w)$ → Ordered pair

v: Source, w: Destination

Undirected graph: e is an unordered pair

$e = (v, w) = (w, v)$

Eg: Transportation System. Google map.

Networks — CNN

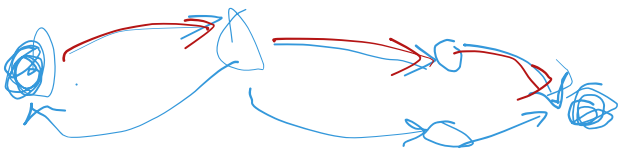
Dependency graphs.

Multiple copies of an edge is forbidden.

Digraphs can have both (v, w) and (w, v).

Self-edge: (v, v)

Path: Sequence of vertices with each adjacent pair connected by an edge.
If graph is directed, edges must be aligned w/ the direction of the path.

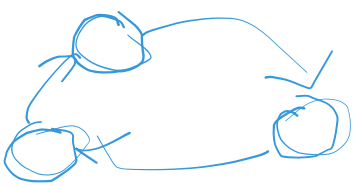


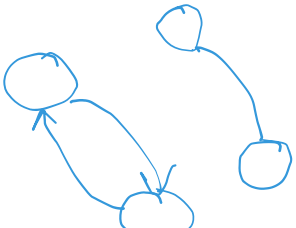
Length of path: # of edges in path

Length = 0

Path can revisit a node and an edge.

Strongly connected: If there is a path from every vertex to every other vertex





Connected graph for undirected graph.