GRAPHS

JANIE LANE SABADO

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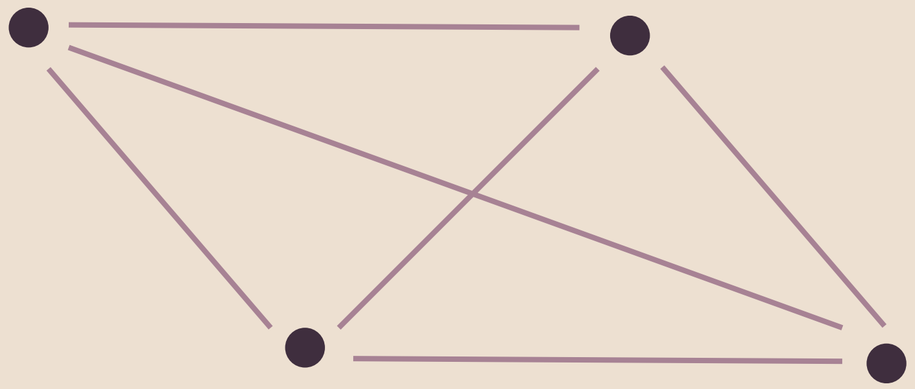
GRAPH

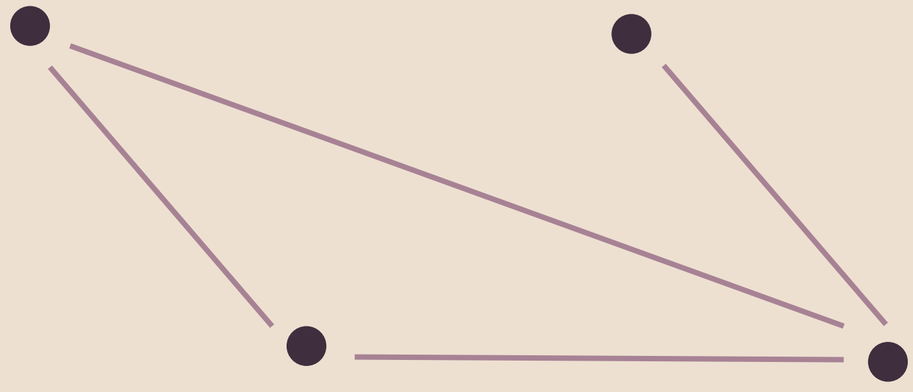
- finite set of points called **vertices/nodes**
- together with a finite set of **edges**
    - each of which join a pair of nodes



GRAPH

CONNECTED GRAPH

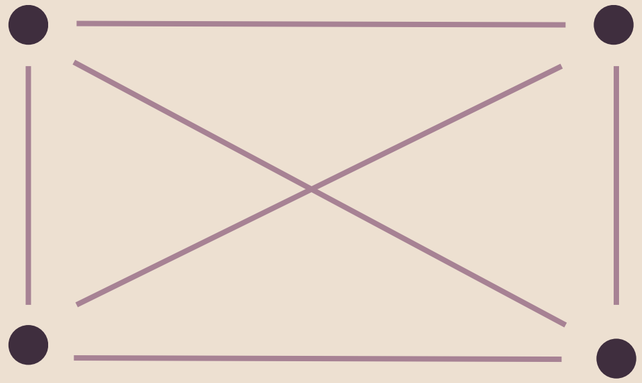
- if there exists a path from any arbitrary source node to an arbitrary destination node

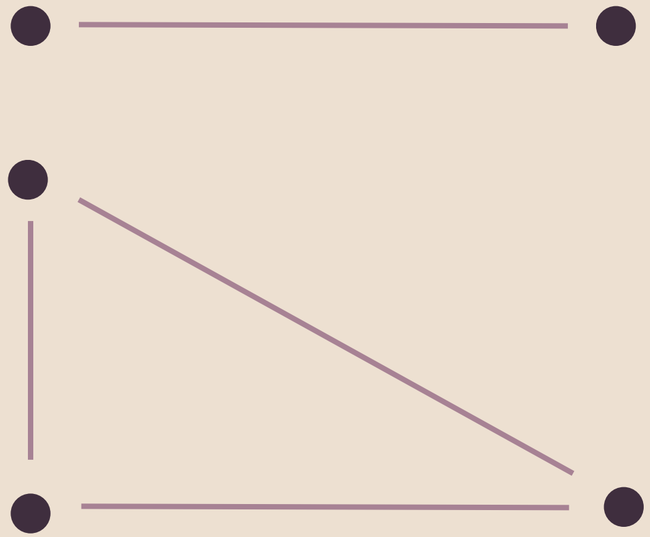


GRAPH

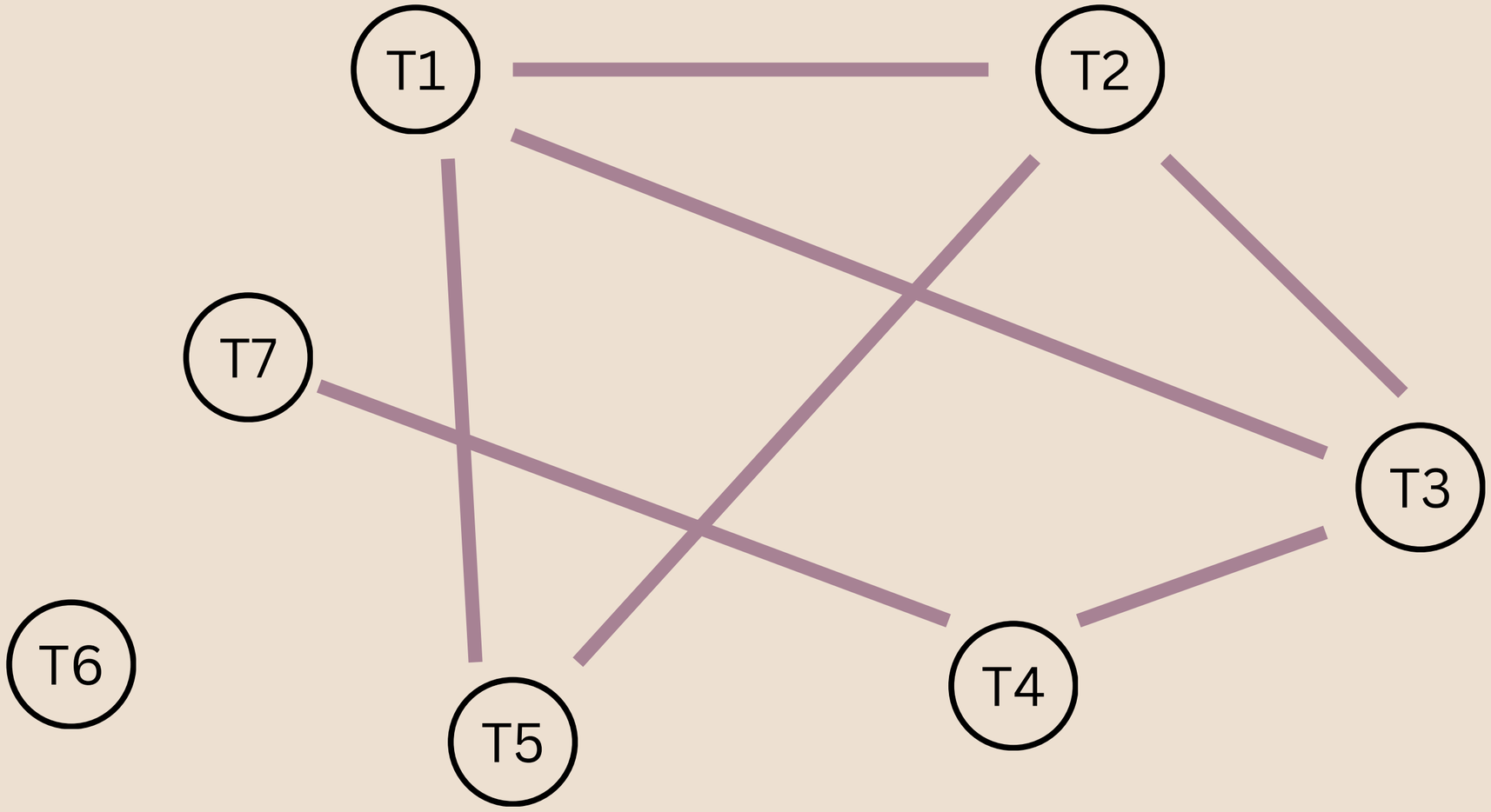
COMPLETE GRAPH

- every pair node is joined by an edge
- **general formula:** (n-1)*n/2





GRAPH



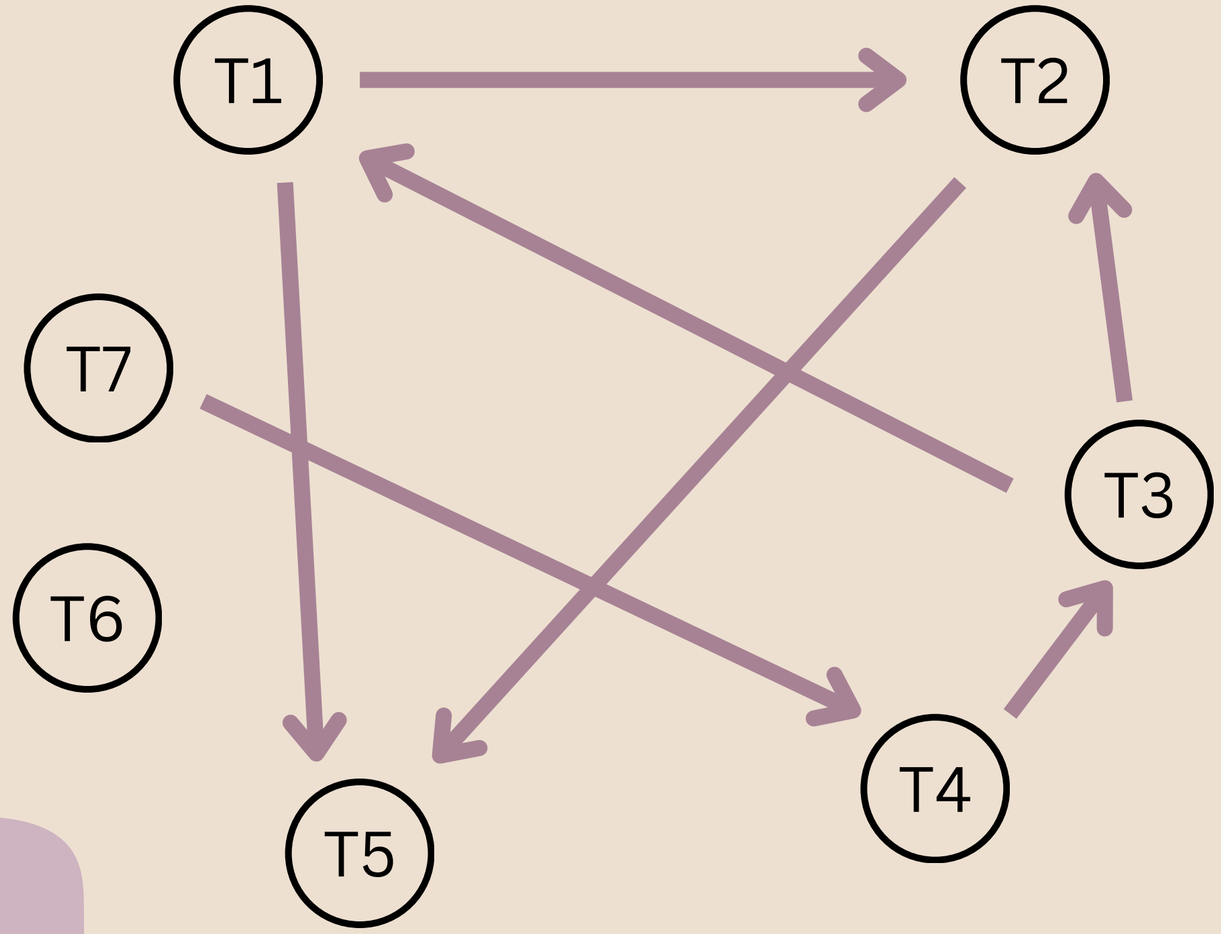
GRAPH

UNDIRECTED GRAPH

DIRECTED GRAPH

ARCS

GRAPH



Path

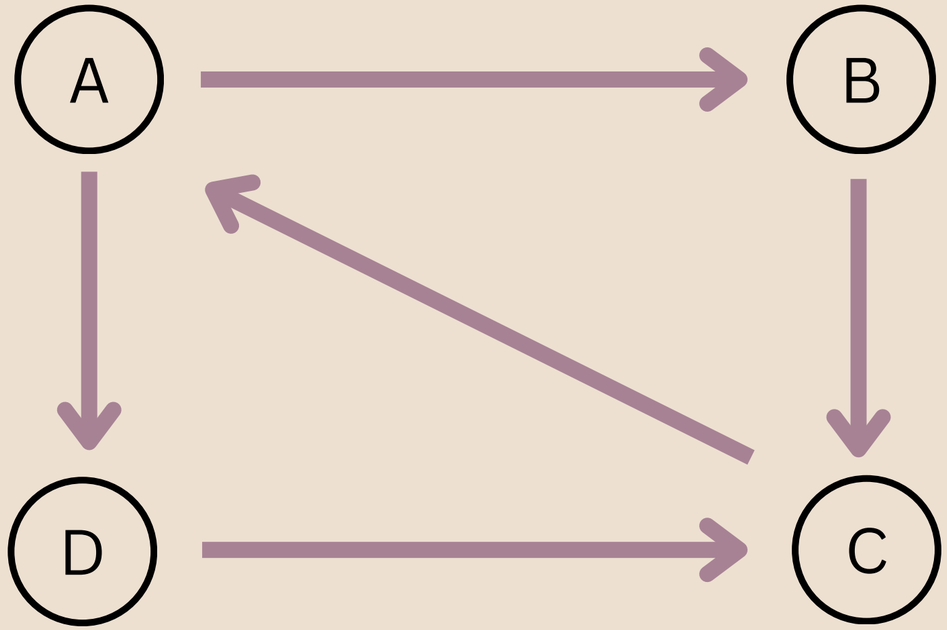
- sequence of vertices

Length

- number of arcs in a path

SIMPLE PATH

- if all vertices in a path are distinct
- both paths from T7 to T2 are simple paths



simple

A → D

not simple

A → B → C → A → D

SIMPLE PATH

Simple Cycle

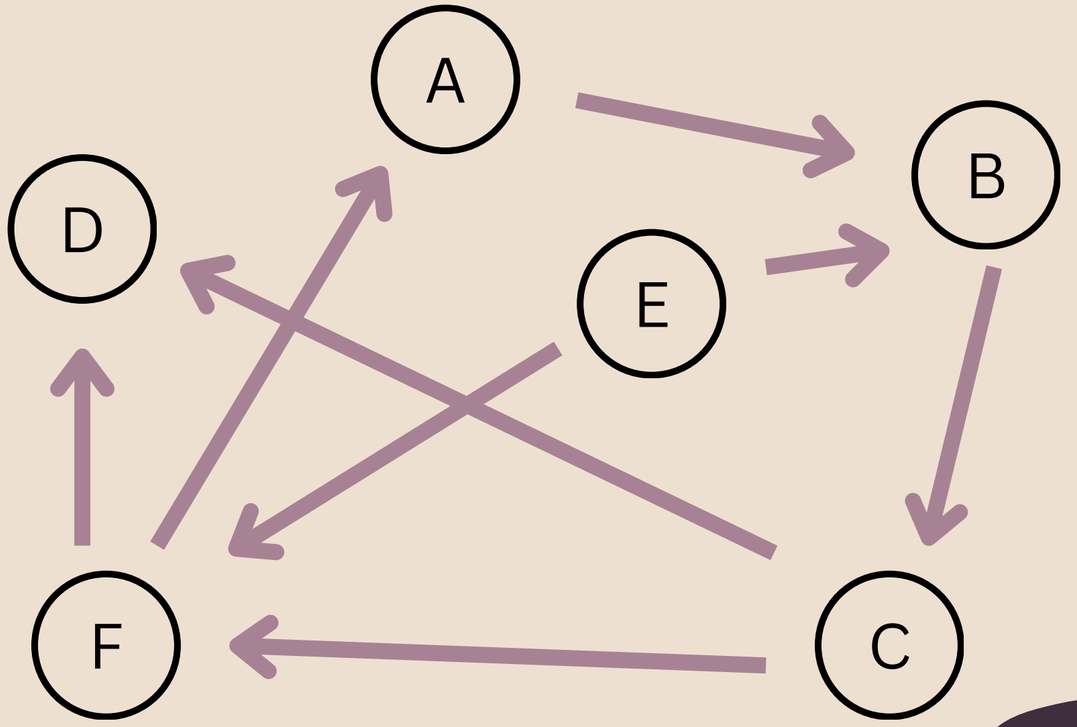
- simple path that begins and ends at the same vertex

Cyclic Graph

- when a graph contains a cycle

Acyclic Graph

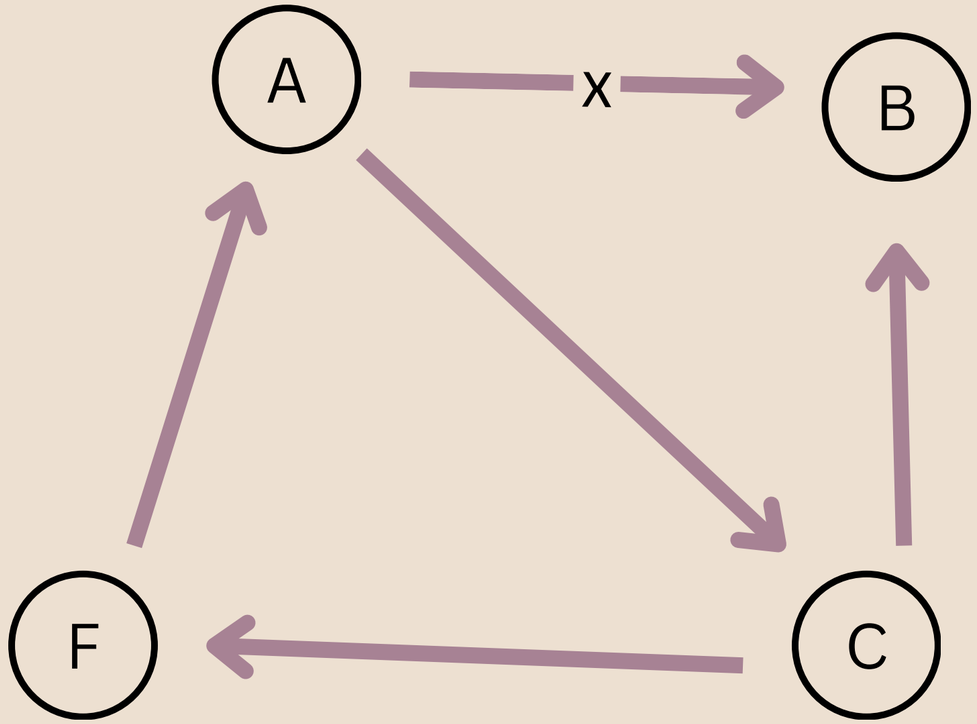
- when a graph has no cycle



INCIDENT

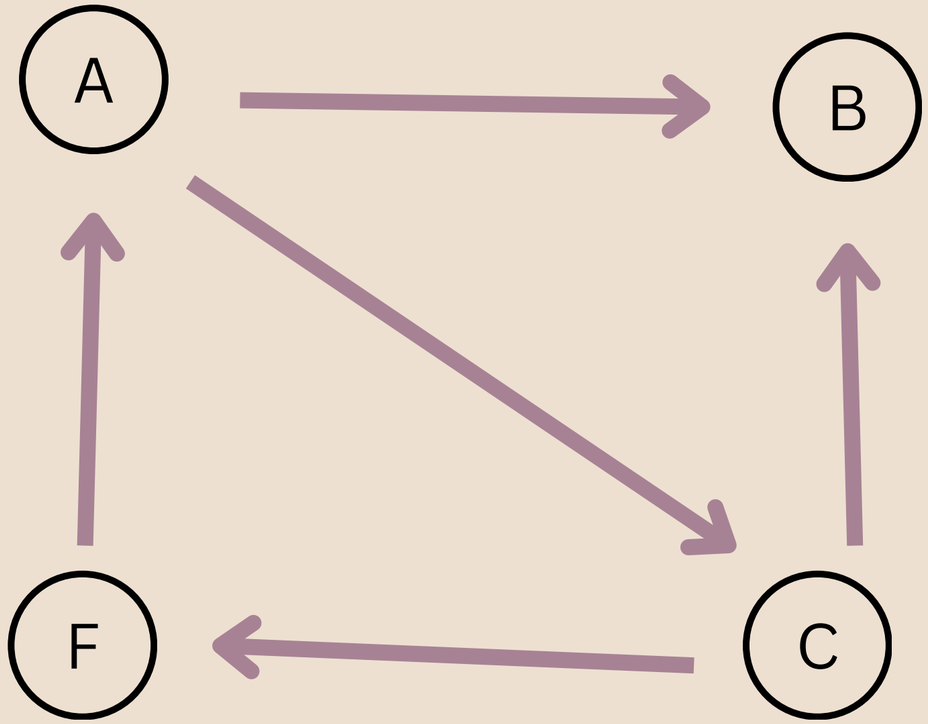
- a node is **incident** to an arc if n *(node)* is one of the 2 nodes in the ordered pair

A is incident to arc x
B is incident to arc x



DEGREE

- number of arcs incident to it
- **Indegree of a node**
  - number of arcs that have node as a head
- **Outdegree of a node**
  - number of arcs that have node as a tail



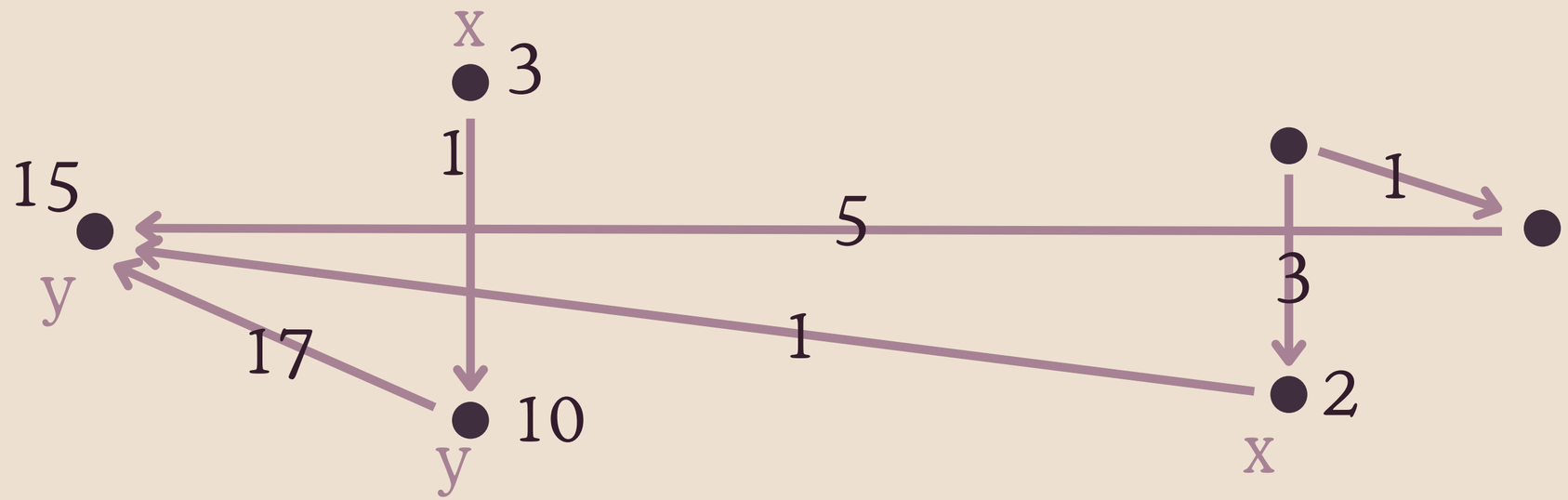
RELATION

WEIGHTED GRAPH

- weight of each arc is the remainder of y/x or head/tail

LABELED GRAPH

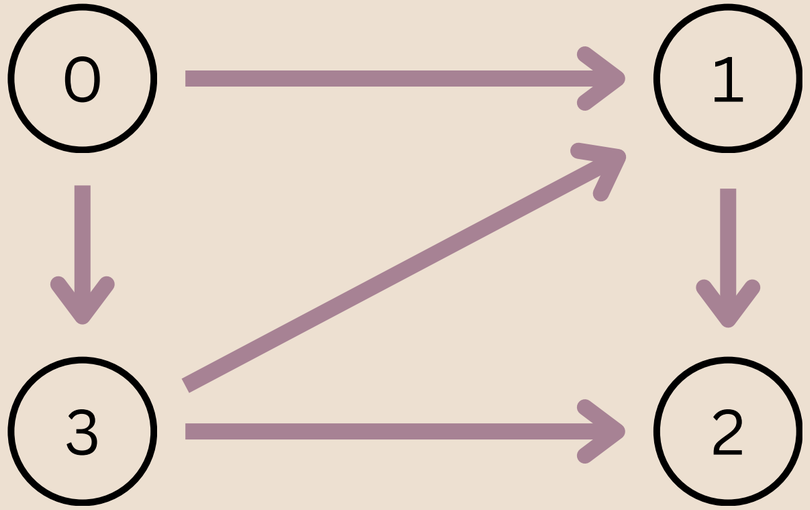
- di-graph in which arcs and/or vertices have associated label of any value



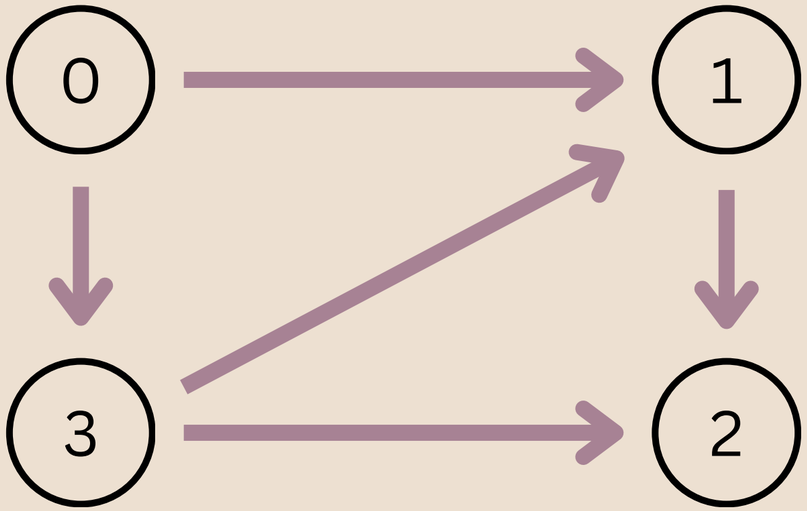
REPRESENTATION

Adjacency Matrix

- given a graph G = (V,E) & V = {0,1,2,3,...}. thje adjacency matric of the diagraph G is an n x n Matrix of Booleans, where A [i,j] is true if & only if there is an arc from vertex i to vertex j

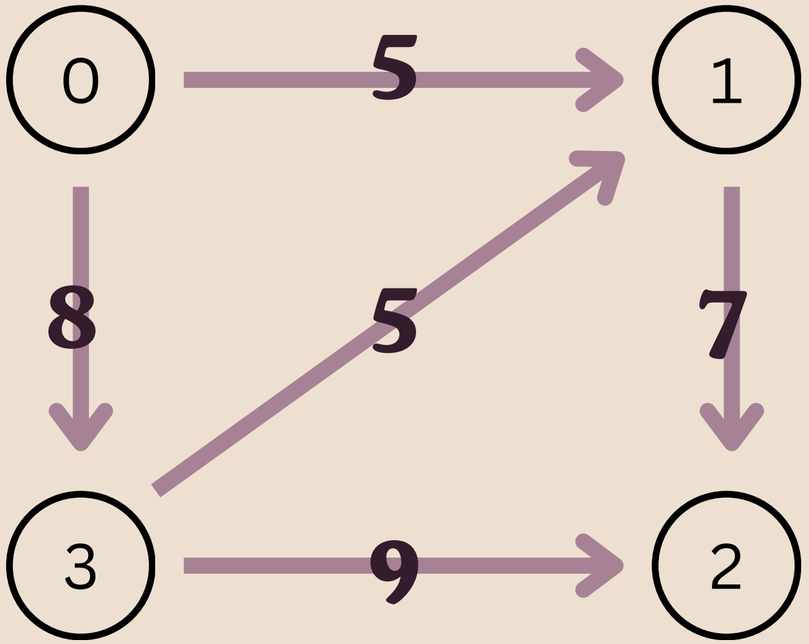


REPRESENTATION



	0	1	2	3
0	0	1	0	1
1	0	0	1	0
2	0	0	0	0
3	0	1	1	0

REPRESENTATION

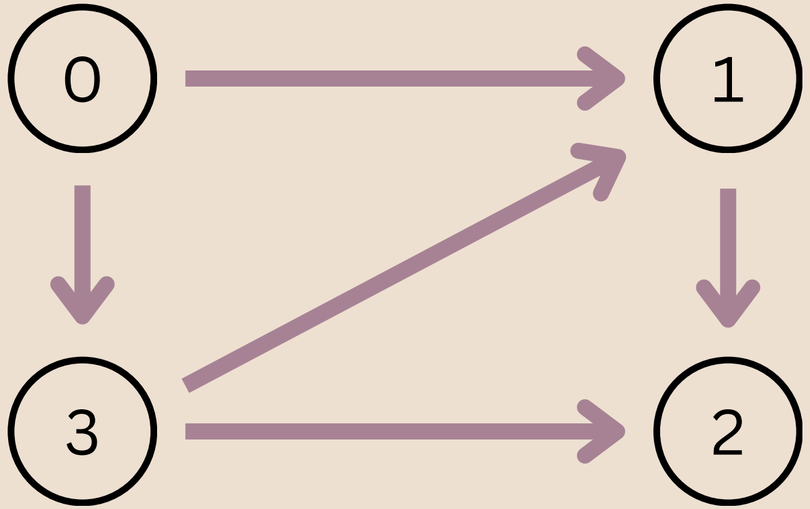


	0	1	2	3
0	∞	5	∞	8
1	∞	∞	7	∞
2	∞	∞	∞	∞
3	∞	5	9	∞

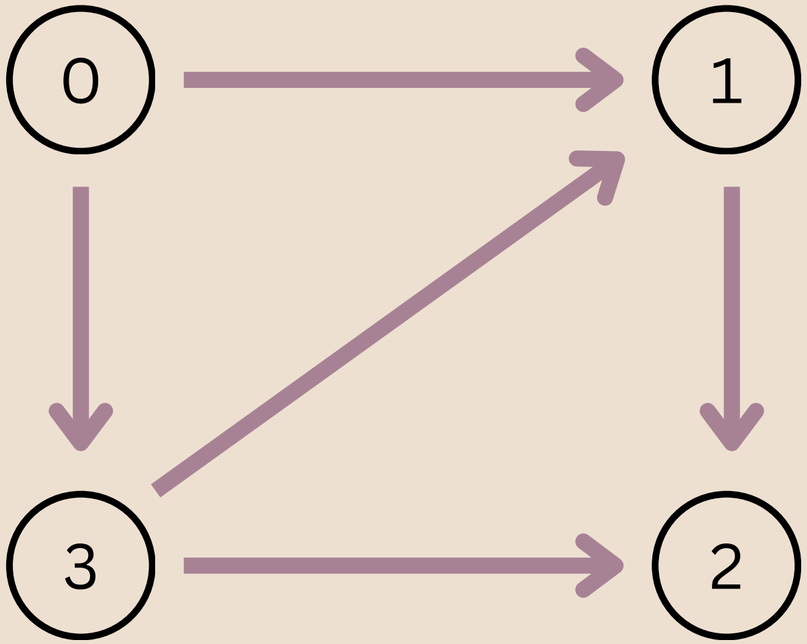
REPRESENTATION

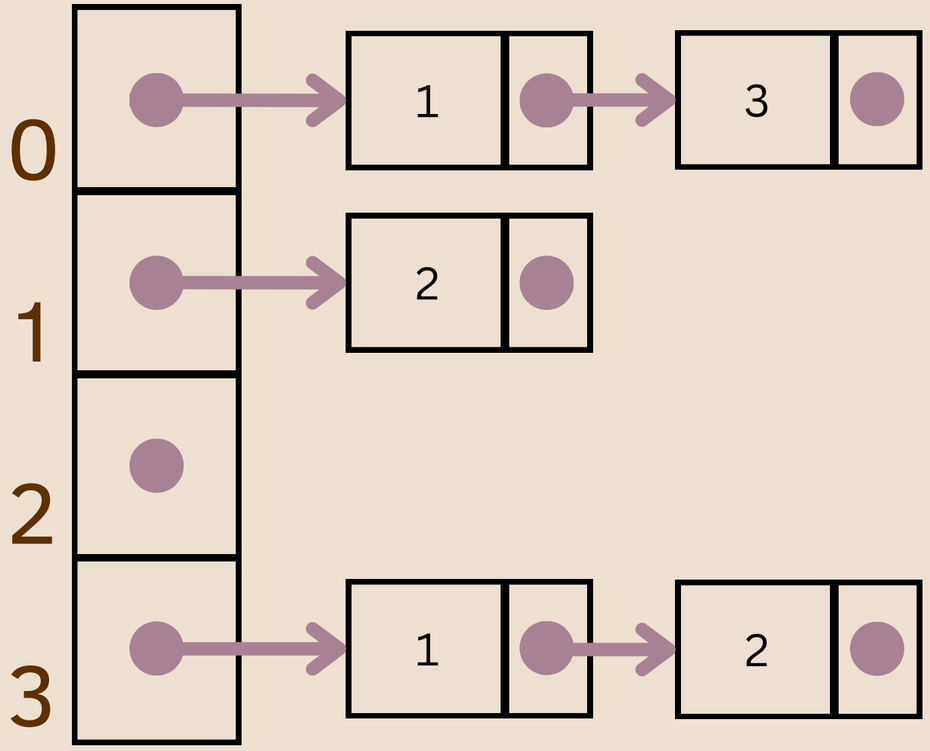
Adjacency List

- using Open Hashing Chaining concept and Closed Hashing concept to represent the connection between nodes



REPRESENTATION





THANK YOU