

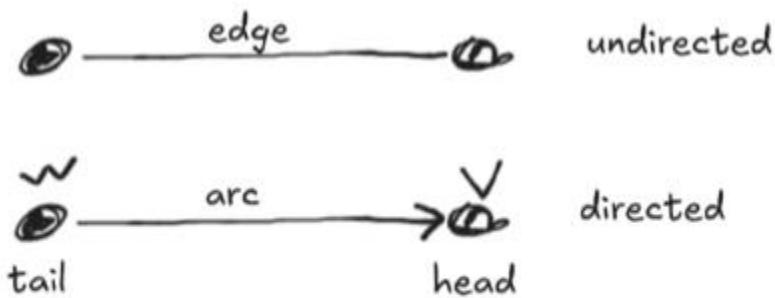
Vertices/nodes – finite set of edges

Complete graph – every pair of nodes is joined by an edge ( $n-1 * n / 2$ )

Connected graph – where every pair of vertices is connected by a path

**Directed graph** – has direction (with arrow), Arc

**Undirected graph** – no direction, it joins a **pair of vertices**, Edge



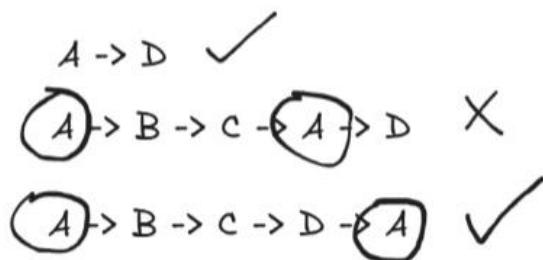
*w is adjacent to v*

Path – sequence of vertices

Length – number of arcs, if path is 6 then length is 5

Simple path – if all vertices in a path are distinct

### SIMPLE PATH



### SIMPLE CYCLE

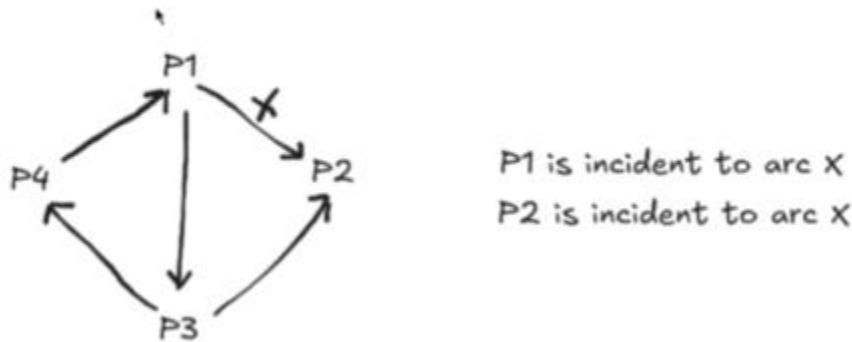
Simple cycles – is a simple path that begins and ends in the same vertex

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  $n(\text{arc})$  is 1 of the two nodes in the ordered pair

INCIDENT



Degree – number of arcs incident to it ( $P_2 = 2$ )

Indegree – number of arcs that have node as a head ( $P_2 = 2 \mid P_3 = 1$ )

Outdegree – number of arcs that have the node as a tail ( $P_3 = 2 \mid P_4 = 1$ )

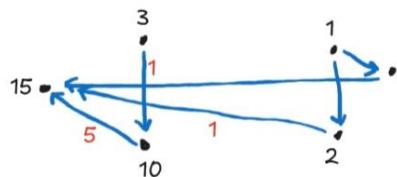
Relation

Weighted Graph – the weight of each arc is the remainder of  $y \% x$  or head % tail

RELATION

Weighted Graph

Labeled Graph



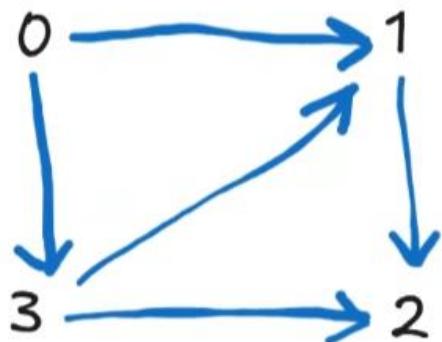
Labeled graph – is a di-graph in which arcs and or vertices have an associated label of any value

## Representation

### Adjacency Matrix

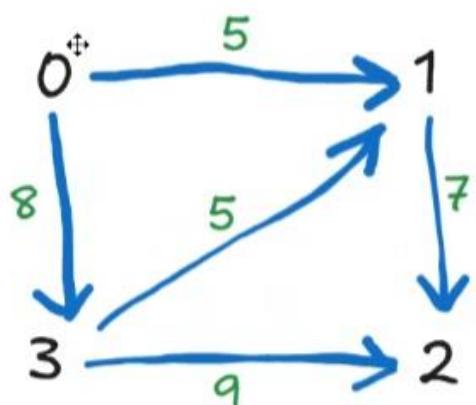
# REPRESENTATION

## Adjacency Matrix



head

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



	0	1	2	3
0	$\infty$	5	$\infty$	8
1	$\infty$	$\infty$	7	$\infty$
2	$\infty$	$\infty$	$\infty$	$\infty$
3	$\infty$	5	9	$\infty$