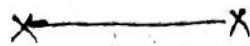


# Graph.



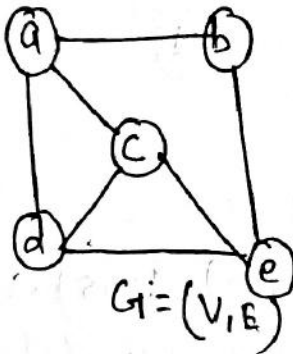
What is a Graph?

A graph  $G = (V, E)$  is composed of

$V$ : set of vertices

$E$ : set of edges connecting the vertices in  $V$ .

- An edge  $e = (u, v)$  is a pair of vertices.



$$V = \{a, b, c, d, e\}$$

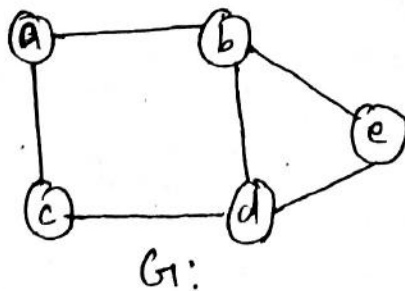
$$E = \{(a,b), (a,c), (a,d), (b,e), (c,d), (c,e), (d,e)\}$$

## Types of graph.



↳ Undirected graph: — An undirected graph is a graph in which edges have no direction. The edge  $(x, y)$  is identical to the edge  $(y, x)$  i.e, they are not ordered pairs.

example:

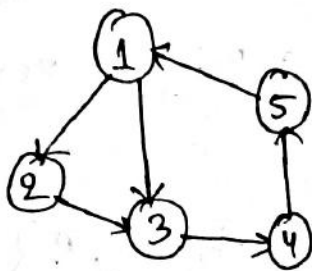


$$V = \{a, b, c, d, e\}$$

$$E = \{(a,b), (a,c), (b,d), (b,e), (c,d), (d,e)\}$$

↳ Directed Graph: → A Directed graph (di-graph) is a graph in which edges have directions. i.e the edge  $(x,y)$  is not identical to the edge  $(y,x)$ .  
Note → order pair of vertices is important.

for example



$(1,2): 1 \rightarrow 2$   
 $(2,1): 2 \rightarrow 1$

$$V = \{1, 2, 3, 4, 5\}$$

$$E = \{(1,2), (2,3), (1,3), (3,4), (4,5), (5,1)\}$$