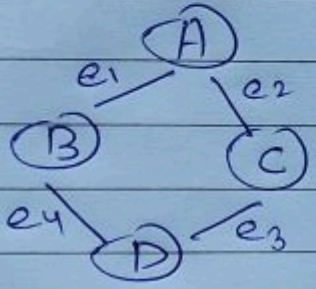
Data Structure & Algorithm

Q. What is Graph? full explaination.

Ans→ Graph is a collection of data item called node where nodes are connected to each-other by the help of edge.

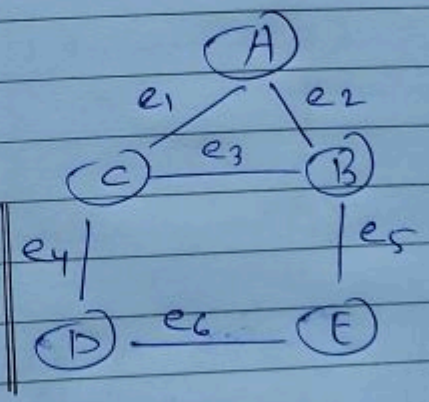


Note:- i) A graph G can be represent an ordered pair i.e G(V, E).

ii) Where, 'V' indicates no. of vertices or node and 'E' indicates no. of edges.

In simple, Collection of vertices and edges called Graph.

Explaination:-



V(A, B, C, D, E)
E(e1, e2, e3, e4, e5, e6)

G(5, 6)

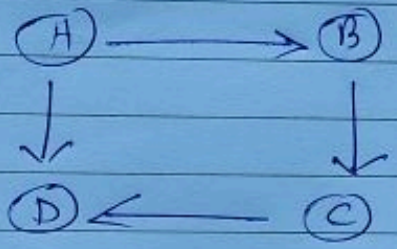
Data Structure & Algorithm

TYPES

- Directed
- Undirected

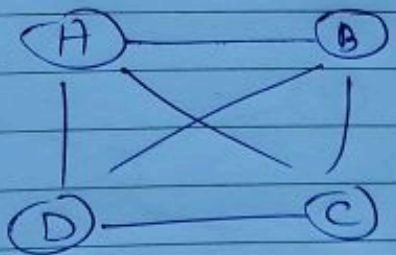
Or Connected graph
Unconnected graph

(I) Directed graph



It indicates a specific path from one vertex to other vertex.

(II) Undirected graph



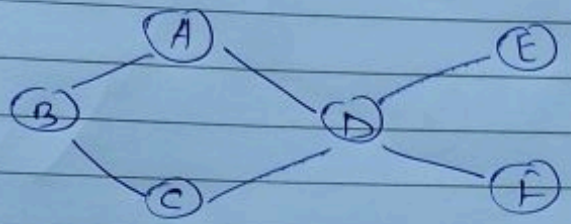
In this, graph, edges are not associated with the any directions. For example — If an edge exists between A & B vertex then the vertices can be traversed from B to A and A to B as well.

Data Structure & Algorithm

Terminology of Graph :-

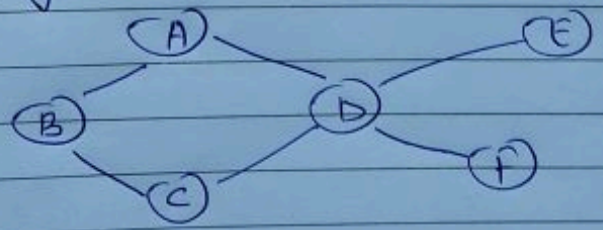
i) **Path** :- A path is nothing but a way to reach initial node to terminal node.

Ex →



ii) **Adjacent** node :- If two nodes (A) and (B) are connected via an edge (E), then the nodes (A) & (B) are called as neighbors.

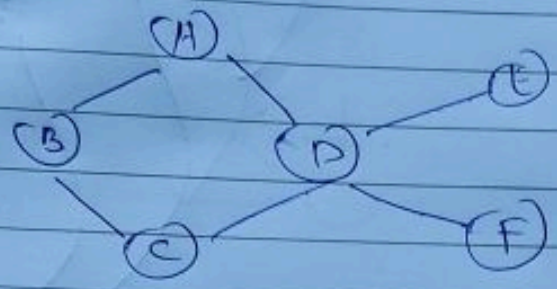
Ex →



Data Structure & Algorithm

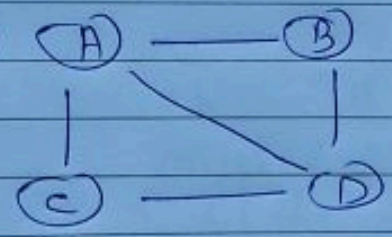
iii) **Cycle** :— A cycle is nothing but path which has no repeated edges or vertices except the first & last vertices.

Ex →



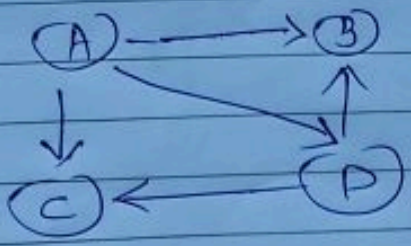
iv) **Degree** :— The degree of node's indicates total no. of edges connected to it.

Ex → 1)



Degree (A) = 3
Degree (B) = 2

ii)



Directed graph
- → In degree
- → Out degree

(A) ⇒ indegree − 0
out degree − 2

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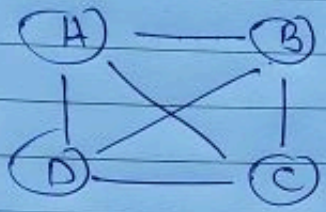
v) Complete graph :- If all the nodes of a graph connected to each-other then its called Complete graph.

Ex →



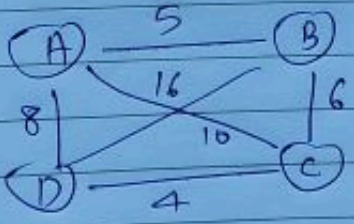
Note :- A Complete graph Contain $n(n-1)/2$ edges where n is the number of nodes.

Vertices or node → 4

edges → $\frac{4(4-1)}{2} = 6$

vi) Weighted graph :- If edge of a graph are assigned with value or weight then its called weighted graph.

Ex →



vii) Multi-graph - If a graph contain multiple edges between two nodes.

Ex →