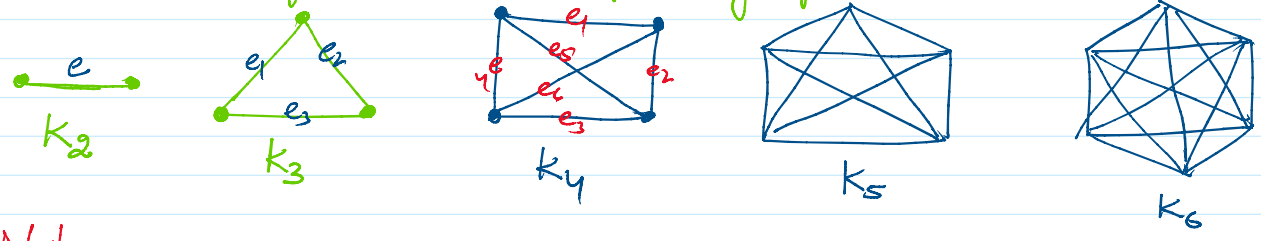
L-18 Graphs

Wednesday, March 16, 2022 10:04 AM

(iii) Complete Graph : A simple graph in which there exists an edge between every pair of vertices is called a complete graph. It is also known as universal graph.

Every vertex is connected with all other vertices. It is denoted by K_n

K_n n: No. of vertices in complete graph.



Note

No. of Edges in a Complete graph with n vertices $(K_n) = {}^nC_2$

K_n = ⟶ $= \frac{n(n-1)}{2}$

Ex No. of Edges in K_{10} = $n = 10$ ${}^{10}C_2$

$\frac{10(10-1)}{2}$

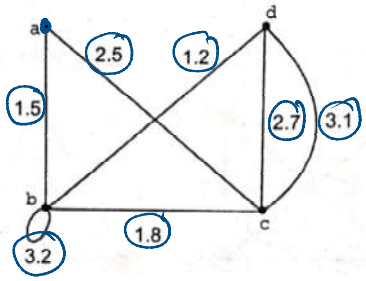
$= 5 \times 9 = 45$

$n=2$ K_2 No. of Edges $= {}^2C_2 = 1$

$n=3$ K_3 " " $= {}^3C_2 = 3$

$n=4$ K_4 " " $= {}^4C_2 = 6$

(iv) Weighted graph : Let G = (V, E) be any graph and $\omega : E \to R$ be a function from edge set E to set real numbers R. Then the graph G = (V, E, ω) in which each edge is assigned a number called the weight of the edge, is known as weighted graph.

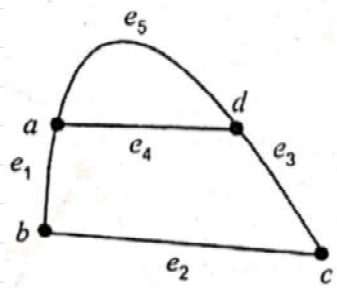


Finite Graph

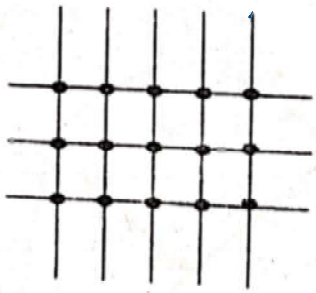
If the vertex set is a finite set

Infinite graph

Vertex set is Infinite set



(Finite graph)



(Infinite graph)

$V(G) = \{a, b, c, d\}$

$|V(G)| = 4$

Order of a Graph :-

No. of Vertices in a graph.

$|V(G)|$ = Order of graph G

Trivial Graph :-

One vertex and No Edge

$V(G) = \{a, b, c, d\}$

$|V(G)| = 4$

One Vertex and No Edge

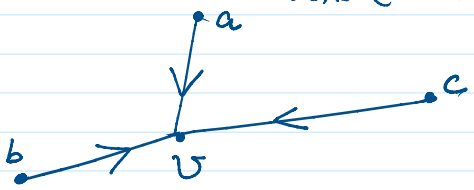
v •

Degree of a Vertex :→

Directed Graph Degree of a Vertex

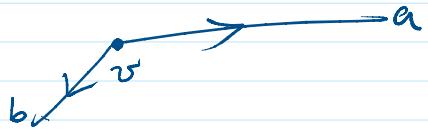
Indegree $\dot{d}(v)$

[No. of edges for which the Vertex v is Terminal Vertex. (Toward v)]



Outdegree $\bar{d}(v)$

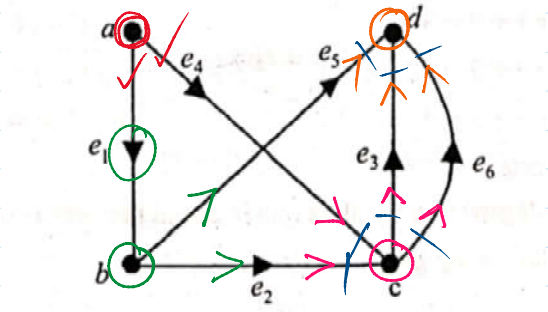
[No. of edges for which the Vertex v is Initial Vertex (Away from v)]



Degree of $v = d(v)$

$= \text{Indegree} + \text{Outdegree} = \dot{d}(v) + \bar{d}(v)$

Undirected graph :→ Degree of a Vertex v is the No. of edges Incident of that Vertex v.



v	In $\dot{d}(v)$	Out $\bar{d}(v)$	$d(v)$
a	0	2	0+2 = 2
b	1	2	1+2 = 3
c	2	2	2+2 = 4
d	3	0	3+0 = 3

Note :→ Degree of a loop = 2

No. of Edges in loop = 1

" Vertices " = 1

Indegree = 1

Outdegree = 1