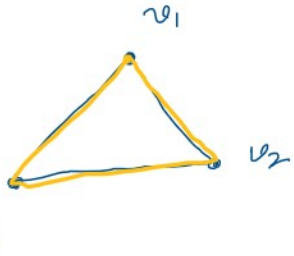
L27 11 April 2022

11 April 2022 10:04

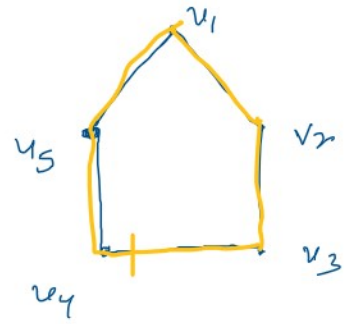
(5) Cycle graph :→ It is denoted by C_n, $n \geq 3$ ($n \rightarrow$ no. of vertices in the graph)

$V = \{v_1, v_2, v_3, \ldots, v_n\}$

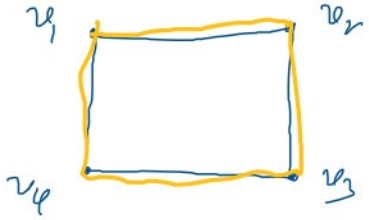
$C_3 \rightarrow$ v_1, v_2, v_3



C_5



C_4



In C_n, $n \geq 3$

① the no. of vertices = n

② the degree of every vertex = 2

③ the no. of edges = n.

Handshaking : $\sum \deg(v) = 2e$

$2(n) = 2e \Rightarrow \boxed{e = n}$

For what value of n, C_n contains an Euler circuit. → $\deg(v)$ = even

(a) odd (b) Even (c) all, $n \geq 3$ (d) No value

In C_n, $n \geq 3$

$\deg(v) = 2 \rightarrow$ even

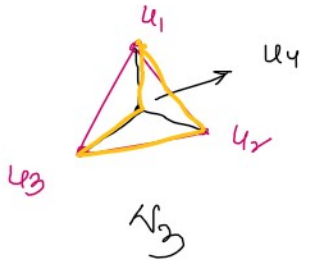
For what value of n, C_n contains an Hamiltonian circuit.

(a) odd (b) Even (c) all $n \geq 3$ (d) No value

All cycle graphs are regular

2-regular graphs

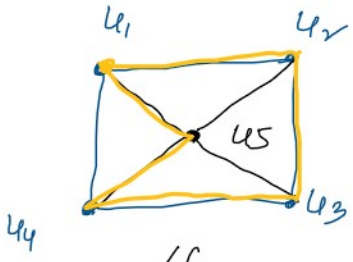
(1) ✓



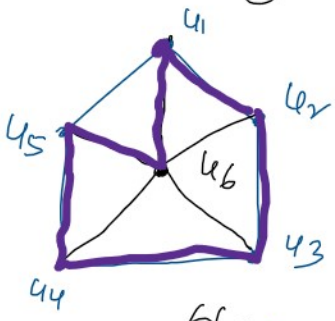
W_3

(6) **Wheel :→**

The wheel W_n can be generated with the help of C_n, by ingesting an extra vertex at the centre and connect that vertex to every other vertex of the graph



W_4



W_5

In W_n, $n \geq 3$

(1) the no. of vertices = $n+1$

(2) the degree of every vertex (except 1) = 3 and one vertex is having degree = n

$n+1$ → n, 3

(3) the no. of edges = $2n$

Handshaking Thm $\quad \sum \deg(x) = 2e$

$3(n) + n(1) = 2e$

$3n + n = 2e$

$4n = 2e$

$\Rightarrow \boxed{e = 2n}$

For what value of n, W_n, $n \geq 3$ contains an Euler circuit

(a) odd (b) Even (c) all, $n \geq 3$ (d) No value

For what value of n, W_n, $n \geq 3$ contains an Hamiltonian circuit

(a) odd (b) Even (c) all, $n \geq 3$ (d) No value

W_n is regular for $n = 3$ only

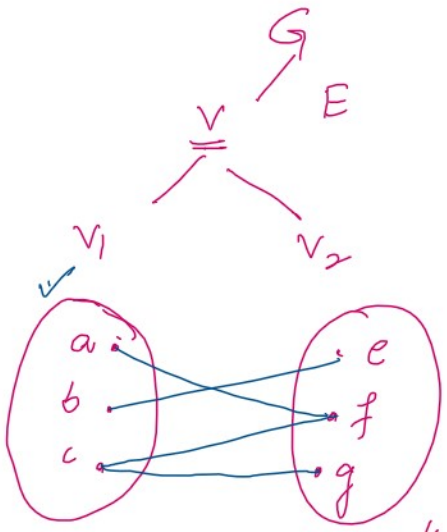
(9) Bipartite Graph

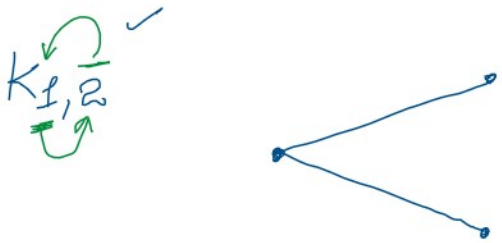
↓

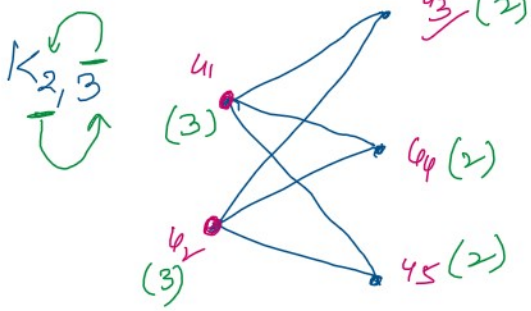
Complete Bipartite Graph

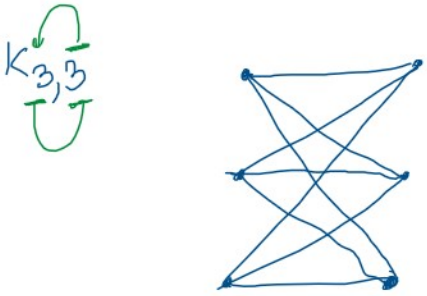
↓

It is denoted by $K_{m,n}$









In $K_{m,n}$

In $K_{m,n}$

① the no. of vertices $= m+n$

② the degree of m vertices $= n$ and degree of n vertex $= m$

③ the no. of edges $= m.n$

Handshaking Thm $\quad \sum \deg(v) = 2e$

$$m(n) + n(m) = 2e$$

$$2mn = 2e$$

$$\Rightarrow \boxed{e = mn}$$