CS & IT ENGINEERING

Discrete Mathematics

Graph Theory

Lecture No. 11

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01 covering set

02 Covering number

03 Planar Graph

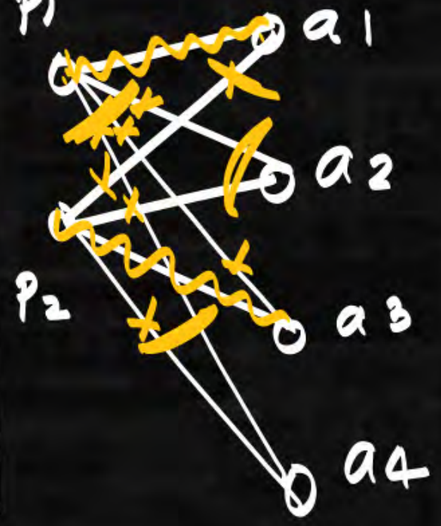
04 Euler's Formula In planarity

05 Sum of Degrees in Region

$K_{1,3}$.

$m(K_{1,3}) = 1$

$K_{2,4}$.



$m(K_{2,4}) = 2$.

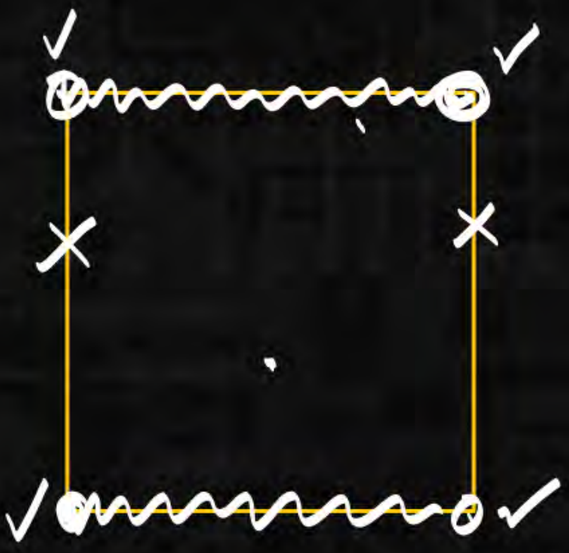
$m(K_{2,4}) = \min\{2, 4\} = 2$.

$m(K_{m,n}) = \min\{m, n\}$.

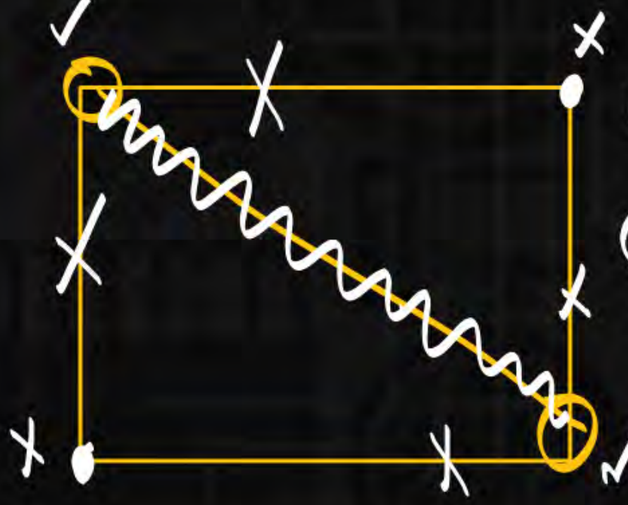
Perfect matching :

→ maximal matching which covers all vertices
touches

→ collection of edges → vertices (touch)

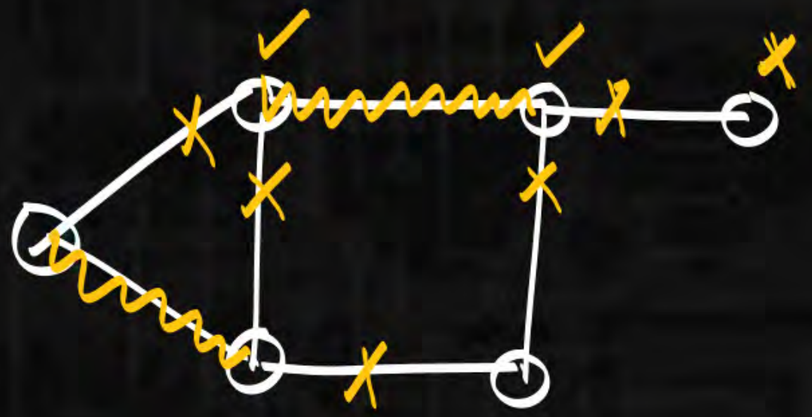


maximal matching :



maximal matching :

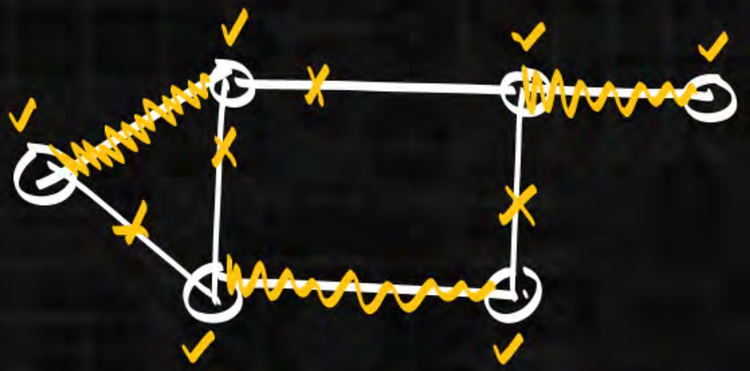
not perfect matching.



maximal matching

↓

not P.M.



maximal matching.

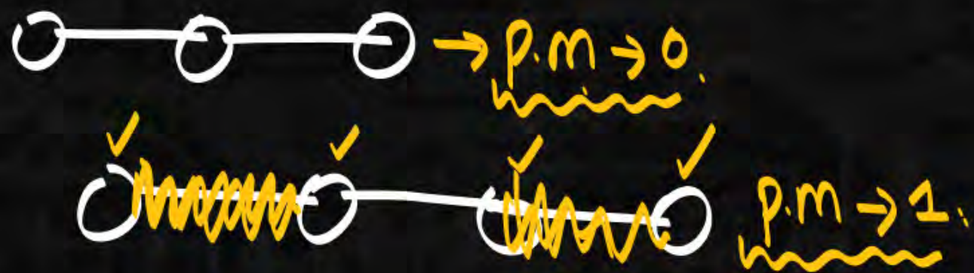
↓

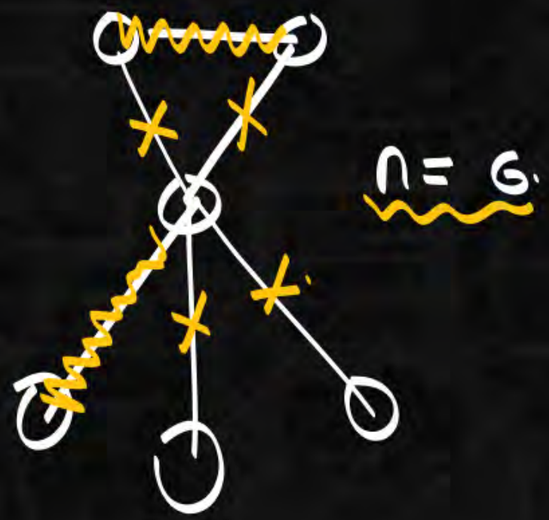
perfect matching.

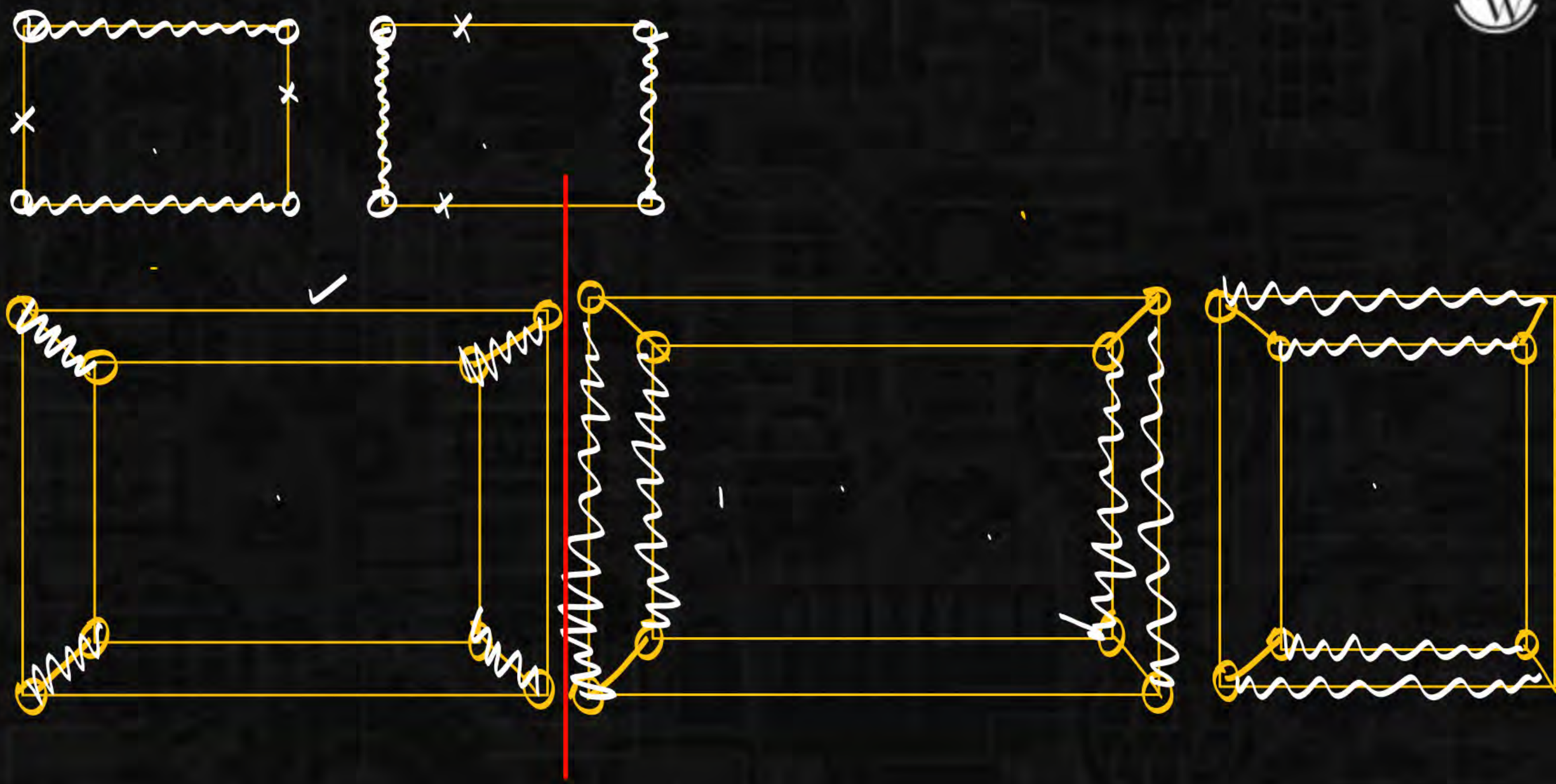
note: If perfect matching exist then no of vertices will be even.

vice versa is not true.

→ In a tree no of perfect matching is at most 1.







Total vertices = $2n$ (even)

no. of perfect matching K_{2n}

$(2n-1)\cdot(2n-3)\cdot(2n-5)\cdots$

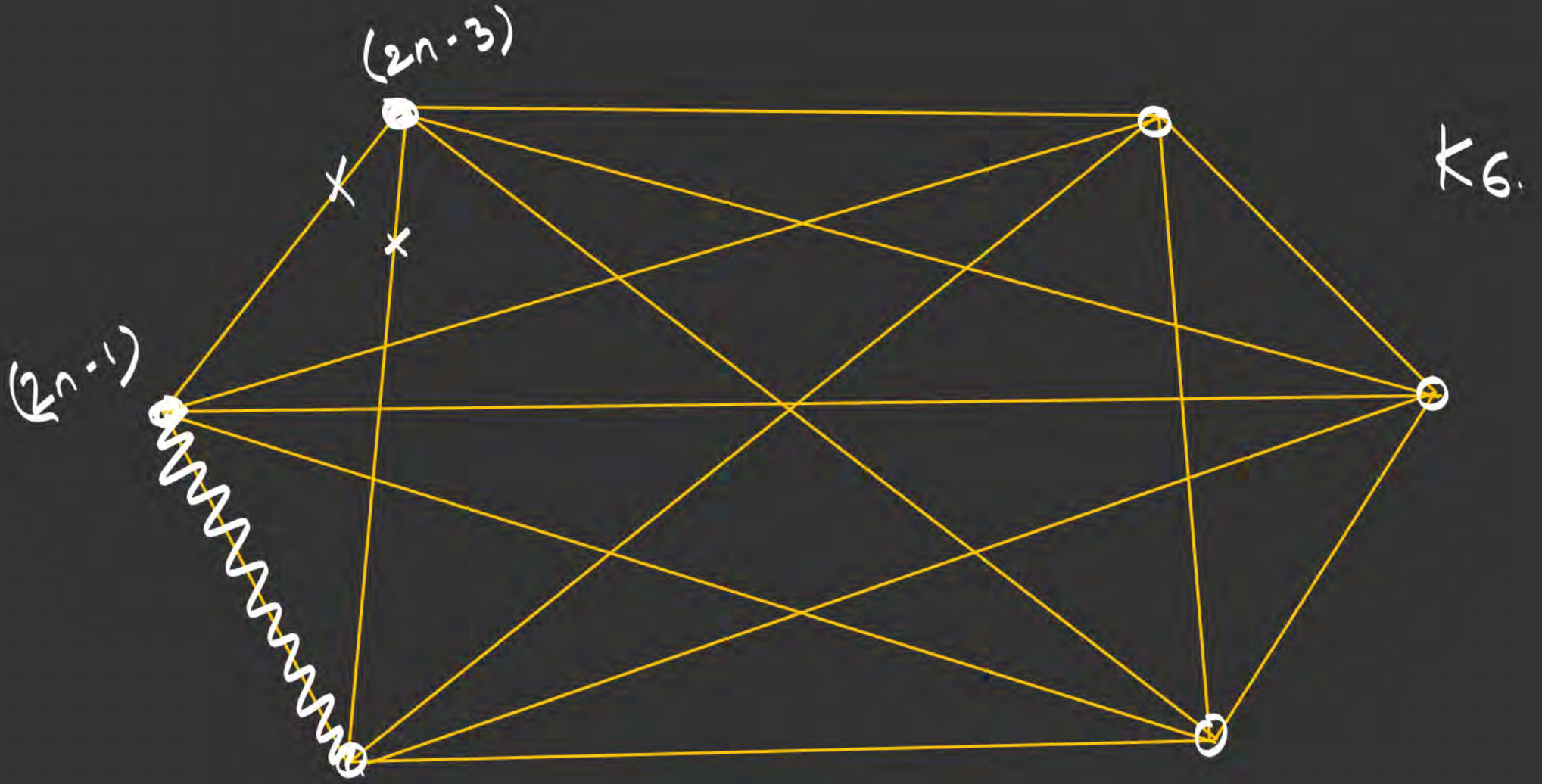
$$\frac{(2n)}{(2n)}(2n-1)\frac{(2n-2)}{(2n-2)}(2n-3)\frac{(2n-4)}{(2n-4)}(2n-5)$$

$$\frac{(2n)(2n-1)(2n-2)(2n-3)(2n-4)(2n-5)}{(2n)(2n-2)(2n-4)}$$

$$\frac{(2n)!}{2^n\, n!}$$

$$\frac{(2n)!}{2^n\, n(n-1)(n-2)\cdots}$$

(Dmntr take 2 common)


(2n-3)
(2n-1)
K6

GATE:

Total no of perfect matching in K_6.

$$K_{2n} = K_6$$

$$2n = 6$$

$$n = 3.$$

Ans: 15

$$(2n-1)(2n-3)(2n-5)\ldots\ldots$$

mistake

$$K_n = K_6$$

$$n = 6.$$


THANK YOU GW
SOLDIERS !