

CS & IT ENGINEERING

Discrete Mathematics

Graph Theory

Lecture_ 07



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Recap of Previous Lecture



Topic

Hypercube.



Topics to be Covered



Topic

Disconnected.

Topic

connected.



Topic: Graph Theory

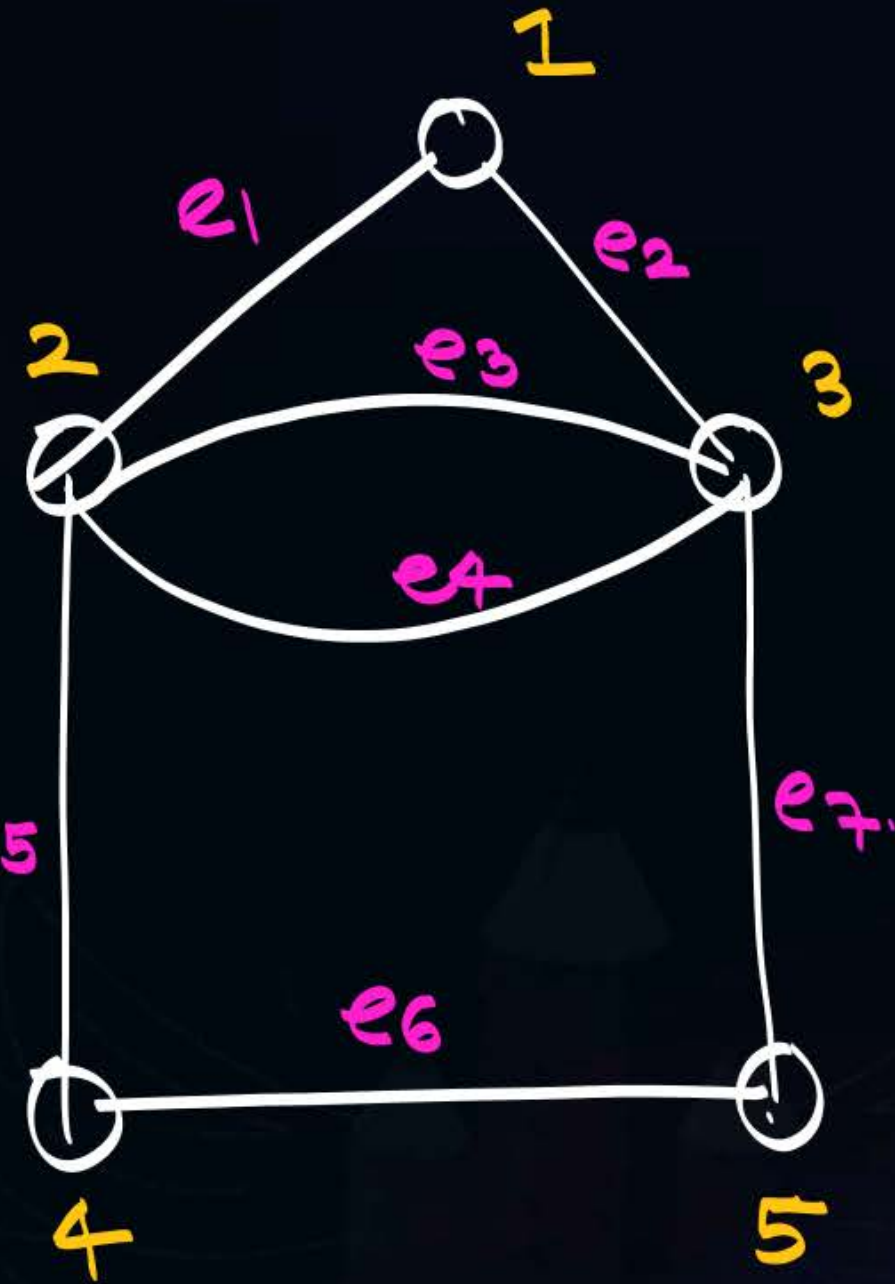
1 e_2 3 e_3 2 e_3 3 e_7 5

walk: alternating sequences of vertices & edges. $R.V | R.E.$

Trail: 1 e_2 3 e_3 2 e_4 3 e_7 5 | e_5
 $R.V | R.E$

Path: 1 e_2 3 e_7 5

~~$R.V | R.E$~~

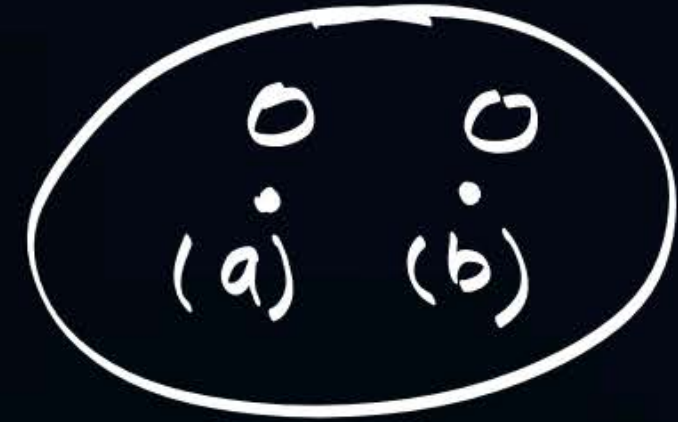




Topic: Graph Theory



0,0



$k=2$
D.C.

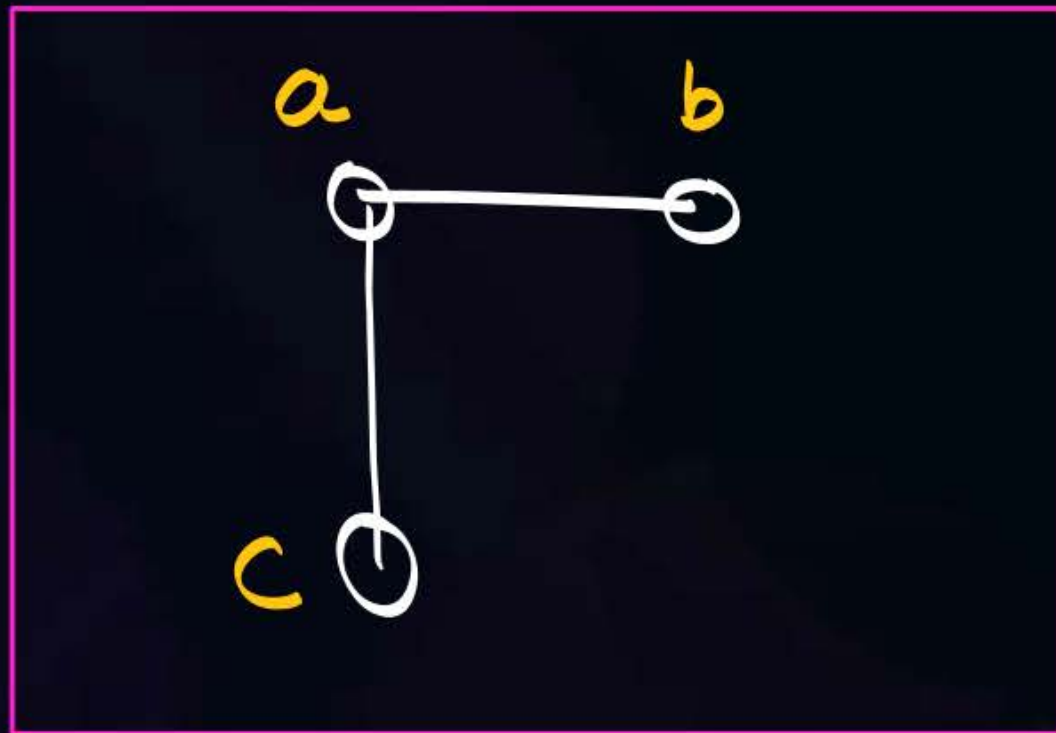


Connected Graph.

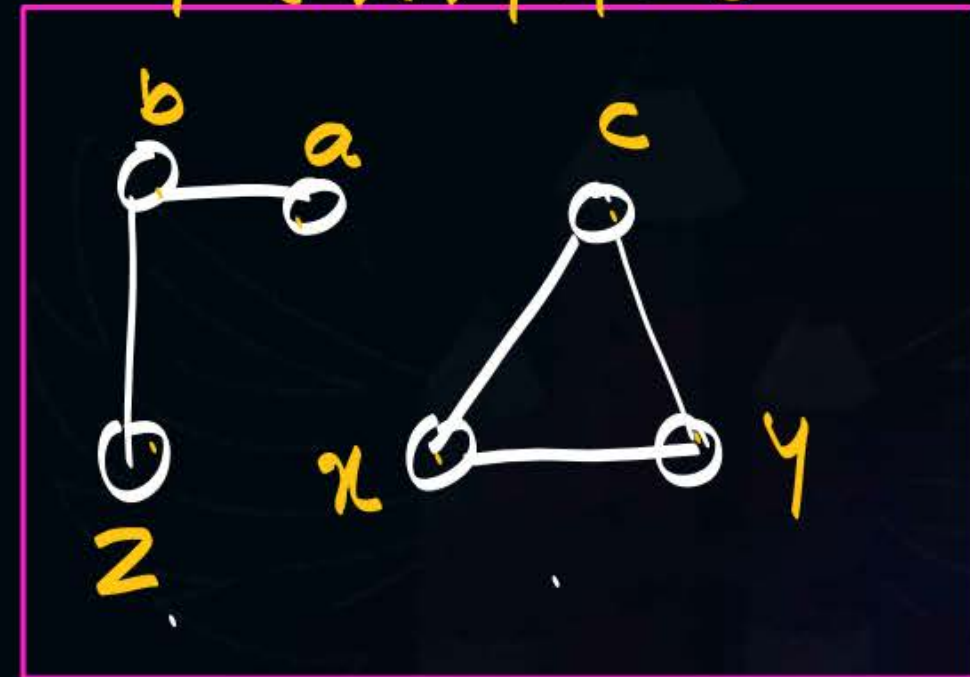
Path is available betⁿ all pair of vertices.

Graph

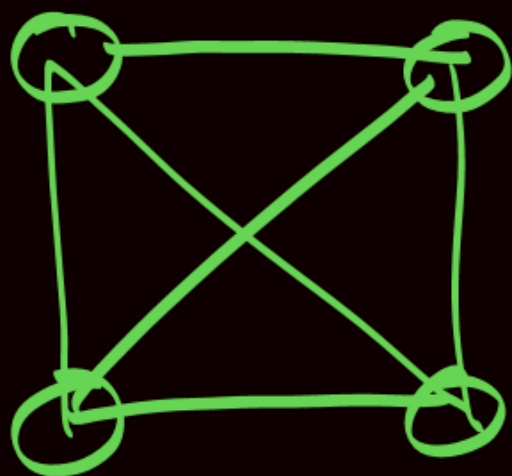
connected. ($k=1$)



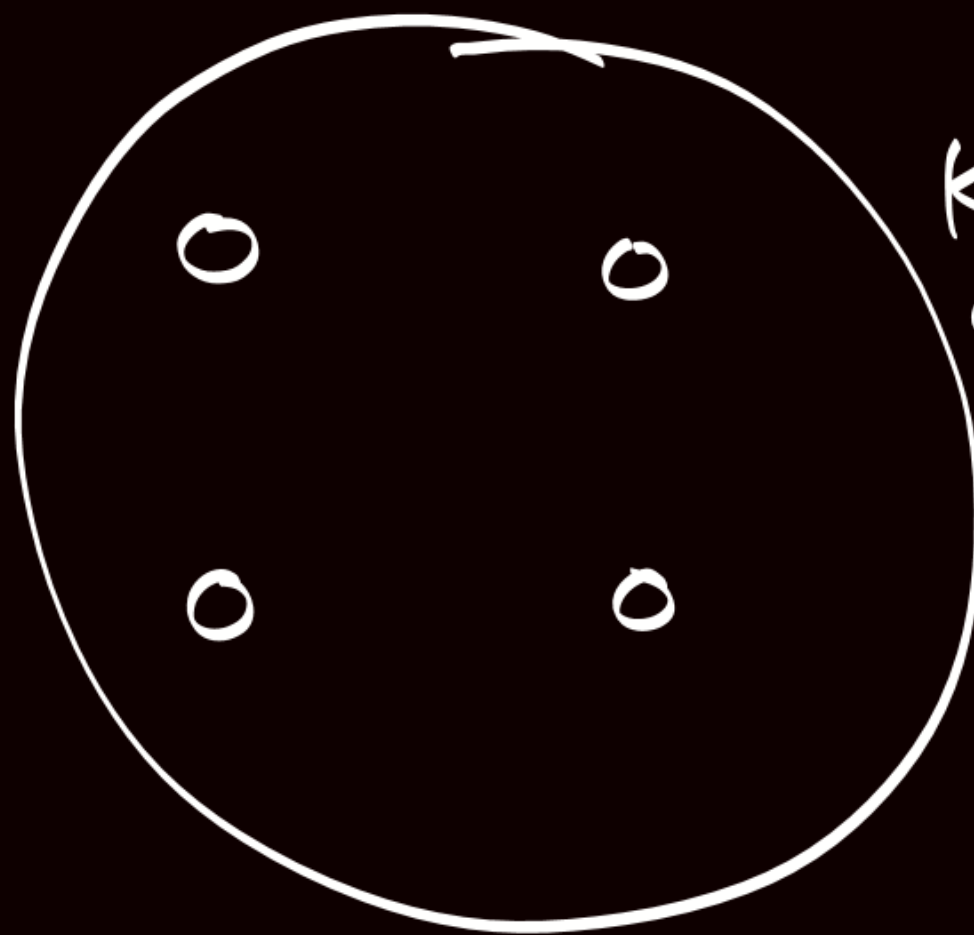
Disconnected ($k \geq 2$)
 $G=(V,E) \mid |V|=6$



Path is not available for atleast 1 pair.



K_4



$K=4$

Disconnected.
Graph.



Topic: Graph Theory



Disconnected Graph contains connected subparts.
component. (K)



Topic: Graph Theory

Star Graph.



6 vertices.



complement



→ component?

→ $e(\bar{G}) = ?$

$$e(K_{1,5}) = 5$$

$$e(K_{1,5}) + e(\bar{K}_{1,5}) = \frac{n(n-1)}{2}$$

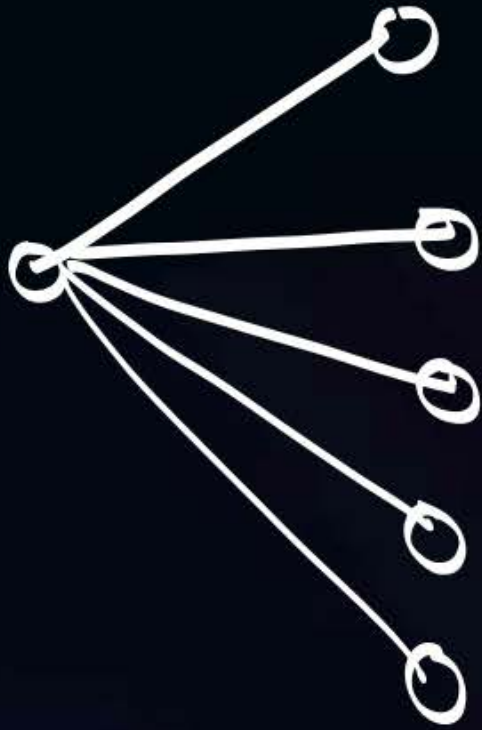
$$5 + x = \frac{6 \cdot 5}{2}$$

$$x = 15 - 5 = 10$$

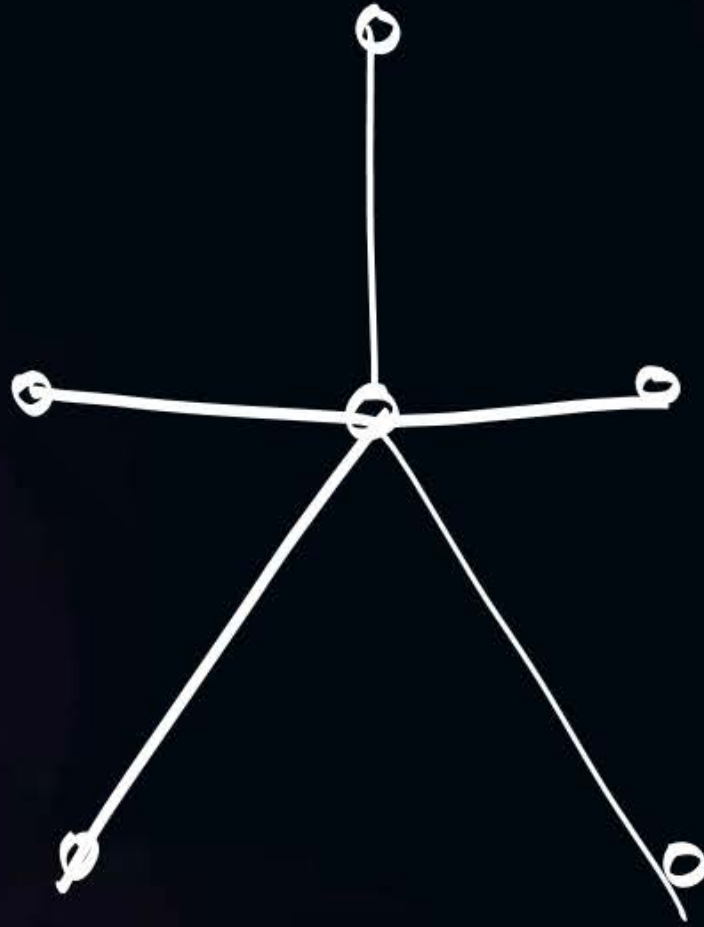
$$e(\bar{K}_{1,5}) = 10$$



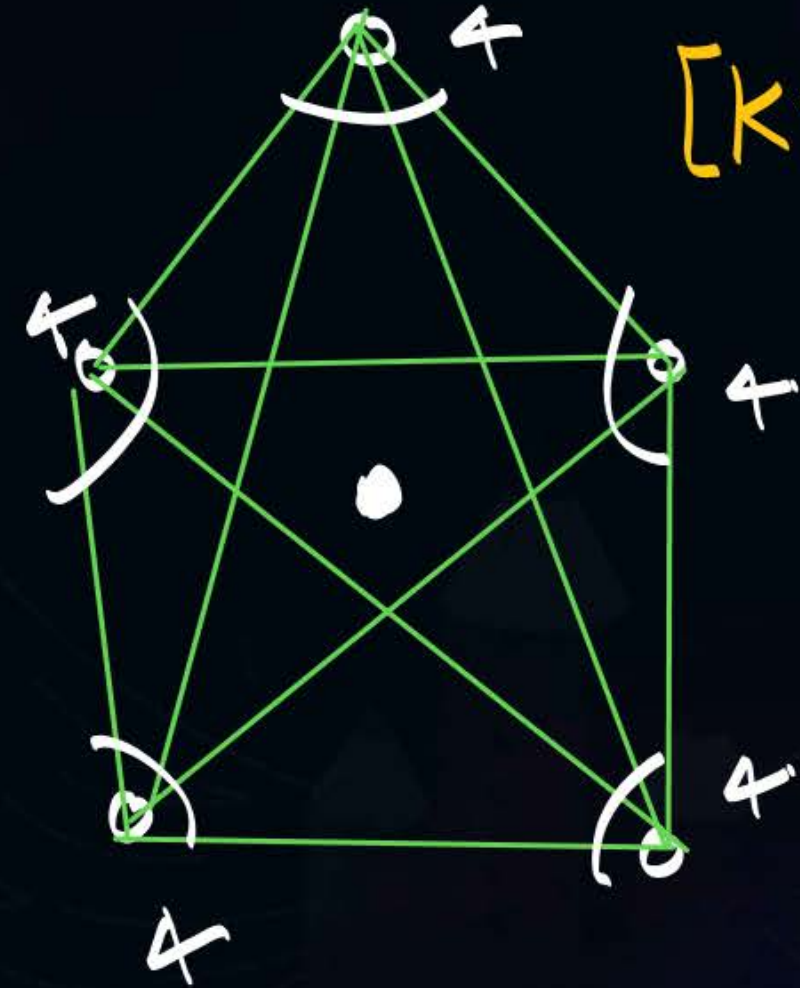
Topic: Graph Theory



$K_{1,5}$
~



$K_{1,5}$



$[K=2]$

K_1

K_5



Topic: Graph Theory

Consider a Graph vertices are represented as one of the elements from a set $\{1 \dots 100\}$

two vertices are adjacent a, b .

$$|a - b| = 4.$$

then, what will be total components?

$$e(G) = ?$$



Topic: Graph Theory



1 — 5 — 9 — 13 97

2 — 6 — 10 — 14 98

3 — 7 — 11 — 15 99

4 — 8 — 12 — 16 100

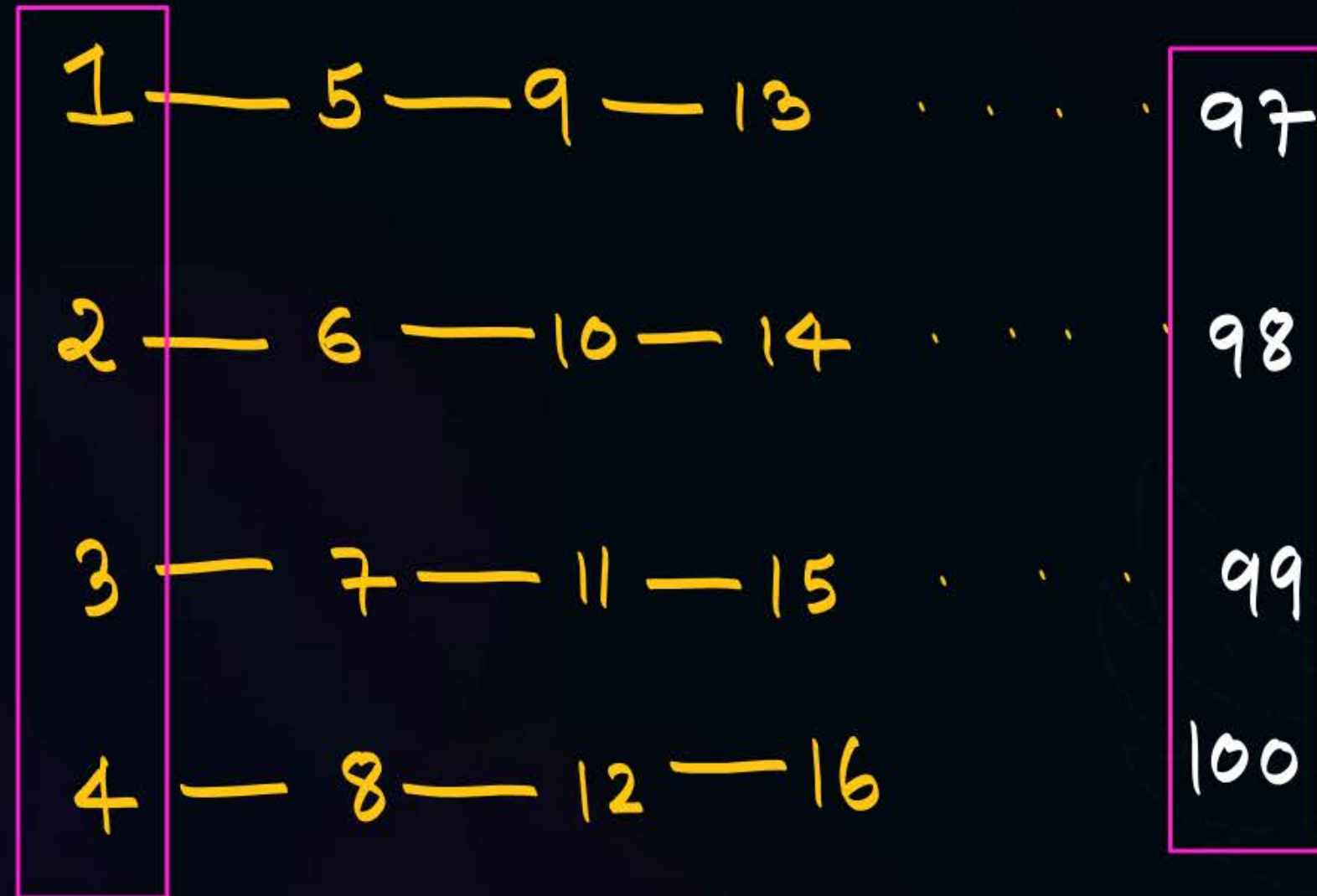
$$|a - b| = 4$$

$$|1 - 5| = 4$$

$$\begin{cases} K = 4 \\ e = 96 \end{cases}$$



Topic: Graph Theory



$$4 \times 1 + 4 \times 1 + 92 \times 2 = 2e.$$

$$4 + 4 + 184 = 2e.$$

$$e = 96$$



THANK - YOU