

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

P
W

1 e₂ 3 e₃ 2 e₃ 3 e₇ 5.

Walk: alternating sequences
of vertices & edges.

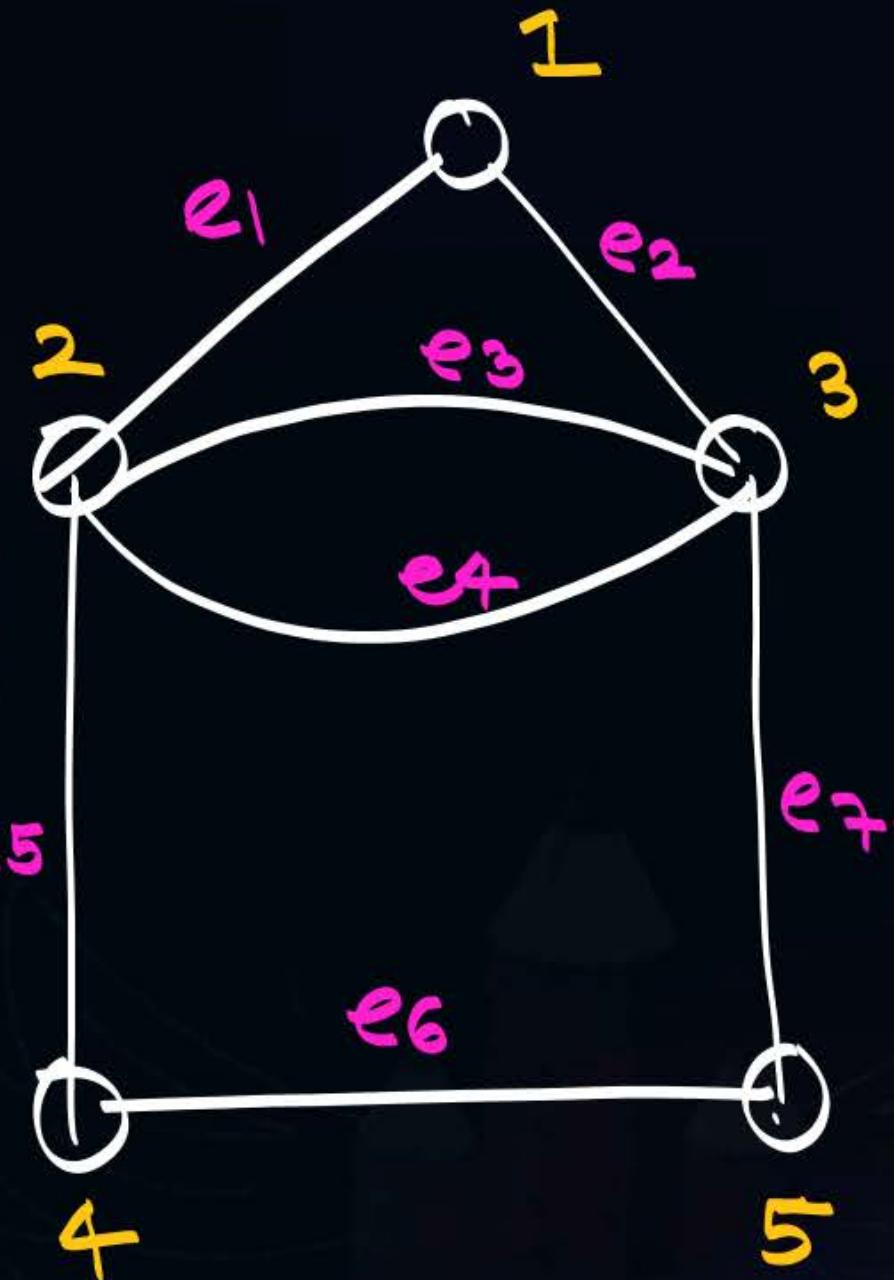
R.V | R.E

Trail: 1 e₂ 3 e₃ 2 e₄ 3 e₇ 5 | e₅

R.V | R E

Path: 1 e₂ 3 e₇ 5

R V | R E





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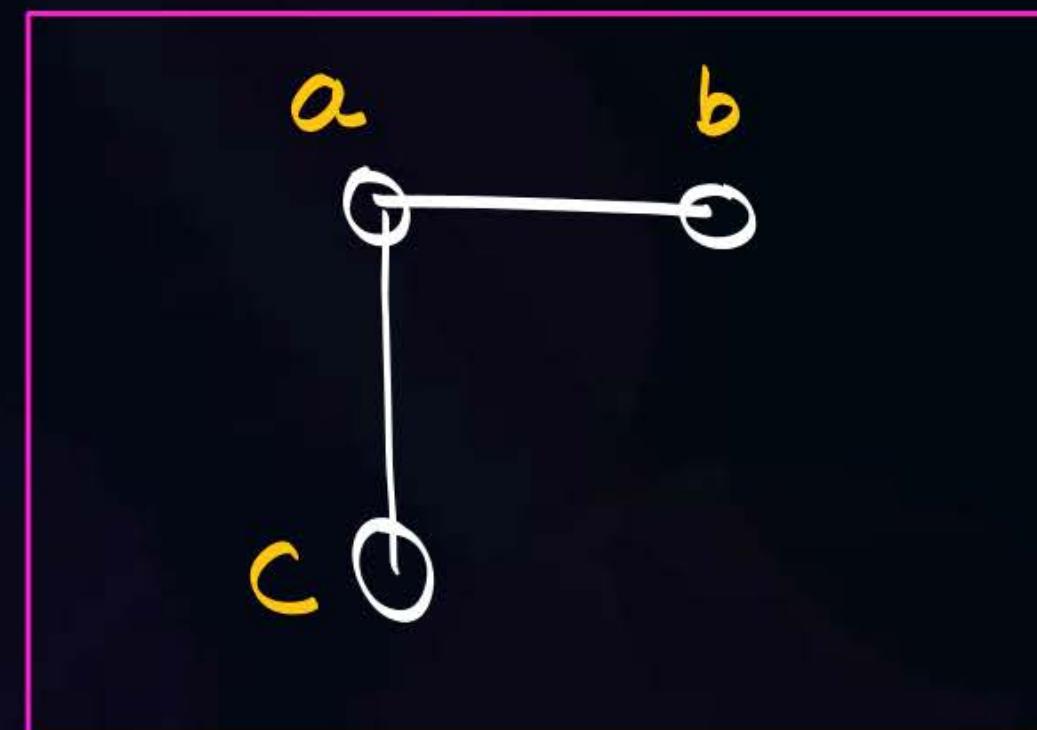


Connected
Graph.

Graph

connected. ($K=1$)

Path is
available
betⁿ all
pair of
vertices.



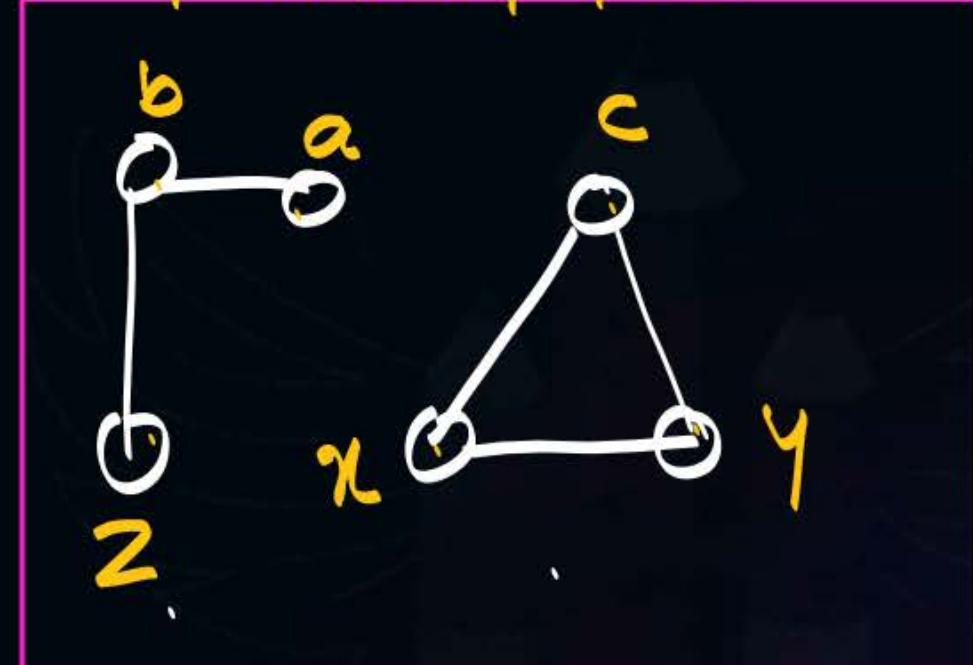
0,0



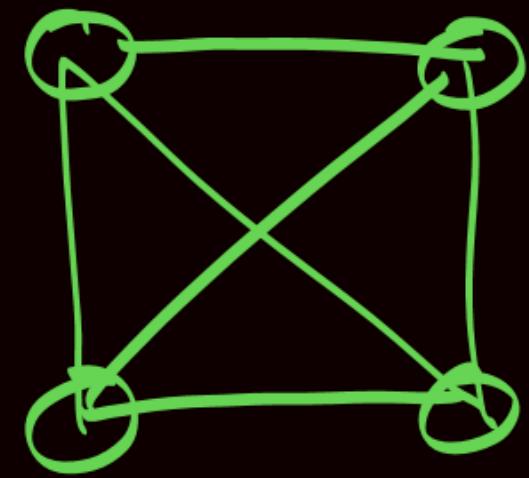
$K=2$
D.C.

Disconnected. ($K \geq 2$)

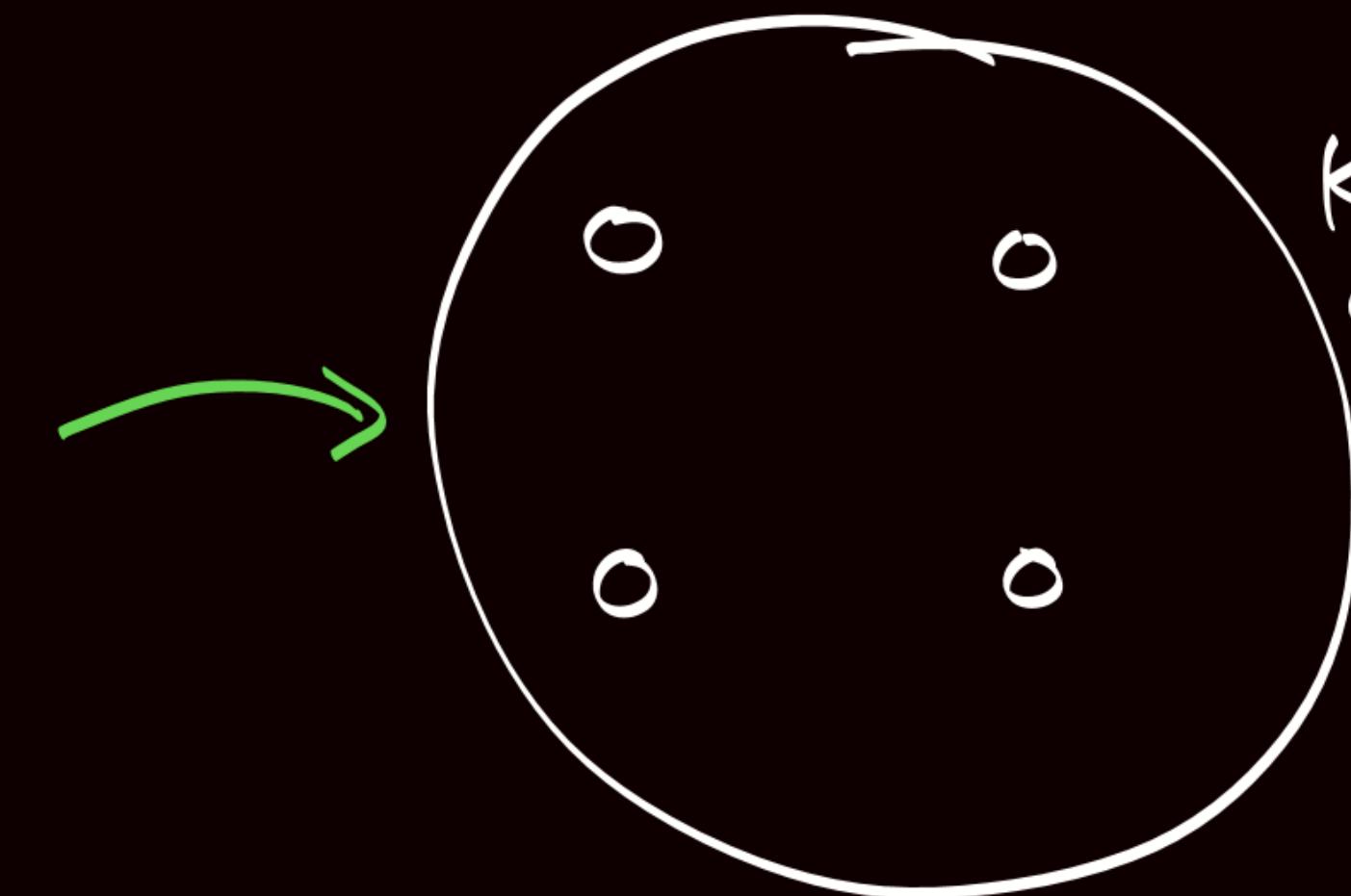
$$G = (V, E) \mid |V| = 6$$



Path is
not available
for
at least
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 ?
→ $e(\bar{G})=?$

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

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

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

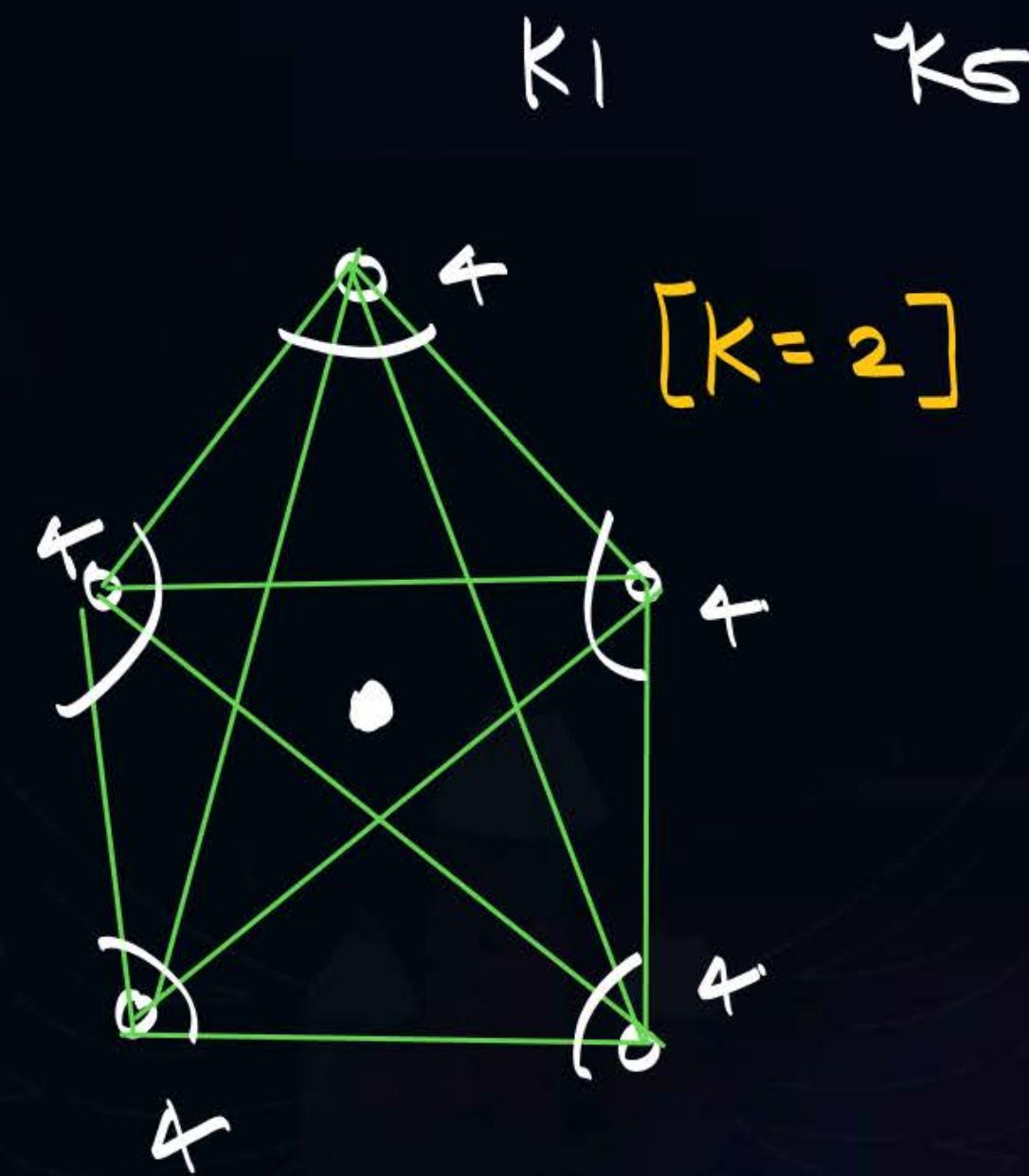
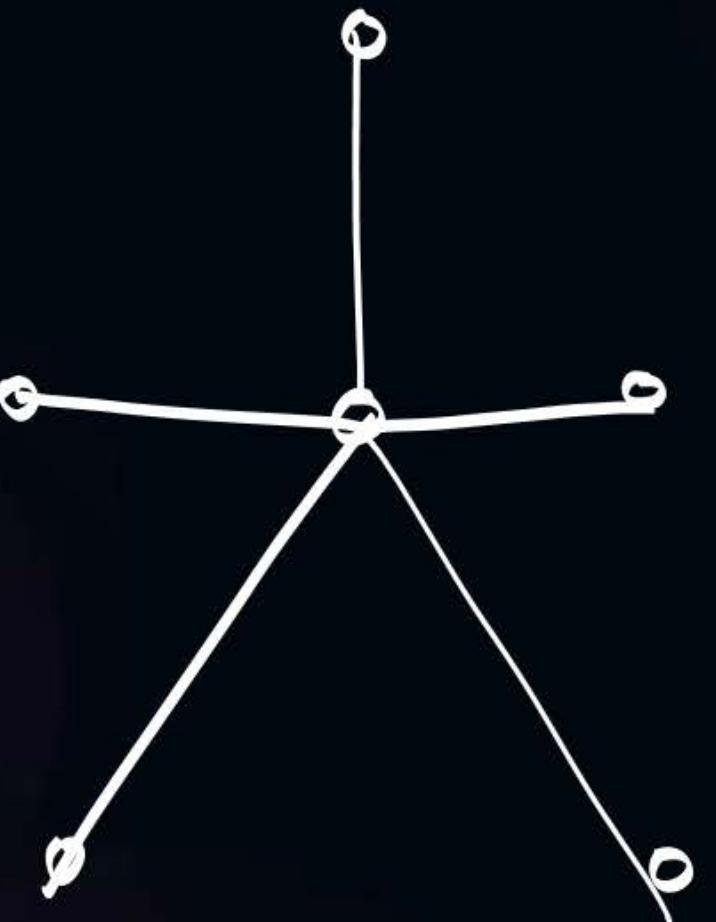
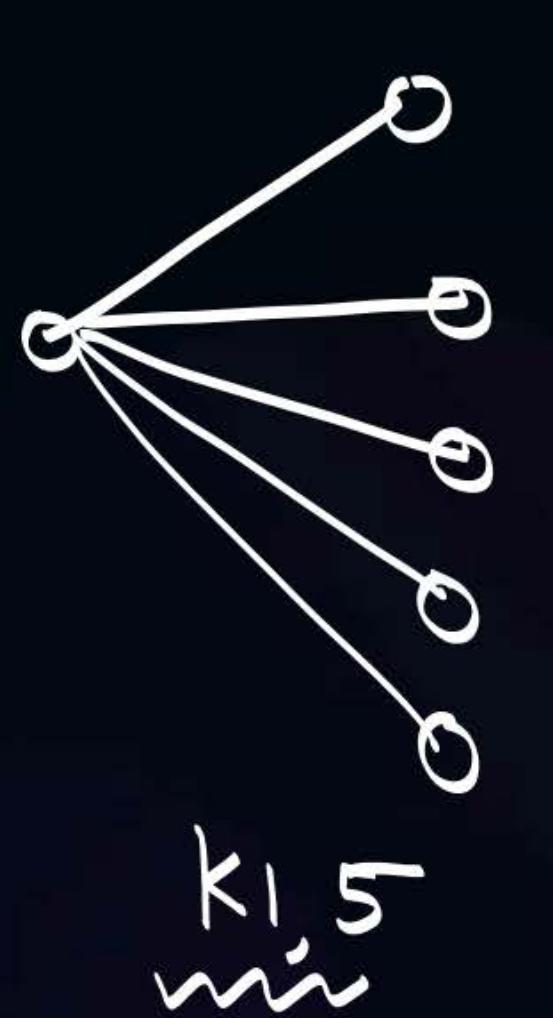
$$x = 15 - 5 = 10$$

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



Topic: Graph Theory

P
W





Topic: Graph Theory

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

two vertices are adjacent if,

$$|a - b| = 4$$

then, what will be total components?

$$e(G) = ?$$



Topic: Graph Theory

1 — 5 — 9 — 13 97

$$|a - b| = 4$$

2 — 6 — 10 — 14 98

$$|1 - 5| = 4$$

3 — 7 — 11 — 15 99

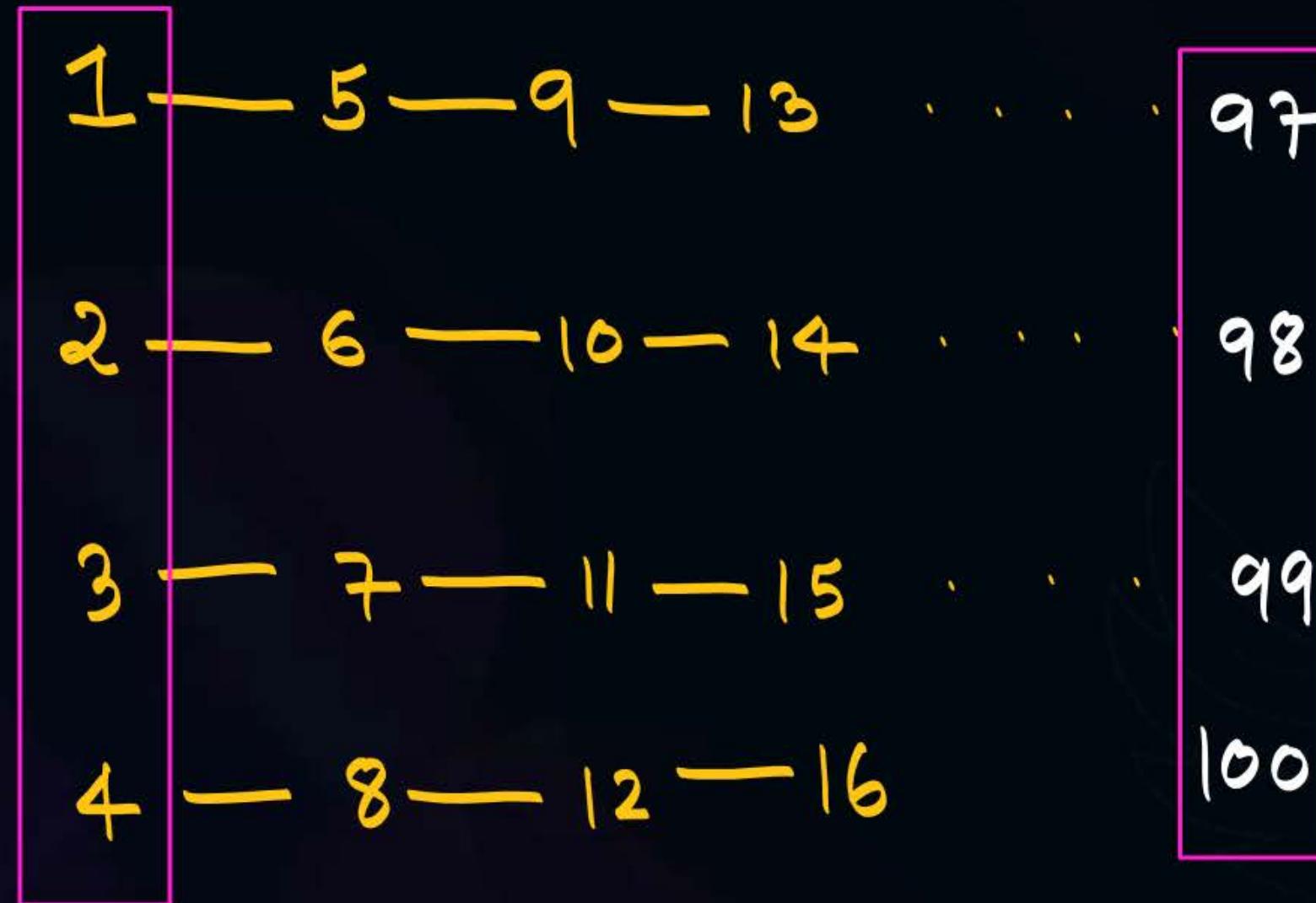
$$\{ k = 4 \}$$

4 — 8 — 12 — 16 100

$$\{ e = 96 \}$$



Topic: Graph Theory



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

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

$e = 96$



THANK - YOU