

lecture 22:- GRAPHS. → Structure. → خبر لنا
(30 min) K.

$G = (V, E)$.

$V =$ Set of Vertices.

$E =$ Set of edges.

problem Representation.

DS.

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Types of Graphs.

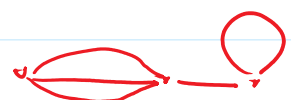
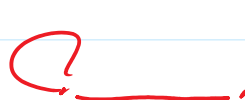
1-- Simple Graphs.

- No loops.
No multi edges.

2- Multi Graph. - Contains multi edges.

multiplicity = Maximum # of edges
btw any pair of Vertices.

3- Pseudograph:- - may contain loops + ^{possibly} multi edges.



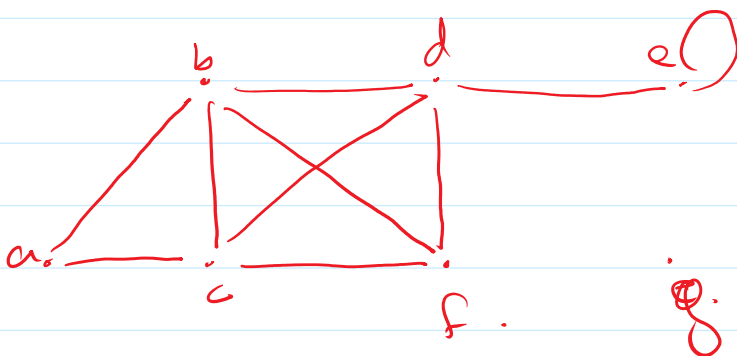
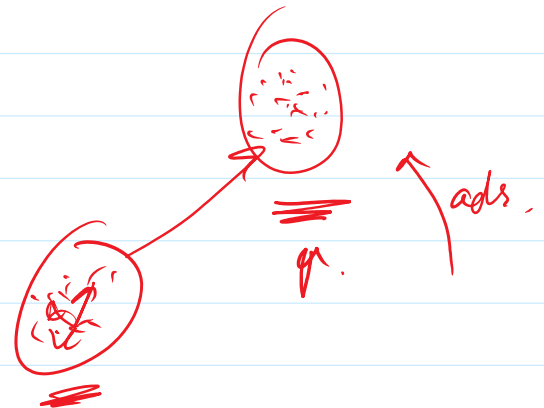
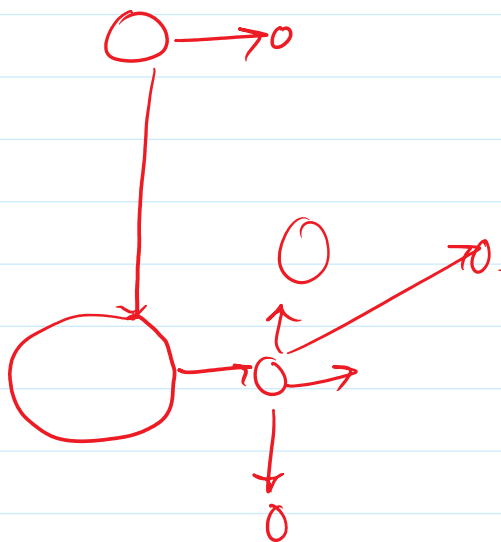
4- Directed Graphs:- every edge has a direction.
→

5- Directed Simple Graph.
- No loops.
- No multiedges.
- Direction.

6- Directed multigraph:-

7- Mixed Graph:-

Graphs:-



$\deg(a) =$
 $\deg(b) =$
 $\deg(c) =$
 $\deg(d) =$
 $\deg(e) =$
 $\deg(f) =$
 $\deg(g) =$

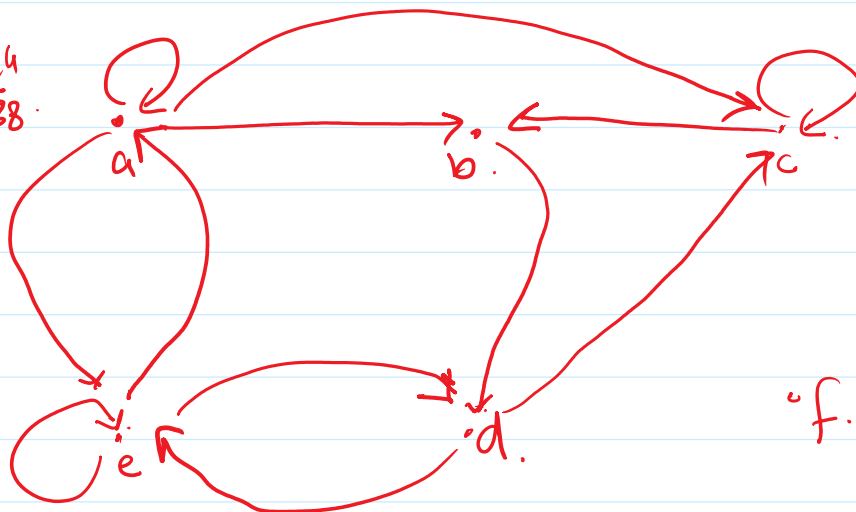
c f. g.

$\hookrightarrow (d) =$
 $\hookrightarrow (e) =$
 $\hookrightarrow (f) =$
 $(g) =$

Handshaking theorem

$$2e = \sum_{u \in V} \deg(u).$$

Ex 4
538.



$\deg^-(a) =$	$\deg^+(a) =$
$\deg^-(b) =$	$\deg^+(b) =$
$\deg^-(c) =$	$\deg^+(c) =$
$\deg^-(d) =$	$\deg^+(d) =$
$\deg^-(e) =$	$\deg^+(e) =$
$\deg^-(f) =$	$\deg^+(f) =$

$$\sum_{u \in V} \deg^-(u) = \sum_{u \in V} \deg^+(u) = |E|$$

Special Types of ^{Simple} Graphs.

1- Complete Graph.

K_1 .

K_2 .



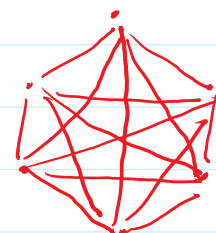
K_3 .



K_4 .



K_5 .

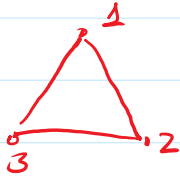


K_6 .

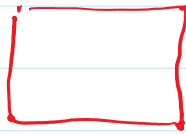
Cycles

$n \geq 3$

$(1, 2), (2, 3), (3, 4), \dots, (n-1, n), (n, 1)$



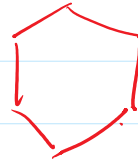
C_3



C_4

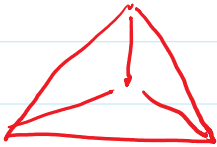


C_5

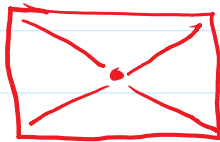


C_6

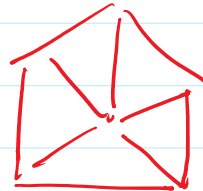
Wheels



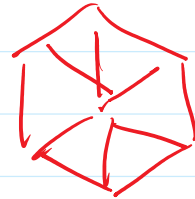
W_3



W_4



W_5



W_6

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