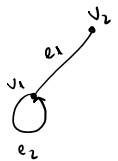


Isomorphisms of Graphs



$$V = \{v_1, v_2, \dots, v_n\} \xrightarrow{t} W = \{w_1, w_2, \dots, w_n\}$$

$$E = \{e_1, e_2, \dots, e_m\} \xrightarrow{s} F = \{f_1, f_2, \dots, f_m\}$$

edge-endpoint function

edge-endpoint function

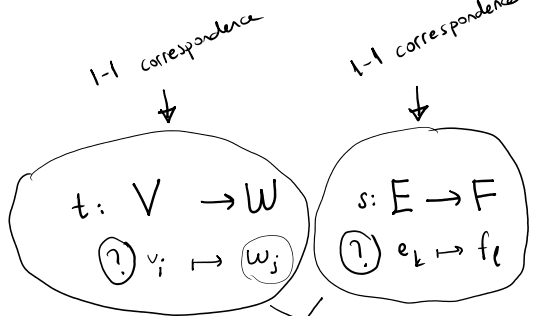
$$f: E \rightarrow V \quad \checkmark$$

- $e_1 \mapsto \{v_1, v_2\}$
- $e_2 \mapsto \{v_1\}$
- \vdots
- $e_m \mapsto \{ \}$

$$g: F \rightarrow W \quad \checkmark$$

- $f_1 \mapsto \{w_2, w_3\}$
- \vdots
- $f_m \mapsto \{ \}$

t and s should preserve:

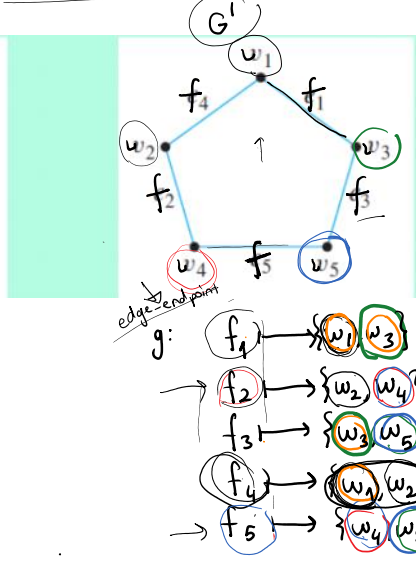
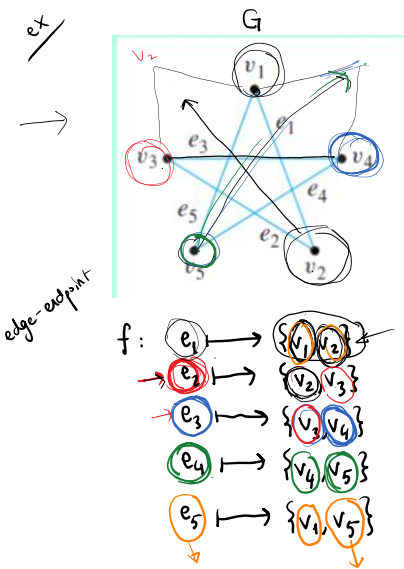


preserving these

are called isomorphism

If such an isomorphism can be created (preserving edge-endpoint functions) between G and G' \Leftrightarrow G and G' are isomorphic graph

v is an endpoint of e \Leftrightarrow the image of v under t is an endpoint of the image of e under s

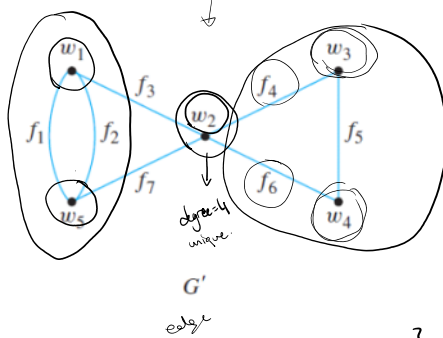
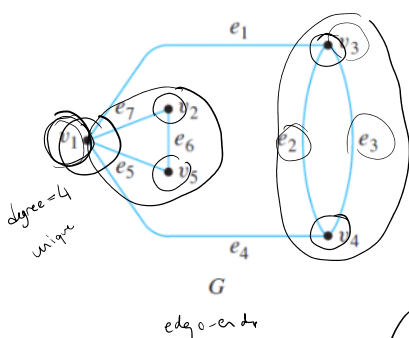


While creating these check

- t: V \rightarrow W
- $v_1 \mapsto w_1$
 - $v_2 \mapsto w_2$
 - $v_3 \mapsto w_4$
 - $v_4 \mapsto w_5$
 - $v_5 \mapsto w_3$

- s: E \rightarrow F
- $e_1 \mapsto$ either f_1 or f_4
 - $e_2 \mapsto$ either f_2 or f_4
 - $e_3 \mapsto$ either f_2 or f_5
 - $e_4 \mapsto$ either f_3 or f_5
 - $e_5 \mapsto$ either f_1 or f_3

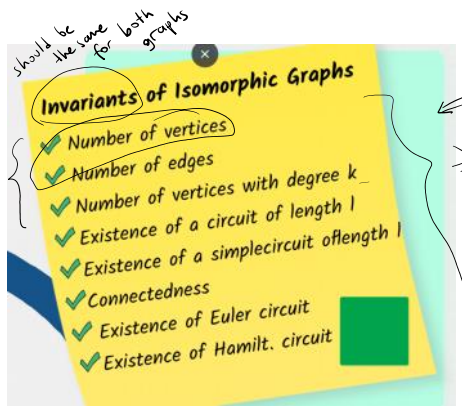
G and G' are isomorphic.



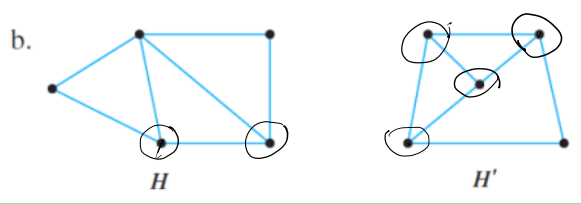
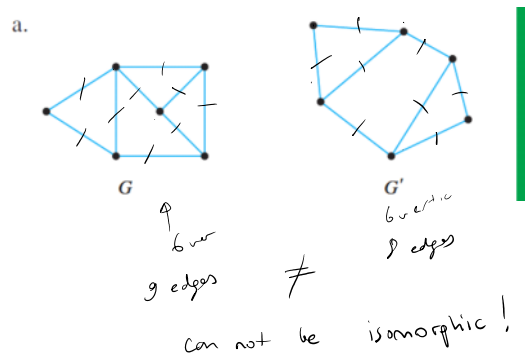
G edge-entr
 2 vertices of degree 3
 " " 2

G' edge
 2 vertices with degree 3
 " " deg. 2

$=$
 $=$



isomorphic
~~isomorphic~~



5 vertices = 5 vertices
 7 edges = 7 edges
 2 vertices with deg=3 \neq 4 vertices with deg=3

H and H'
 not isomorphic.