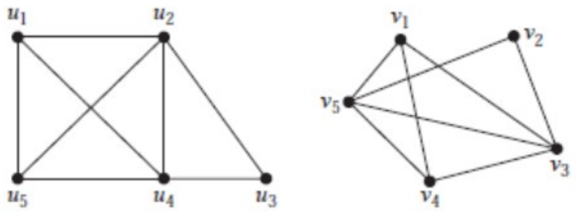
Lecture 28

26 October 2021 11:07



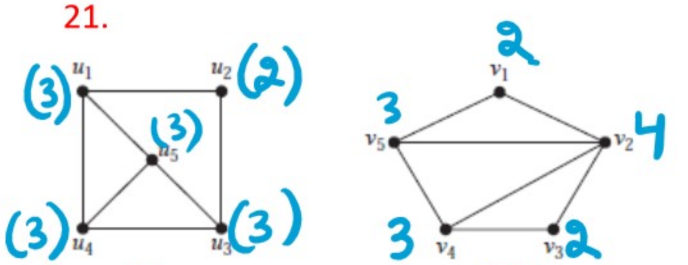
$u_1(3)$	$u_2(4), u_5(3), u_4(4)$
$u_2(4)$	$u_1(3), u_3(2), u_4(4), u_5(3)$
$u_3(2)$	$u_2(4), u_4(4)$
$u_4(4)$	$u_1(3), u_2(4), u_3(2), u_5(3)$
$u_5(3)$	$u_1(3), u_4(4), u_2(4)$

$v_1(3)$	$v_3(4), v_4(3), v_5(4)$
$v_2(2)$	$v_5(4), v_3(4)$
$v_3(4)$	$v_1(3), v_2(2), v_4(3), v_5(4)$
$v_4(3)$	$v_1(3), v_3(4), v_5(4)$
$v_5(4)$	$v_1(3), v_2(2), v_3(4), v_4(3)$

$$\begin{array}{c} u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \end{array} \begin{bmatrix} 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 0 \end{bmatrix}$$

$$\begin{array}{c} v_1 \\ v_3 \\ v_2 \\ v_5 \\ v_4 \end{array} \begin{bmatrix} 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 0 & 0 \end{bmatrix}$$

21.



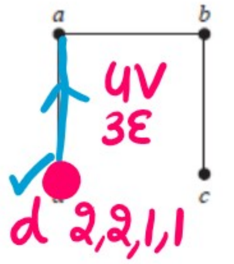
5V 7E

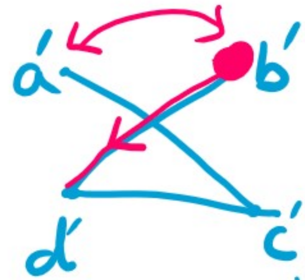
5V 7E

$3,3,3,3,2 \neq 4,3,3,2,2$

G, H are not isomorphic.

Self Complementary: A simple graph $\boldsymbol{G}$ is said to be self-complementary if it is isomorphic to $\overline{\boldsymbol{G}}$.





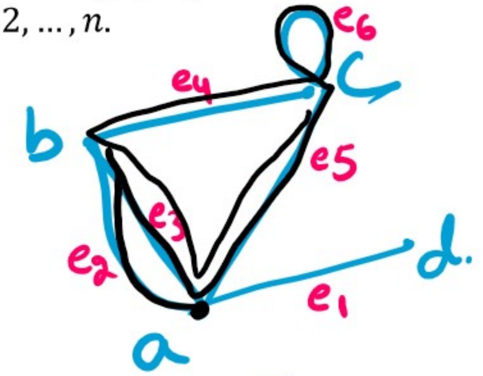
$f(b') = d$
$f(d') = a$
$f(c') = b$
$f(a') = c$

$$\begin{array}{c} a \\ b \\ c \\ d \end{array}\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} = \begin{array}{c} \\ d' \\ c' \\ a' \\ b' \end{array}\begin{array}{c} \begin{array}{cccc} d' & c' & a' & b' \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix} \end{array}$$

$G, \overline{G}$ are isomorphic, G is self complementary.

Connectivity

Path: Let G be an undirected graph. A path of length n from u to v in G is a sequence of n edges $e_1, e_2, \ldots, e_n$ of G for which there exists a sequence $x_0 = u, x_1 =, \ldots, x_{n-1}, x_n = v$ of vertices such that e_i has the endpoints x_{i-1} and x_i for $i = 1, 2, \ldots, n$.

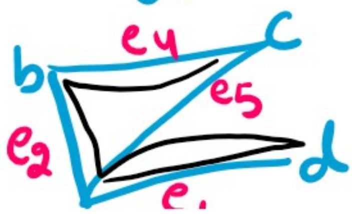


a to c

$e_2 e_3 e_5 e_6 e_4 e_3 e_5$

Path → Length → 7

Walk → $a e_2 b e_3 a e_5 c e_6 c e_4 b e_3 a e_5 c$



a to c adabc

a to c, adabc

When the graph is simple, we denote this path by its vertex sequence $x_0, x_1, \ldots, x_n$.

Circuit: The path is a circuit if it begins and end at the same vertex.

Walk: A walk is defined as an alternating sequence of vertices and edges of a graph $v_0, e_1, v_2, \ldots, v_{n-1}, e_n, v_n,$ where $v_{i-1}$and v_i are the endpoints of e_i for $i = 1, 2, \ldots, n$. **Closed Walk** is used for circuits.