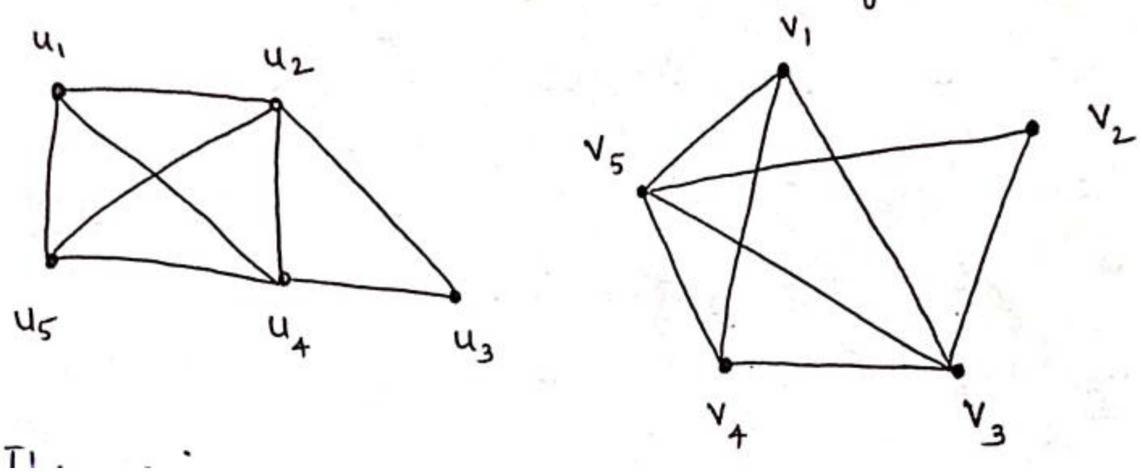
TOPIC:6-Isomorphic Graphs

Isomorphism

If two graphs have exactly the same for
m the sense that there is a one-one
orrespondence between their vertex sets that
reserves edges. In such a case, we say
that the two graphs are isomorphic. Two graphs
$G_1 = (V_1, E_1)$ and $G_2 = (V_2, E_2)$ are the same or isomorphic, if there
is a bijection $F : V_1 \to V_2$ such that $(u, v) \in E_1$ iff $(F(u), F(v)) \in E_2$

1)

Examine whether the following pair of graphs
are isomorphic. If not isomorphic, give the reasons



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The given 2 graphs have

(1) Same no. of vertices

(2) Same no. of edges.

Moreover, in the gn. diagram u_1 & u_5 are of degree 3 each, u_2 & u_4 are of degree 4 each and u_3 is degree 2. |||ly v_1 and v_4 are of degree 3 each, v_3 & v_5 are of degree 4 each and v_2 is of degree 2.

Now, we assign.

$u_1 \to v_1$, $u_5 \to v_4$, $u_2 \to v_3$, $u_4 \to v_5$,

$u_3 \to v_2$.

The adjacency matrix are

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

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

These two matrices are equal.