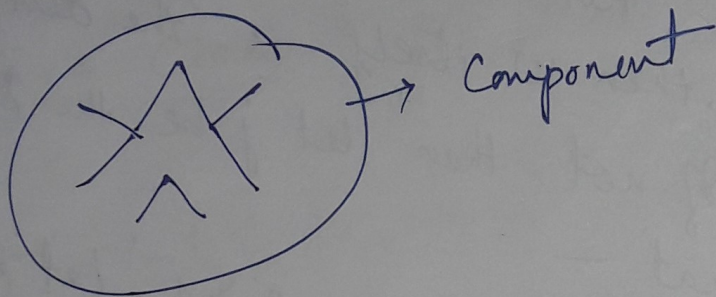


from any vertex to any other vertex. More, formally a graph is said to be connected if there is at least one path between every pair of vertices in  $G$ . Otherwise  $G$  is disconnected. A null graph ~~more~~ more than one vertex is disconnected. A disconnected graph consists of two or more connected graphs each of these connected sub-graph is called a Component.



Theorem: — A graph  $G$  is disconnected iff its vertices  $V$  can be partitioned into two non-empty disjoint subsets  $V_1$  &  $V_2$  such that there exists no edge in  $G$  which one end vertex is in subset  $V_1$  & the other in subset  $V_2$ .

Proof: — Suppose that such a partition exists. Consider two arbitrary vertices  $a, b \in G$ , such that  $a \in V_1$  &  $b \in V_2$ . No path can exist between vertices  $a$  &  $b$ . Otherwise there would be at least one edge whose one end vertex