

Kruskal's algorithm.

- It is used to determine the minimum spanning tree.
- The objective is similar to Prim's but the approach is different.
- The difference is it ~~needs not to be~~ chooses the lowest cost edge and while adding it to 'T', it checks for a cycle.

Algorithm:- $G = (V, E)$.

$E_T \leftarrow \phi$, $count \leftarrow 0$.

$E_{sorted} \leftarrow$ Sort E in the ascending order of cost.

while ($count < |V| - 1$)

 select an edge e_k from E_{sorted}

 if $T \cup e_k$ is acyclic.

 add e_k to T .

$count++$

 else.

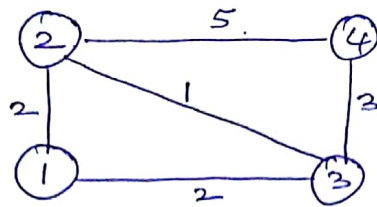
 discard e_k .

$k \leftarrow k + 1$

~~$count++$~~ ~~$count++$~~

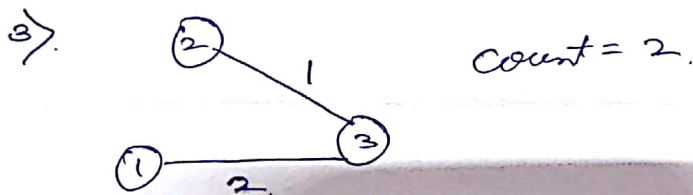
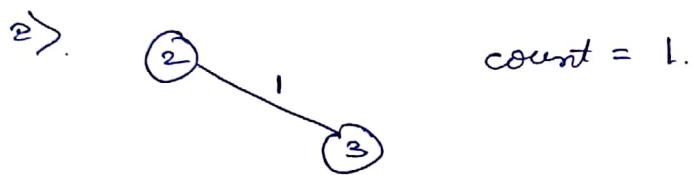
end while.

Example.:-

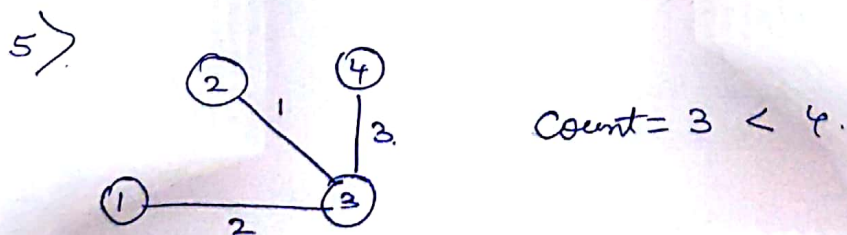


1) $E =$ $\begin{matrix} \downarrow & \downarrow & \downarrow & 2 & 5 \\ 1 & 2 & 2 & 3 & \\ \{2,3\} & \{1,3\} & \{1,2\} & \{4,3\} & \{2,4\} \end{matrix}$

Count.

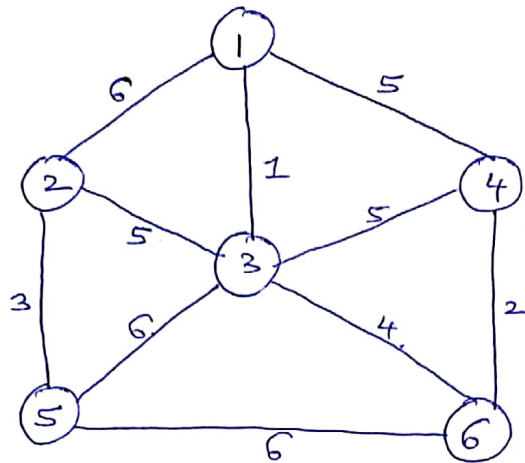


4) $\{1, 2, 3\}$ forms a cycle. ignore.



6) $\{2, 4\}$ form a cycle, ignore

Example 2:-



1) Start the edges according to weights.

$E = \sum_{k=0}^9$
 $\begin{matrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ \checkmark & \checkmark & \checkmark & \checkmark & \{2,3\} & \{3,4\} & \{1,2\} & \{1,3\} & \{5,6\} \end{matrix}$

2) $Count = 0, R = 0.0$

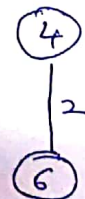
$e_R = 1$



Increment
 $Count = 1, k = 1$

3)

$e_R = 2$

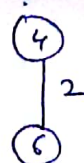


$Count = 2$

$R = 2$

4)

$e_R = 3$



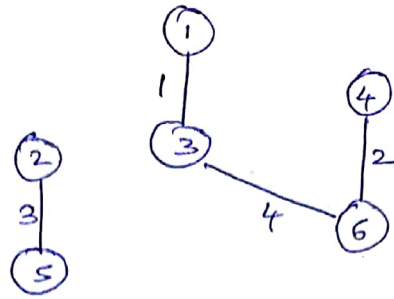
$Count = 3$

$R = 3$

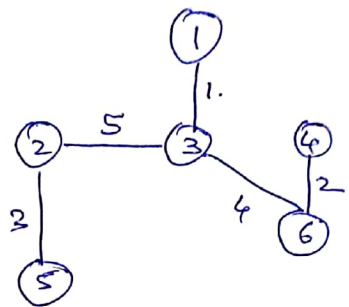
5) $c_k = 4$

Count = 4

$k = 4$



6) $c_k = 5$



→ Solution

Count = 5, $k = 5$

7) $c_k = 5$ {3, 4} forms a cycle Ignore

~~Count = 6~~ → $k = 6$

8) $c_k = 5$ {1, 4} forms a cycle Ignore.
 $k = 7$

9) $c_k = 6$ {1, 2} forms a cycle Ignore.
 $k = 8$

10) $c_k = 6$ {3, 5} forms a cycle Ignore
 $k = 9$

11) $c_k = 6$ {5, 6} forms a cycle Ignore.
 $k = 10$