

MINIMUM SPANNING TREES KRUSKAL'S ALGORITHM



COMPLEXITY

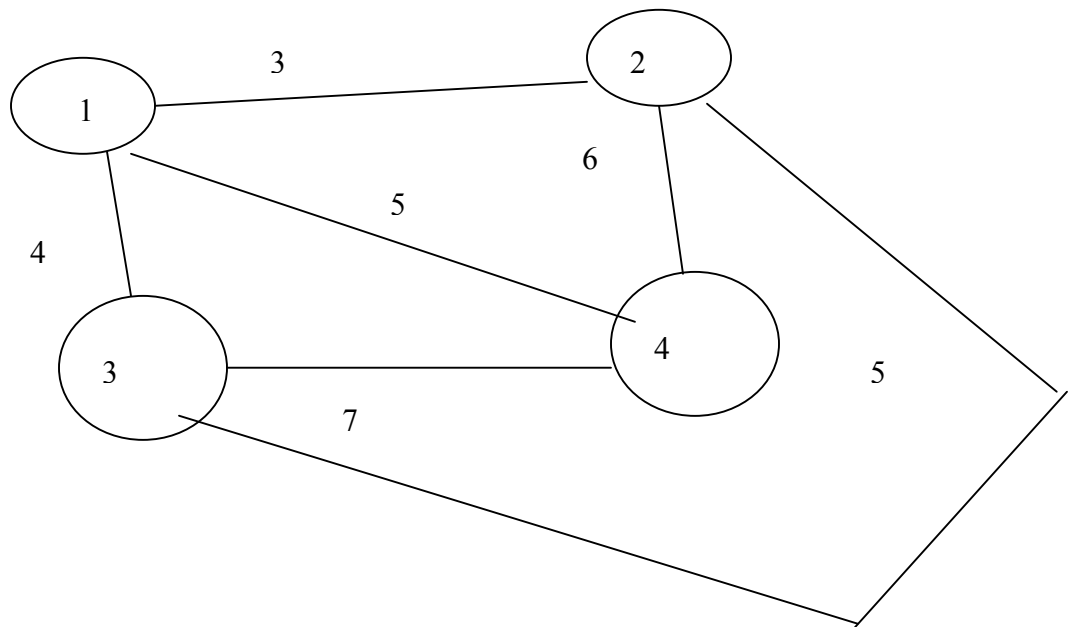
$$T(n) = O(e \alpha(e))$$

=O(e) practically

$e \leq n^2$ is number of edges

Consider a **undirected graph** of four vertices, v_i , $1 \leq i \leq 4$, with edge (v_i, v_j) having a weight of $i+j$, for $i \neq j$.

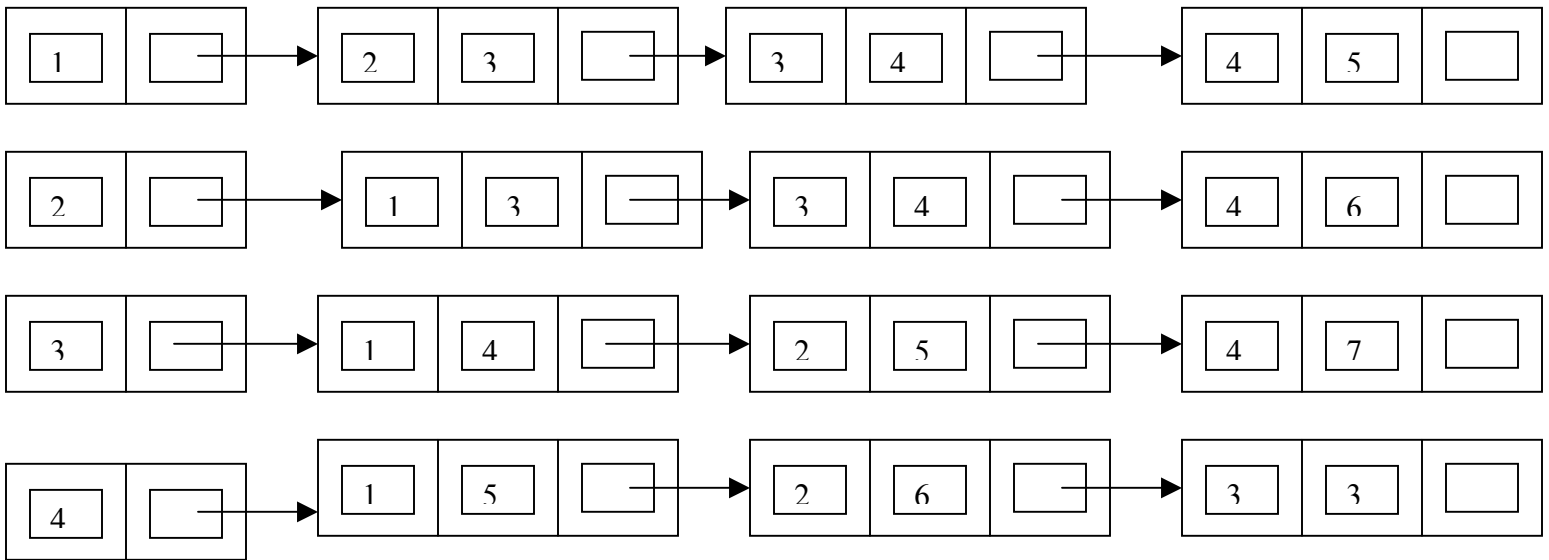
Pictorial view of the graph:



ADJACENCY MATRIX REPRESENTATION OF THE GRAPH

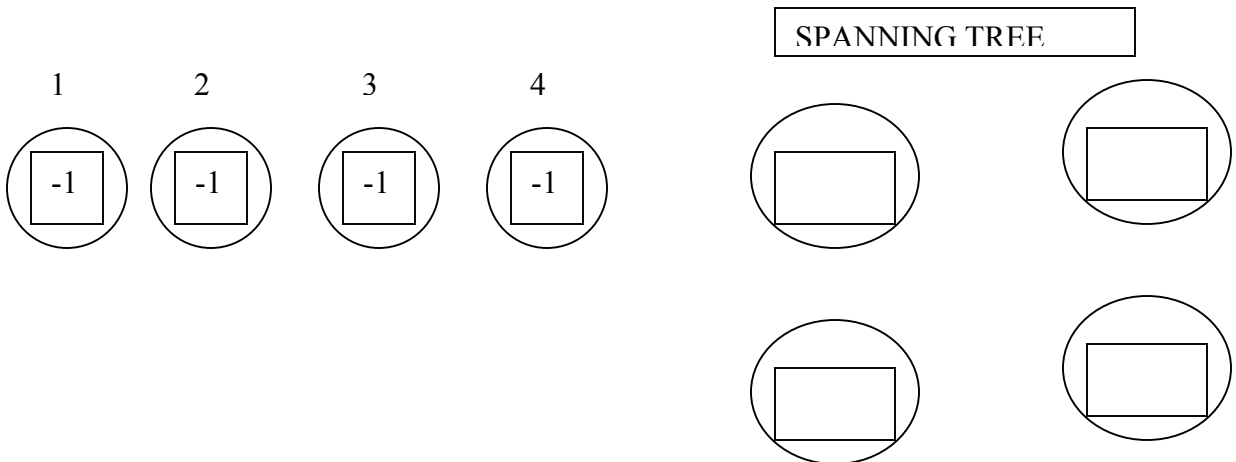
	1	2	3	4
1	∞	3	4	5
2	3	∞	5	6
3	4	5	∞	7

ADJACENCY LIST REPRESENTATION OF THE GRAPH



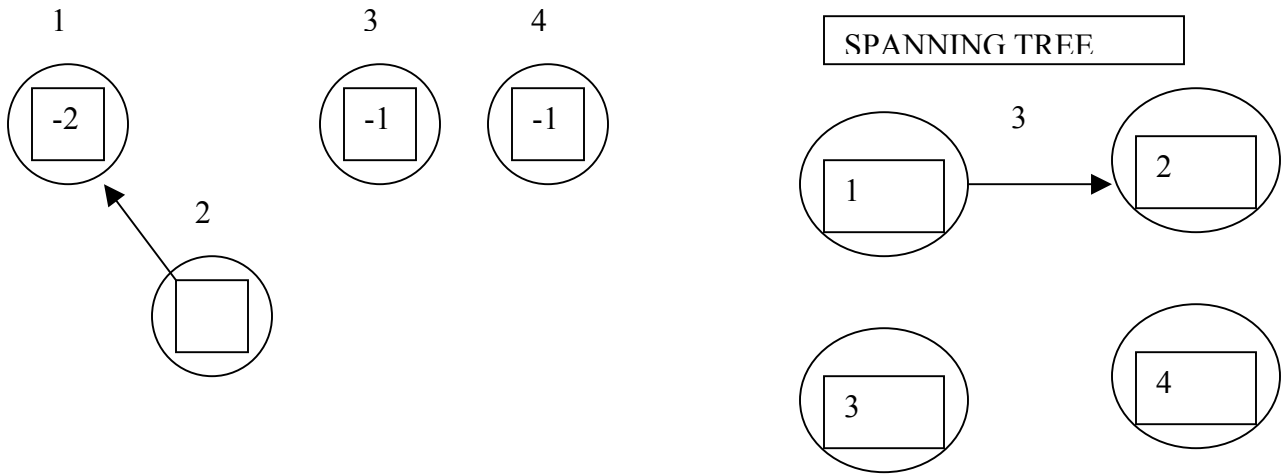
KRUSKAL'S ALGORITHM TO FIND THE MINIMUM SPANNING TREE

Consider the edges in nonincreasing order.



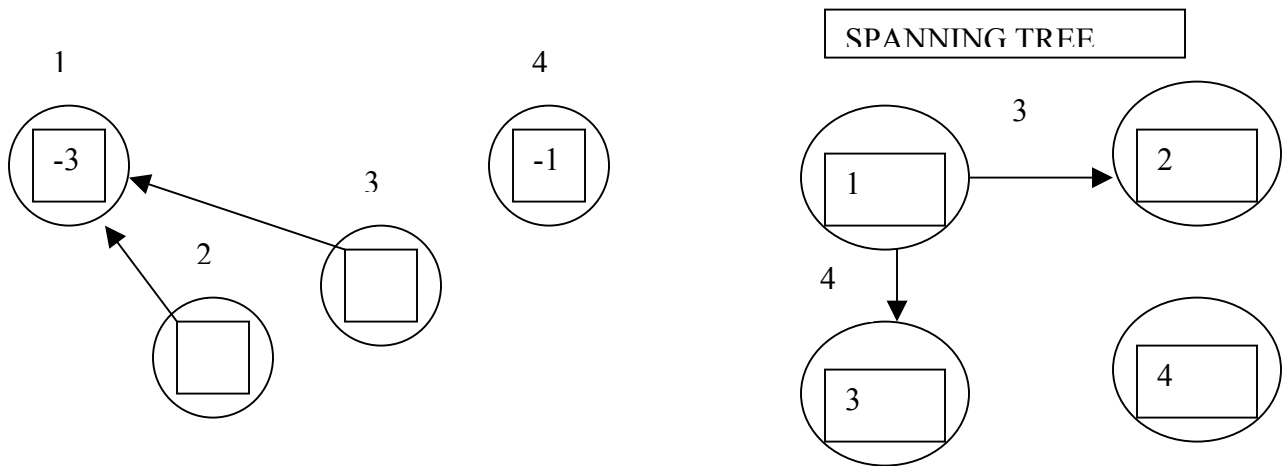
Least cost edge is $\text{cost}(1,2) = 3$.

$F(1), F(2)$...1 and 2 are in different sets so we take $U(1,2)$



Next minimum cost edge, $\text{cost}(1,3) = 4$

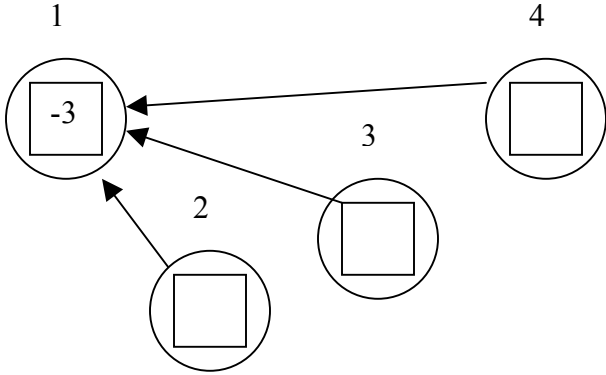
$F(1), F(3)$ as 1 and 3 are in different sets we take $U(1,3)$



Next minimum cost edge is $\text{cost}(2,3) = 5$

$F(2), F(3)$both are in the same set 1, so reject this edge.

The next minimum cost edge is $\text{cost}(1,4) = 5$
 $F(1), F(4)$they are in different set so $U(1,4)$ is performed.



SPANNING TREE

