

Questions about Homework:

NOT simple

$A \rightarrow B$ :  $AB, ACB, ACDAB, ACDEAB, ~~ACDAEDAB~~$

$A \rightarrow C$ :

$A \rightarrow D$ :

$A \rightarrow E$ :

$B \rightarrow A$ :  $\checkmark$

$B \rightarrow C$ :  $\times$

$B \rightarrow D$ :  $\times$

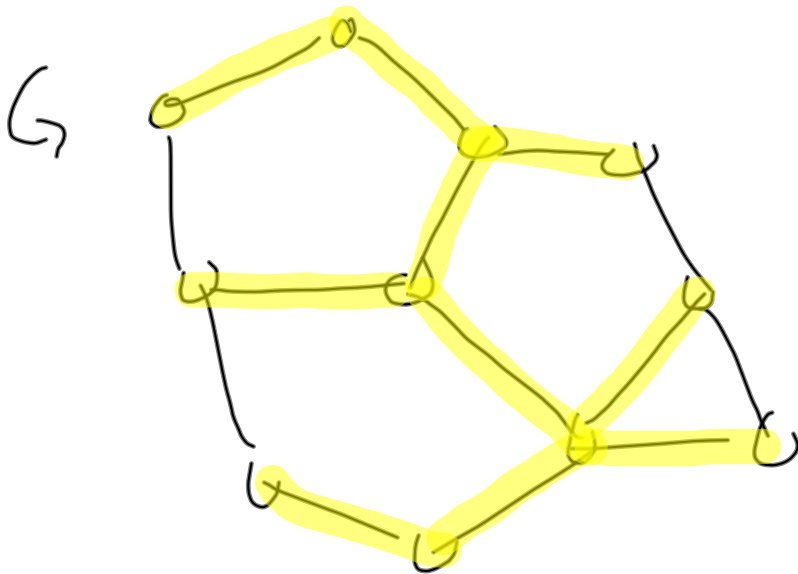
$B \rightarrow E$ :  $\times$

$\vdots$

## Spanning Trees:

Def: If  $G$  is a graph, then a spanning tree of  $G$  is a tree consisting of some edges of  $G$  and all vertices of  $G$ .

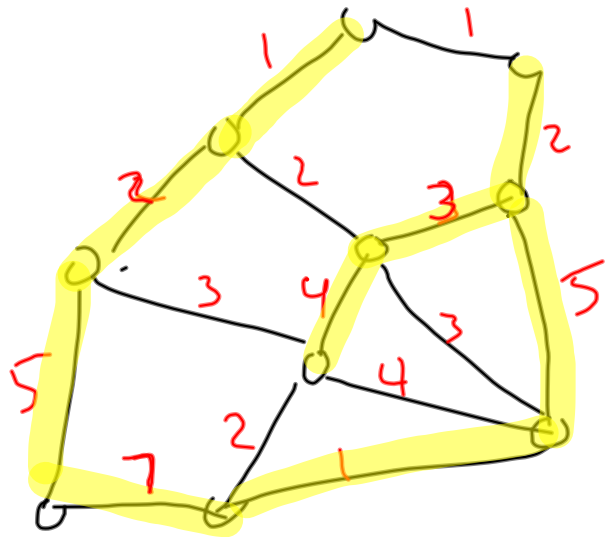
Eg:



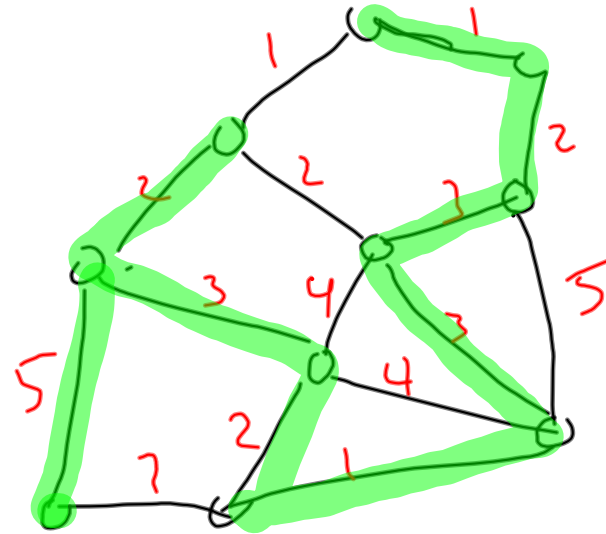
$T$  is a spanning tree inside of  $G$ .

A weighted graph is a graph with some number on each edge.

Eg:

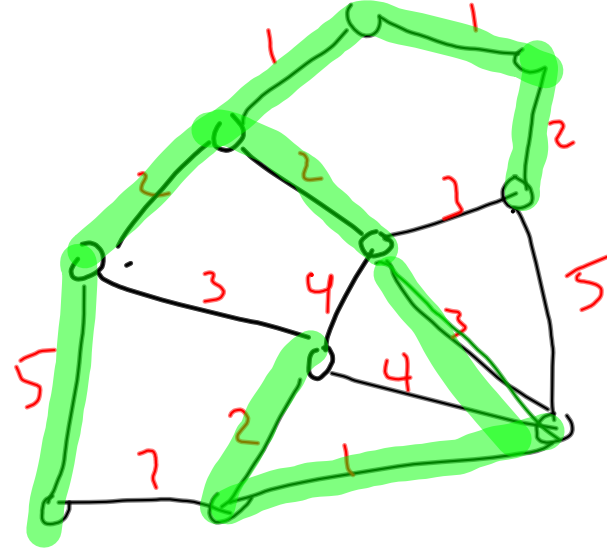
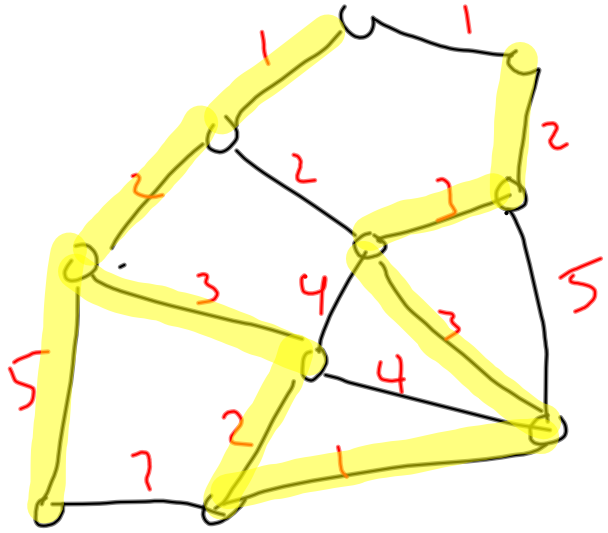


Cost of this spanning tree = 30



Cost of this spanning tree is 22

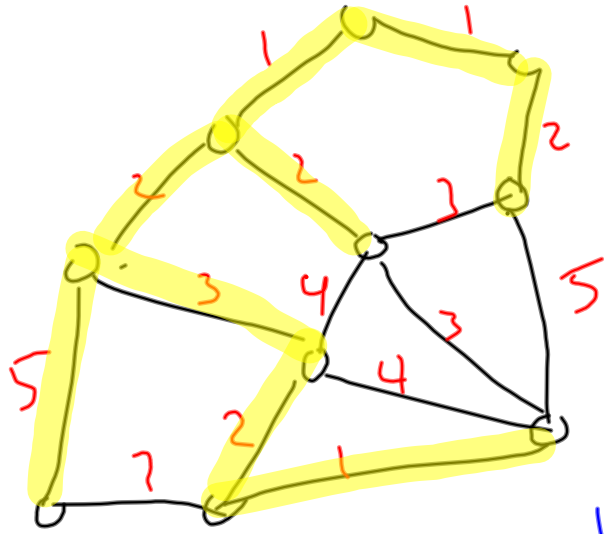
Is that the best?



Kruskal's Algorithm

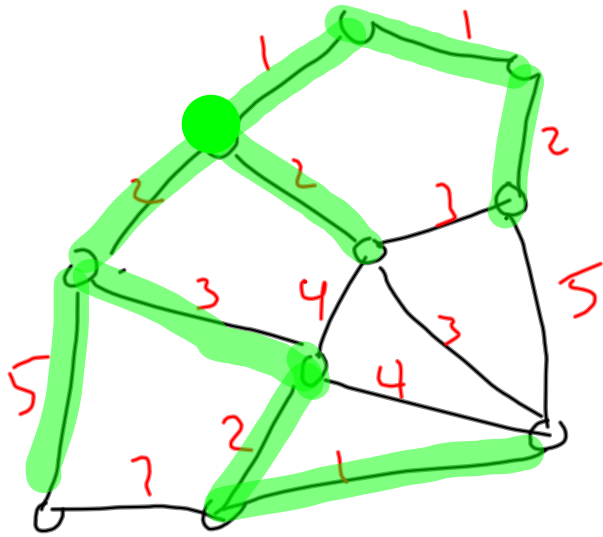
$(\text{cost}) = 19$

Start with an empty tree, and add edges one at a time, from cheapest to most expensive, without creating a cycle, until you have a spanning tree.



Weight = 19

this is the S.T.  
that Kruskal's algorithm  
builds, and it is  
guaranteed to be the  
Minimum Weight Spanning Tree  
(MWST).



## Prim's Algorithm.

Select a START vertex  
 Build a tree from this  
 vertex, at each stage

Selecting the cheapest edge  
 connected to that tree that  
 does not create a cycle.