Assignment 4

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Exe.2

Solution:

a) True.

Proof:

Squaring each edge cost does not affect the order of edge during the execution of algorithm, so T must still be a minimum spanning tree for this different costs.

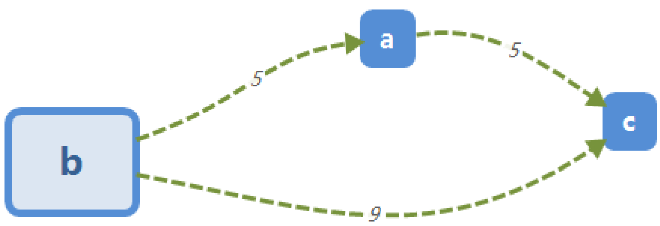
i.e. $a<b<\cdots\cdots<z \rightarrow a^2<b^2<\cdots\cdots<z^2$

b) False.

Counterexample：

Before squaring, b $\rightarrow$ c is the shortest path.

After squaring, b $\rightarrow$ a $\rightarrow$ c is the shortest path.



Exe.8

Solution：

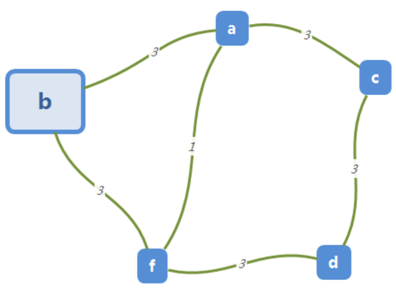
Suppose that G has two different MST **P** and **Q**. Assume that we find a minimum weighted edge **e** from **P** which is not included in **Q**. And we add **e** to **Q** to become **I**. (**Q** + **e** = **I**) it is easy to know that **I** must has a circuit that at least has one edge **f** whose weight is larger than **e**. After removing **f**, we get another connected graph **J** whose weight is smaller than **H**, which is a contradiction. So G has a unique minimum spanning tree.

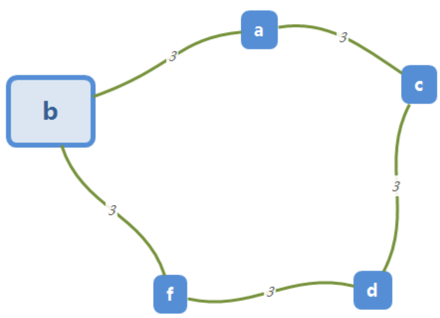
Exe.22

Solution:

False.

Counterexample:





Graph G Spanning tree T

every edge e ∈ some MST，but H is NOT a MST.