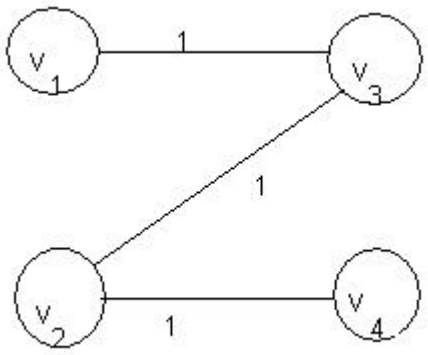
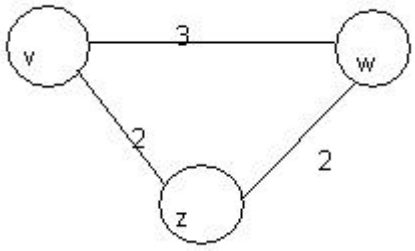
CS2223
HW#4 SOLUTIONS

1. The algorithm does not always construct a minimum spanning tree because for the graph



it would never even find a spanning tree.

2. **CONJECTURE 1** is false. For graph



the algorithm would return the path *v, z, w,* although the path *v, w* is shorter.
CONJECTURE 2 is true. Choose *v* and *w* such that the arc between *v* and *w* is a shortest arc in the graph. It will belong to a minimum spanning tree, and hence is the shortest path from *v* to *w* in the minimum spanning tree.

3.
```
n←1
while (x>T[n]) n←2*n;
BinarySearch(T[(n/2)+1..n],x)
```
The second and third instructions take time in $O(\lg n)$.