CS 260 Fundamentals of the Design and Analysis of Algorithms **Fall 2016**

HomeWork 2

Name: *Liangjian Chen*
ID*: #52006933*

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Problem 3 **Solution:**

Problem 4 **Solution:**

```
def Subsequence(S, S_prime):
  j = 0
  for event in S:
    if S_prime[j] == event:
      j += 1
    if j == len[S_prime]:
      break
  if j == len[S_prime]:
    return "Yes"
  return "No"
```

Problem 8 **Solution:**

Assume that T and T' is two different minimum spanning trees. An edge $e \in T$,and $e \notin T'$. Let's add e into Tree T, then there are two different situation.

(a) e is the most expensive among the circle
Because all weights are different, at least one edge's weight larger then e, let's assume it is e'. Substitute e for e', it forms a new tree with smaller weight. Contradict with T' is a minimum spanning tree.

(b) e is not the most expensive among the circle
There must be an edge in the circle which is not belong to tree T(Otherwise e form a circle in the tree T).Let assume it is e''. By substituting e'' for e in tree T, we construct a new tree with smaller sum weight. It contradicts with the assumption.

In conclusion, G's minimum spanning tree is unique.

Problem 9 **Solution:**

(a)

(b)

Problem 11 **Solution:**

Problem 17 **Solution:**

Problem 27 **Solution:**