HW5 - Coms 311

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1.

Vertex	s	t	x	y	z
Initial Values	0	∞	∞	∞	∞
Iteration 1	0	6	∞	7	∞
Iteration 2	0	6	4	7	2
Iteration 3	0	2	4	7	2
Iteration 4	0	2	4	7	-2

2.

a)

LCS(String s1, String s2, int m, int n) = { 0 if i = 0 or j = 0
{ 1 + LCS(s1, s2, m-1, n-1) if s1[n] = s2[m]
{ max(LCS(s1, s2, i-1, j), LCS(s1, s2, i, j-1)) otherwise

b)

```
LCS(String s1, String s2)
    HashMap<String, Integer> map = new HashMap<String, Integer>();

    int m = s1.length();
    int n = s2.length();

    for(int i = 0; i <= m; i++)
    {
        for(int j = 0; j <= n; j++)
        {
            if(i == 0 || j == 0)
            {
                map.put(i + ", " + j, 0);
            }
            else if(s1.charAt(i - 1) == s2.charAt(j - 1))
            {
                int val = 1 + map.get((i-1) + ", " + (j-1));
                map.put(i + ", " + j, val);
```

```
                        }
                        else
                        {
                        int val = Math.max(map.get((i-1) + ", " + j), map.get(i + ", " + (j-1)));
                                map.put(i + ", " + j, val);
                        }

                }
        }

        return map.get(m + ", " + n );
```

c)

Runtime = O(n * m), this is because you have to run through both loops one going n times the other going m times. All operations inside of the inside loop are constant time assuming constant lookup time for the dictionary.