104062261 Algorithm HW11 Report

We create a (n+1)*(n+1) table to save the longest length, then we make all [0][0…n] and [0…n,0] entry equal to zero.

		1	2	3	1	5
	0	0	0	0	0	0
1	0					
2	0					
5	0					
5	0					
3	0					

Next, we follow three rules to fill the table:

1. If S1[n-1] = S2[m-1], table[n][m] = table[n-1][m-1] + 1
2. Else if table[n-1][m] ≥ table[n][m-1], table[n][m] = table[n-1][m]
3. Else table[n][m] = table[n][m-1]

After that, we will get a table like this.

		1	2	3	1	5
	0	0	0	0	0	0
1	0	1	1	1	1	1
2	0	1	2	2	2	2
5	0	1	2	2	2	3
5	0	1	2	2	2	3
3	0	1	2	3	3	3

And the table last element will be our answer, that is table[n][n] = 3.

The running time of each entry in the table is $O(1)$, since we have n^2 comparison, so the algorithm running time is $O(n^2)$. And the worst-case running time also is $O(n^2)$.