Insertion-Sort/Execution-Counter Worksheet

Assume array A is indexed from 1 to n.

INSERTION _SORT(A, n)
1.**for** $j \leftarrow 2$ **to** n **do**
    2.*key* $\leftarrow A[j]$
    3.$i \leftarrow j - 1;$
    4.**while** $i > 0$ **and** $A[i] > key$ **do**
    5.$A[i + 1] \leftarrow A[i]$
    6.$i \leftarrow i - 1$
    7.$A[i + 1] \leftarrow key$

Instance 1 : [4, 3, 2, 1]
Instance 2 : [1, 4, 2, 3]
Instance 3 : [5, 4, 3, 2, 1]
Instance 4: [1, 2, 3, 4, 5]

Line No	# Times Executed			
	Instance 1	Instance 2	Instance 3	Instance 4
L1	4	4	5	5
L2	3	3	4	4
L3	3	3	4	4
L4	2+3+4=9	1+2+2=5	2+3+4+5=14	3+2+1+0=6
L5	1+2+3=6	0+1+1=2	1+2+3+4=10	2+1+0-1=2
L6	6	2	10	2
L7	3	3	4	4
Total	34	22	51	27

List any observations.

L1 – L3, and L7 are executed a number of times that only depends on the length of the array, and not the order of the elements.