1. Find the *Big oh* value for the following functions. Justify your answer.

$$T(n) = n \log n + n^2 + 1$$
$$T(n) = n^8 + n^3 + 2^n + 4n + 1$$

2. Analyze the running time of the following program fragment assuming a RAM model of computation.

$j = 0$
for $i = 0$ to n
　　while $j \le 5$
　　　　$j = j + 1$

3. What are the best case and worst case running time (in Big O notation) of the insertion sorting algorithm? When do you get such situations in the insertion sorting algorithm?

4. Illustrate the operations of the *New Insertion sort algorithm* for the array with the given set of elements. (For the illustration process assign the values only once to the given algorithm codes and then use diagrammatic way to reach the answer.)

A

	1	2	3	4
	3	4	1	2

NEW-INSERTION-SORT (*A*)
1 **for** $j = 2$ to A.length
2.　　$i = 1$
3.　　　**while** A[j] > A[i]
4.　　　　　$i = i + 1$
5　　　$key = $ A[j]
6　　　**for** $k = 0$ to $j - i - 1$
7　　　　　A[j-k] = A[j-k-1]
8　　　A[i] = key