**Tutorial 2**

1. Write an algorithm that reverses the array $s[1], \ldots, s[n]$.

2. Given an array $s[1], \ldots, s[n]$ such that $n > 1$ and $s[i] \leq s[i+1]$ for all $i$. Write an algorithm that insert an input value $x$ into the array so that $s[i] \leq s[i+1]$ for all $i$.

3. The algorithm for finding the maximum element of an array is in the following

```
Algorithm arrayMax(A, n)
Input array A of n integers
Output maximum element of A
currentMax = A[0]
for i = 1 to n − 1 do
   if A[i] > currentMax then
      currentMax = A[i]
return currentMax
```

   Determine the number of times that the statement "***currentMax*** = ***A***[***i***]" will be executed in the best case and in the worst case.

4. Order the following functions according to their order of growth (from the lowest to the highest).

   $n!$ , $5\lg(n+100)^{10}$, $2^{2n}$, $n^4 + 3n^3 + 1$, $n \lg n$ $3^n$

5. Prove the following assertion:

   If $f(n) = O(g(n))$, then $g(n) = \Omega(f(n))$.

6 (i) If $f(n) = 2n^2 + 1$, prove that $f(n) = O(n^2)$

(ii) If $f(n) = 2^{n+2}$, prove that $f(n) = O(2^n)$

(iii) If $f(n) = 3 \lg n + 2$, prove that $f(n) = O(\lg n)$