

Assignment 1
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Question 1.

Algorithm ComputeAverage(A,n)

Input: Array A with n elements

Output: the average value of n elements (mean value)

```
sum  $\leftarrow$  0
for i  $\leftarrow$  0 to n-1 do
    sum  $\leftarrow$  sum + A[i]
end
return sum/n
```

Question 2&3.

a) value \leftarrow 0 (1)
i \leftarrow 0 (1)
for i \leftarrow 0 to i \leftarrow n-1 do (n)
 value \leftarrow value+(i+1) (3)
 i \leftarrow i+1 (2)
return value (1)

total : $1+1+n(3+2+1)+1+1 = 6n+4$

b) Algorithm RecursiveCompute(n)
Input: positive integer n
Output: sum of all integers from 1 to n

```
if n = 1 then
    return n
return n + RecursiveCompute(n-1)
```

c) $T(n) = 2 \quad n = 1$
 $= T(n-1) + 4 \quad n \geq 2$
 $T(n) = 4n-2$

d) Algorithm ComputeFast(n)
Input: n
Output: sum of all integers from 1 to n

return $(1+n)*n/2$

Question 4

a) f7 , f0 , f1, f4 , f6 , f2 , f5 , f3

- b) (1) g1, g7
(2) g2, g3, g6
(3) g5, g4
(4) g0

Question 5.

```
i ← 0 (1)
While i < n do (n)
    If x = A[i] then (1)
        Return i (1)
    else i ← i+1 (2)
end
return -1 (1)
```

$$T_b(n) = 1+1+1+1 = 4$$

Worst-case

$$T(n) = 1+n(1+2+1)+1+1=3+4n$$