SE2228 - Analysis and Design of Algorithms: Assignment 1 DUE: 07.03.2023

ID & Name

1. a)Determine the following sum:****

b)Determine the following sum: ****

c) Determine the following sum :

2. What are the complexities of the following code segments in terms of n? Give an upper bound.

a)

int i=1;  
while (i<= n) {

int j = i;  
 while (j > 0)  
 j = j/2;  
i++; }  
b)

sum = 0;

for (i = 1; i < n; i++)

for (j = 1; j < i\*i; j++){

if (j % i == 0)

for (k = 0; k < j; k++)

sum++;}

c)

while (n > 0) {

for (int i=0; i<n; i++)

sum++;

n = n/2;}

3.Determine complexities of the following functions (Big-O):

4.For each of the following functions, indicate how much the function’s value will change if its argument is increased **q** times.

(For questions 3 and 4, q=the number of letters in your surname EX: ACAR **q**=4))

4.a)An algorithm has O(√ n) runtime. When run for n=**q**0000,it takes 10 seconds.How long would it run for an input size of 100000?

( Ex :q=3, n=30000, algorithm takes 10 seconds)

b)An algorithm has O(nlog n) runtime. When run for n=**q**6, it takes 32 seconds.How long would it run for an input size of 64?

(Ex : q=**3**, for n=q2==**3**6, algorithm takes 32 seconds)

4.Solve the following recurrence by substitution:

T(n) = T(n-1) + n

=0 if n = 0