Ch. 1 & 2 HW

Exercise 2.2-1

1. Return C (C)Σ // C = 0, 1, 2, ...

```
X = C
y = 0
While (X > 0) Σ
    X = X - 1
    y = y + 1
3
return y
3
```

Prove this returns C.

2.

```
prod(a,b){
    x=a
    y=b
    z=0
    While(x>0){
        z=z+y
        x=x-1
    }
    return z
}
```

prove this returns a*b.

3. Bubble sort is a popular, but inefficent sorting Alg.

```
BubbleSort(A)
    for i=1 to A.length-1 {
        swapped = false
        for j= A.length downto i+1 {
            if A[j] < A[j-1] {
                swap (A[j], A[j-1])
                swapped = true
            }
        }
        if(!swapped) {
            break
        }
    }
```

a. Demonstrate how this Alg sorts (5,1,4,2,8)

b. given $T(n) = \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} 1$ for the above Alg.

Find a formula for T(n) by reducing the Σ down to well known formula's. Hint use Summation formula's.

C. given $T(n) = \sum_{j=2}^{n} 1$ for the above

Alg. Find a formula for T(n) by reducing the Σ down to Well known formula's. Hint use Summation formulas

4. Selection Sort is another simple but inefficent Sorting Alg.

```
SelectionSort(A)                                  Cost      Time
①   for i=1 to A.length-1                         c1        n
②       min=i                                     c2        n-1
③       for j=i+1 to n Σ                          c3        Σ_{i=1}^{n-1} Σ_{j=i+1}^{n+1} 1
④           if A[j] < A[min] Σ
⑤               min=j
⑥           3
⑦       3
⑧       Swap(A[min], A[i])
⑨   3
```

A) demonstrate How it sorts (64, 25, 12, 22, 11)

b) Fill in the Remaining lines with the cost and time.

c) Using part "b" find a formula for T(n). Simplify your summations.