**BETTER ENUMERATION**

**Pseudo- Code:**

The following code was developed after a few brainstorming sessions with team members:

betterEnum(A{1,….,N])

maxSum = -1;

for i from 1 to N

currSum = 0

for j from i to N

currSum += A[j]

if currSum > maxSum

maxSum = currSum

begIndex = i

endIndex = j

return (maxSum, A[begIndex, …,endIndex]

**Theoretical Run Time Analysis:**

Since we have 2 loops the theoretical run time is defined as the following:

The outer loop i runs from 1 to N and the inner loop runs from i to N. There is a constant amount of work being done inside each of these loops so those take Ø(1) time. To compute the overall running time for the above algorithm it can be expressed in the following manner: Note that the expression proceeding the first equals sign is a summation expression for double summations of the form:

**LINEAR TIME**

**Pseudo- Code:**

LinearTimeAlgo (A[1, ..., N])

maxSum = -I

endSum = -1

for i from 1 to N

endHighIndex = j

if endSum> 0

endSum+= A[i]

else

endLowIndex = j

endSum= A[i]

if endSum > maxSum

maxSum = endSum

begIndex = endLowIndex

endIndex = endHighIndex

return maxSum, A[begIndex, ..., endIndex]

**Theoretical Run Time Analysis:**

The i loop runs from 1 to N. Inside this loop all operations are performed in constant time. Hence, the total running time of this algorithm can be expressed as:

The total run time is : Ø(N).

**Testing Methodology:**

In order to test our algorithms for correctness we first fed our algorithms the data set provided in the text file and wrote our results to another and observed if the maxSum returned and maximum subarray returned matched with the results file that was already provided. This was our basic approach to testing. Next, we created test cases modeled on the original data set and wrote test classes to test our algorithms using assertions. Our assertions tested expected versus actual values after running our algorithms against our modified test cases. If expected results matched our actual values our test cases cleared else they failed and we could further investigate the issue and determine the bug / error in our code.