COMP 4030/6030 -- Assignment 6

**Due: 10/31/2017 hard copy due before class.**

**This is a coding assignment. Mail your work to the TA:**

* The name your solution file should be the same as your UID, plus a .py extension. For example, if your UID is jsmith (i.e. your email is [jsmith@memphis.edu)](mailto:jsmith@memphis.edu)), then your solution file should be **jsmith.py**.
* In the file, put your full name, COMP 4030 or COMP 6030, and Assignment 6.
* Send your solution to the TA (Quang Tran, [qmtran@memphis.edu)](mailto:qmtran@memphis.edu)) with the subject line “**COMP 4030 Assignment 6**”.

1. (30 Points) Write a Python function that takes as input a list **A** (containing n numbers) and returns the maximum sum of consecutive numbers in the list. For example, if A = [10, -50, 40, 20, -10, 20, -10, 5], then the output is 70. The reason is 40+20-10+20 (which is equal to 70) is the maximum sum of consecutive numbers in this list.

In this problem, **you are supposed to use the simplest straightforward strategy**: go through all possible “intervals” and keep track of the maximum sum of all intervals. An interval has a beginning and an end. For example, the interval (1,4) in the list A consists of A[1], A[2], A[3], A[3]. In this example, the sum corresponding to the interval (1,4) is -50+40+20-10, which is 0.

1. (30 Points) Write a Python function called **MaxSumFromStart**, which takes as input a list, **B**, of **n** numbers and returns the maximum of B[0], B[0]+B[1], B[0]+B[1]+B[2], etc. For example, given the input [10, -50, 40, 20, -10], the output is 20 because 20 is the maximum of 10, -40 (10-50), 0 (10-50+40), 20, (10-50+40+20), 10 (10-50+40+20-10). The running time of this function must be linear, i.e. Θ(n).
2. (20 Points) Write a Python function called **MaxSumFromEnd**, which takes as input a list, **B**, of **n** numbers and returns the maximum of B[n-1], B[n-1]+B[n-2], B[n-1]+B[n-2]+B[n-3], etc. For example, given the input [10, -50, 40, 20, -10], the output is 50 because 50 is the maximum of -10, 10, 50, 0, 10. The running time of this function must be linear, i.e. Θ(n).
3. (20 Points) Write a Python function that takes as input a list **A** (containing n numbers) and returns the maximum sum of consecutive numbers in the list. For example, if A = [10, -50, 40, 20, -10, 20, -10, 5], then the output is 70.

This problem is exactly like problem 1. However, you will implement a different strategy: First, break A in 2 halves. Compute the max sum of the left half, the right half. Then, use the functions you implemented in problems 2 and 3, to compute the max sum of A.

1. (10 Points) Explain why the solution of problem 4 is faster than the solution of problem 1.