CS 560 HW 3: Maximum-Subarray Problem and

Question 1

Develop a python function to solve textbook (CLRS) Exercises 4.1-5:
Use the following ideas to develop a non-recursive, linear-time algorithm for the maximum-subarray problem. Start at the left end of the array, and progress toward the right, keeping track of the maximum subarray seen so far. Knowing a maximum subarray of A[1 ‥ j], extend the answer to find a maximum subarray ending at index j + 1 by using the following observation: a maximum subarray of A[1 ‥ j + 1] is either a maximum subarray of A[1 ‥ j] or a subarray A[i ‥ j + 1], for some 1 ≤ i ≤ j + 1. Determine a maximum subarray of form A[i ‥ j + 1] in constant time based on knowing a maximum subarray ending at index j.

Question 2

CLRS Exercise 4.5-1: use the master method to give tight asymptotic bounds for the following recurrences.

- T(n) = 2T(n/4) + 1.
- T(n) = 2T(n/4) + sqrt(n)
- T(n) = 2T(n/4) + n.
- T(n) = 2T(n/4) + n*n.

Question 3

CLRS Exercise 4.5-3: Use the master method to show that the solution to the binary-search recurrence T(n) = T(n/2) + Θ(1) is T(n) = Θ(lg n).