Lecture-05-CMSC351

Maximum Continuous Sum:

- Given a list of integers, find the continguous sublist with maximum sum and return that maximum sum. Note the continguous sublist must be nonempty (length cannot be 0) and the maximum contiguous sum may be negative if the list only contains negative numbers.

Brute Force Method:

- Results in theta(n^2) time complexity
- Works for small values of n, but other better solutions exist

Divide and Conquer:

- Can take a divide-and-conquer approach using a recursive algorithm

Steps:

1. Split the list in half, then find the MCS on the left and right sides recursively
2. Find the MCS straddling the middle (not recursive)
3. Take the maximum of these three to get the overall maximum

- Time complexity of this approach is theta(n * lg(n))

Kadane's Algorithm:

- Kadane's algorithm is utilizes dynamic programming to solve the problem in O(n) time complexity.

Steps:

1. Iterate over the list of integers keeping track of the overall MCS (M) and MCS ending at and including index *i* (M_i).

2. In each step, solve:
    - M_i = max(element_1 + element_2, element_2), M = (element_1, M_i)
3. Final MCS (M) is your answer