DSA - Tutorial 2 (Exercise)

Total Marks : 10

21-01-2025

Problem 1:(5 Marks)

Given the sequence $6, 9, 15, 24, 39, 63, 102, \ldots$, derive the recurrence relation for the N-th term in the pattern. Additionally, determine the upper bound (Big-O) for the time complexity to compute the N-th term in the sequence.

Problem 2:(5 Marks)

Given the array $[5, 3, 8, 2, 1, 9, 7, 10, 6, 3]$, demonstrate the splitting and merging procedure for the MergeSort algorithm in detail.

- Splitting: Show the intermediate arrays obtained at each level of splitting until each subarray contains a single element.

- Merging: For each merging step, show:

    - The intermediate arrays after merging.
    - The number of **inversions** that occur during the merge. An inversion is defined as a pair of elements $arr[i]$ and $arr[j]$ where $arr[i] > arr[j]$ and $i < j$.