

CS2023 - Data Structures and Algorithms

Take Home Assignment

Week 4

March 23, 2023

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- **Group I – 18XXXXX to 200500L**
 - **Group II - 200504D to 200813A**
 - **Group III - 210001R to 210483T**
 - **Group IV - 210488M to 210745B**

**According to the above group allocation select your assigned algorithm.
Following are the list of algorithms**

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1. Given n and x (both integers), calculating x^n using recursion - **Group I**
 2. Recursive binary search in an array - **Group II**
 3. Finding the maximum sub array sum of a given number array (using left half and right half divide and conquer approach) - **Group III**
 4. Karatsuba algorithm to multiply two large integers (<https://brilliant.org/wiki/karatsuba-algorithm> , <https://iq.opengenus.org/karatsuba-algorithm>) - **Group IV**

Study your assigned algorithm. For your assigned algorithm,

1. Write the recurrence relation for the time complexity.
2. Solve the recurrence relation using any of the 3 methods that you learned in the lecture.

Upload your answers in PDF format.

You are encouraged to study other algorithms as well.