# PROBLEM SOLVING

ADVANCED PROGRAMMING

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Assignment # 1

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# ***Problem Statement***

Merge two arrays by satisfying given constraints.

***Constraints:*** Given two sorted arrays X[ ] and Y[ ] of size m and n each where m >= n and X[ ] has exactly n vacant cells, merge elements of Y[ ] in their correct position in array X[ ] i.e. merge(X,Y) by keeping the sorted order.

- ***Investigation:***

  In my problem, I have to deal with arrays and integers. Operations to be performed are removing, adding, merging and sorting elements in the arrays. Data is integers in my case.
  In order to deal with the problem, I also have to check whether my data is being processed so I have to write checks after each step. As long as my output is considered, it will be the sorted data in the bigger array.

  **POSSIBLE ERRORS:**

  There can be many errors while writing the code but some possible errors are listed below:

  1. Data may not be sorted in the final array.
  2. "Array out of bound exception" can occur.

- ***Split into Sub-problems:***

  I will divide my problem into sub-problems and solve each sub-problem independently and merge the solutions to these sub-problems at the end. The given problem will be divided in the following sub-problems:

  1. Initializing two arrays with size m and n such that m >= n and also make sure that both arrays are sorted and array with size m has exactly n empty spaces. **(Empty spaces can be represented by zero)**
  2. Moving empty spaces at the start of the array1.
  3. Merging array1 and array2 using merge sort.

- ***Search for familiarity:***

  Merge sort can be used as it was implemented by us in “Data Structures and Algorithms”. Adding elements in array1 (merging) is also a familiarity as it was done using loops.

- ***Mean end analysis:***

  In the start, we have two arrays of sizes m and n.
  In the end, we want array1 to have elements of array2 in sorted manner.

- ***Divide and Conquer:***

  Dividing the main problem into sub- problems is an important step. Divide main problem into sub-problems and tackle with each sub-problem separately.

- ***Merge steps:***

  After I have solutions to all my sub-problems, I will merge them into one solution.