**Basics before starting:** [*https://www.w3schools.com/java/exercise.asp?x=xrcise\_arrays1*](https://www.w3schools.com/java/exercise.asp?x=xrcise_arrays1)

**📌 Day 1 – Arrays Basics**

**Problem 1: Reverse an Array**

* **Statement**: Given an array of integers, reverse the array in-place.
* **Example**:
* Input: [1, 2, 3, 4, 5]
* Output: [5, 4, 3, 2, 1]
* **Constraints**:
  + 1 <= n <= 10^5
  + -10^9 <= arr[i] <= 10^9
* **Follow-up**: Solve using both iterative and recursive approaches.

**Problem 2: Find Minimum and Maximum in an Array**

* **Statement**: Given an array of integers, find the minimum and maximum elements.
* **Example**:
* Input: [3, 7, 2, 9, 4]
* Output: Min = 2, Max = 9
* **Constraints**:
  + 1 <= n <= 10^5
  + -10^9 <= arr[i] <= 10^9
* **Follow-up**: Try to minimize the number of comparisons.

**📌 Day 2 – Searching Basics**

**Problem 1: Linear Search**

* **Statement**: Given an array of integers and a target value, determine if the target exists in the array. If it exists, return its index; otherwise return -1.
* **Example**:
* Input: arr = [5, 2, 8, 9, 1], target = 9
* Output: 3
* **Constraints**:
  + 1 <= n <= 10^5
  + -10^9 <= arr[i], target <= 10^9

**Problem 2: Binary Search (Iterative & Recursive)**

* **Statement**: Given a **sorted array** of integers and a target value, use **Binary Search** to determine if the target exists. Return the index if found, otherwise return -1.
* **Example**:
* Input: arr = [1, 3, 5, 7, 9], target = 5
* Output: 2
* **Constraints**:
  + 1 <= n <= 10^5
  + Array is sorted in **non-decreasing** order.
* **Follow-up**: Implement both **iterative** and **recursive** versions.

**📌 Day 3 – Problem Statements**

1. **Find the Largest Element in an Array**
   * Input: An array of integers.
   * Output: The largest (maximum) element in the array.
   * Example:
   * Input: [12, 5, 40, 8, 27]
   * Output: 40
2. **Find the Smallest Element in an Array**
   * Input: An array of integers.
   * Output: The smallest (minimum) element in the array.
   * Example:
   * Input: [12, 5, 40, 8, 27]
   * Output: 5
3. **Find the Second Largest Element in an Array**
   * Input: An array of integers.
   * Output: The second largest distinct element in the array.
   * Example:
   * Input: [12, 35, 1, 10, 34, 1]
   * Output: 34
   * Note: If all elements are equal, print a message like *"No second largest element exists."*
4. **Find the Second Smallest Element in an Array**
   * Input: An array of integers.
   * Output: The second smallest distinct element in the array.
   * Example:
   * Input: [12, 35, 1, 10, 34, 1]
   * Output: 10
   * Note: If all elements are equal, print a message like *"No second smallest element exists."*