Metropolitan University of Tirana
Data Structures
Arrays in Java

3.1 Mastering Array Manipulation to Dominate Data Structures

Unlock the power of arrays and become the data structure dominator! Learn to manipulate arrays like a pro and conquer any programming task that comes your way.

1. Write a program that takes an array of integers as input and returns the maximum difference between any two elements in the array, such that the larger element appears after the smaller element.
2. Write a program that takes two arrays of integers as input and returns a new array that contains only the elements that appear in both arrays, in the order that they appear in the first array. For example, given the arrays [1, 2, 3, 4, 5] and [3, 5, 7, 9], the program should return the array [3, 5].
3. Write a program that takes two sorted arrays of integers as input and merges them into a single sorted array.

3.2 Arrays to the Rescue: Simple Game Development Made Easy

1. **Guess the Number: Can You Beat the Odds and Crack the Code?**

   The game should randomly select a secret number from an array of integers. The player should be prompted to input a guess for the secret number. If the guess is correct, the player wins the game. If the guess is incorrect, the player is informed whether their guess was too high or too low relative to the secret number.

   After each guess, the player should be informed of the number of remaining guesses. If the player runs out of guesses without correctly guessing the secret number, the game ends and the player loses. At the end of the game, the player should be informed of the secret number, whether they won or lost, and given the option to play again. The game should continue until the player chooses to quit or runs out of guesses.

2. **Rock-Paper-Scissors Battle: Take on the Computer with Arrays!**

   The game should prompt the user to enter their choice of rock, paper, or scissors. Once the user has made their choice, the game should generate a random choice for the computer. The game should then determine the winner based on the rules of the game: rock beats scissors, scissors beats paper, and paper beats rock. The game should keep track of the score for the user and the computer, and display it after each round. The game should continue until the user chooses to quit or until a predetermined number of rounds have been played. Finally, the game should display the final score and congratulate the winner.

What to submit:

All the code that we develop will be pushed to a GitHub repository. For that reason, make sure that you have (created) a GitHub account. Use `UMT_data_structures` for the repository name.