

DAY 23:

ASIGNMENT 9:

Task 9: Generic Classes and Methods

Implement a generic method that swaps the positions of two elements in an array, regardless of their type, and demonstrate its usage with different object types.

```
public class ArrayUtils {  
  
    // Generic method to find the maximum element in an array  
    public static <T extends Comparable<T>> T findMax(T[] array) {  
        if (array == null || array.length == 0) {  
            throw new IllegalArgumentException("Array must not be null or  
empty");  
        }  
  
        T max = array[0];  
        for (T element : array) {  
            if (element.compareTo(max) > 0) {  
                max = element;  
            }  
        }  
    }  
}
```

```

    }
    return max;
}

// Main method to demonstrate the usage of the findMax method
public static void main(String[] args) {
    // Demonstrate with an array of Integers
    Integer[] intArray = {1, 2, 3, 4, 5};
    System.out.println("Maximum Integer: " + findMax(intArray));

    // Demonstrate with an array of Strings
    String[] stringArray = {"apple", "banana", "cherry", "date"};
    System.out.println("Maximum String: " + findMax(stringArray));

    // Demonstrate with an array of Doubles
    Double[] doubleArray = {1.1, 2.2, 3.3, 4.4};
    System.out.println("Maximum Double: " + findMax(doubleArray));
}
}

```

Explanation:

1. *Generic Method Definition*:

- The method findMax is defined as a static generic method with the syntax `<T extends Comparable<T>> T findMax(T[] array)`.

- The <T extends Comparable<T>> indicates that the type parameter T must implement the Comparable interface. This ensures that we can call the compareTo method on elements of type T.

2. *Parameter Check*:

- The method checks if the array is null or empty and throws an IllegalArgumentException if it is.

3. *Finding the Maximum Element*:

- The variable max is initialized to the first element of the array.
- A for loop iterates through the array, comparing each element to max using the compareTo method. If an element is greater than max, max is updated to that element.

4. *Main Method*:

- The main method demonstrates the usage of the findMax method with arrays of different types: Integer, String, and Double.
- The maximum element found in each array is printed to the console.