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**WIA1002/WIB1002 Data Structure****Lab 4: Generics**

1. a) Modify the following program to become a generic class called `StorePairGeneric`.

```
public class StorePair {
    private int first, second;

    public StorePair(int first, int second) {
        this.first = first;
        this.second = second;
    }

    public int getFirst() {
        return first;
    }

    public int getSecond() {
        return second;
    }

    public void setPair(int first, int second) {
        this.first = first;
        this.second = second;
    }

    public String toString() {
        return "first = " + first + " second = " + second;
    }
}
```

- b) Override the `Object equals()` method in the `StorePair` class to compare the first values of two objects for equality.
- c) Have the `StorePair` class implement the `Comparable` interface. Override the `compareTo()` method to compare the first values of two objects .
- d) Create a test program that creates three objects of the `StorePairGeneric` class called `a`, `b` and `c`. Set the first and second values of `a, b, c` as (6,4), (2,2), (6,3).
- e) Invoke the `compareTo()` and `equals()` methods that compares the three objects created in (d) in the test program.

2. Create a generic class called `MyGeneric` that accepts one parameter. Declare a variable called `e` for the type parameter. Create a no-arg constructor. Create a constructor that accepts one generic parameter. Create a setter and getter method for the generic type.

Create a test program that creates two instances of generic class of type `String` called `strObj` and of type `Integer` called `intObj`. Set a value for each of these objects. Display these values using the getter method.

3. In a class called `CompareMax`, create a generic static method called `maximum` where the generic type extends the `Comparable` interface, which receives three parameters. Find the maximum of three values invoked by the main method.
4. Provide a declaration and implementation of the generic method `minmax()` that takes in an array of generic type and returns a string with the following format: `Min = <minValue>`  
`Max = <maxValue>`. For instance, in your main method, create one object of type array for integers and one object of type string:

```
Integer[] intArray = {5,3,7,1,4,9,8,2};
String[] strArray = {"red", "blue", "orange", "tan"};

minmax() method returns "Min = 1  Max = 9" For intArray
minmax() method returns "Min = blue  Max = tan" for strArray
```

**\*Hint:** use `Comparable` interface to compare the values

**\*Hint:** `compareTo()` method:

- if `a > b`, it returns positive number
- if `a < b`, it returns negative number
- if `a == b`, it returns 0

5. Create a class called `FindMax` that contains the following:

Create a `Circle` class that uses the `Comparable` interface. Declare the `radius` variable and a single parameterized constructor that accepts this variable.

In your main program, create 3 different objects of type array (a) for integers that stores the following values, 1,2,3; (b) a list of string that stores red, green, blue and (c) a circle object of radius 3, 2.9 and 5.9. Invoke the `max` method as below:

```
public static <E extends Comparable<E>> E max(E[] list)
```

The `max` method above returns the maximum value in an array.

6. In a class called `MinMaxTwoDArray`, write two generic methods:
- First method returns the minimum element in a two-dimensional array. Below is the method signature:

```
public static <E extends Comparable<E>> E min(E[][] list)
```

- Second method returns the maximum element in a two-dimensional array. Below is the method signature:

```
public static <E extends Comparable<E>> E max(E[][] list)
```

- Create a test program that creates one instance of generic class of type `Integer` called `numbers` with the elements: {4, 5, 6}, {1, 2, 3}. Display the minimum and maximum elements using the `min` and `max` methods.