

**Module 2**  
**Java Development**

Assignment 7- MADP202- July11, 2019

Due: Friday July 19, 6:30 pm:

**Submission:** Please create a corresponding pull-request to the correct Github branch

**Late submission Penalty Policy:**

Lack of submission of 3 or more assignments: 50% of your entire assignments. (7.5% of your course mark).

Lack of submission of 5 or more assignments: 100% of your entire assignments (15% of your course mark).

Remember you need to get at least 70% to pass the course.

**Topics:**

**Generic Types in Java**

**Problem 1:**

Write a generic method to count the number of elements in a collection that have a specific property (for example, Students with GPA above average, Books with specific categories). You need to:

- Define and implement a generic class with a generic method called:  
*countNumberOfElementsWithSpecificProperty*
- Design and implement a POJO class an element like Book, Student, Building, Account and define 3 properties for this class.
- Create an ApplicationDriver class (with a main method) and test your implementation.
- Note: You might need to create classes or interfaces in addition to the three classes mentioned above.

**Problem 2:**

Will the following class compile? If not, why?

```
1. public final class Algorithm {  
2.     public static <T> T max(T x, T y) {  
3.         return x > y ? x : y;  
4.     }  
5. }
```

**Problem 3:**

Write a generic method to exchange the positions of two different elements in an array.

- Follow the same procedure as described in problem one. Just name the generic method  
*exchangeElements*

**Problem 4:**

Write a generic class with the following three methods and properties:

- The class has a generic property of type List.
- *addItemToList*: add a generic object to the list
- *removeItemFromTheList*: remove a generic object from the list
- *performOperation*: Performs an operation on the list and returns a list of all items which satisfies a specific search criteria. If no item is found return null.

Note: Follow the same steps as defined in problem one.

### **Problem 5:**

How do you invoke the following method to find the first integer in a list that is relatively prime to a list of specified integers?

```
1. public static <T>
2.     int findFirst(List<T> list, int begin, int end, UnaryPredicate<T> p)
```

Note that two integers  $a$  and  $b$  are relatively prime if  $\text{gcd}(a, b) = 1$ , where gcd is short for greatest common divisor.