### Lab: Reflection and Annotations

This document defines the lab for "Java OOP" course @ Software University. Please submit your solutions (source code) of all below described problems in Judge.

### Part I: Reflection

#### 1. Reflection

Import "Reflection. java" to your "src" folder in your project. Try to use reflection and print some information about this class. Print everything on new line:

- This class type
- Super class type
- All interfaces that are implemented by this class
- Instantiate object using reflection and print it too

Don't change anything in "Reflection class"!

#### Solution

```
Class reflection = Reflection.class;
System.out.println(reflection);
Class superClass = reflection.getSuperclass();
System.out.println(superClass);
Class[] interfaces = reflection.getInterfaces();
for (Class anInterface : interfaces) {
    System.out.println(anInterface);
// Object ref = reflection.newInstance(); // Deprecated since Java 9
Object reflectionObject = reflection.getDeclaredConstructor().newInstance();
System.out.println(reflectionObject);
```

### 2. Getters and Setters

Using reflection to get all **Reflection** methods. Then prepare an algorithm that will recognize, which methods are getters and setters. Sort each collection alphabetically by methods names. Print to console each getter on new line in format:

"{name} will return class {Return Type}"

Then print all setters in format:

"{name} and will set field of class {Parameter Type}"

Do this without changing anything in "Reflection.java"

















# 3. High Quality Mistakes

You are already expert of **High Quality Code**, so you know what kind of **access modifiers** must be set to members of class. Time for **revenge** has come. Now you have to check code produced by your "**Beautiful and Smart**" trainers in class **Reflection**. Check all **fields and methods access modifiers**. Sort each category of members **alphabetically**. Print on console all **mistakes** in format:

Fields
 {fieldName} must be private!
 Getters
 {methodName} have to be public!
 Setters
 {methodName} have to be private!

### Part II: Annotations

#### 4. Create Annotation

Create annotation **Subject** with a **String[]** element called **categories**, that:

- Should be available at runtime
- Can be placed only on types

### **Examples**

```
@Subject(categories = {"Test", "Annotations"})
public class TestClass {
}
```

# 5. Coding Tracker

Create annotation **Author** with a **String** element called **name**, that:

- Should be available at runtime
- · Can be placed only on methods

Create a class Tracker with a method:

public static void printMethodsByAuthor()

















# **Examples**

```
@Author(name = "George")
public static void main(String[] args) {
    Tracker.printMethodsByAuthor(Tracker.class);
}

@Author(name = "Peter")
public static void printMethodsByAuthor(Class<?> cl) {...}
```

### **Output**

```
George: main()
Peter: printMethodsByAuthor()
```















