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First Refactor: Dead Code

Dead Code happens when many changes were made to the code base and some code became obsolete or unusable. In this case my class ObjectEx has been obsolete when I made changes to the class SimpleObject. The way to fix this was to extract any method/variables that are still usable or delete the entire code. I fixed this by deleting the entire class as it has no association with the entire code base.

```
1 package ReflectionSerializable;
2
3 public class ObjectEx {
4
5     int a;
6     int b;
7     public void ObjectEx(int a, int b) {
8         this.a = a;
9         this.b = b;
10    }
11
12 }
13
```

Second Refactor: Final Keyword

Although the final keyword may not be a standard refactoring technique. It is good to use it as practice because variables who do not have final in it may be altered. A good way to protect these variables from being altered accidentally through coding is to use the keyword Final. This will prevent any accidental assignment to the variables.

```
eleClass.setAttribute("Object", c.getName());

//Field array
//If field is type array then length is needed otherwise not
serial.addContent(eleClass);
Field[] fields = c.getDeclaredFields();
for(Field field : fields) {
    if(!field.getType().isArray()) {
        field.setAccessible(true);
        Element firstElement = new Element("Field");
        firstElement.setAttribute("Name", field.getName()).setAttribute("DeclaringClass", field.getDeclaringClass().getName());
        firstElement.addContent(new Element("Value").setText(field.get(obj).toString()));
        eleClass.addContent(firstElement);
    }
    else if (field.getType().isArray()) {
        field.setAccessible(true);

        Object array = field.get(obj);
        int length = Array.getLength(array);
        Element anotherElement = new Element("Field");
        anotherElement.setAttribute("Name", field.getName()).setAttribute("DeclaringClass", field.getDeclaringClass().getName()).setAttribute("Length", String.valueOf(length));
        for(int i = 0; i < length; i++) {
            Object element = Array.get(array, i);
            anotherElement.addContent(new Element("Value").setText(element.toString()));
        }
        eleClass.addContent(anotherElement);
    }
}

doc = new Document();
final Element serial = new Element("Serialized");
doc.appendChild(serial);
final Class c = obj.getClass();
final Element eleClass = new Element("Class");
eleClass.setAttribute("Object", c.getName());

//Field array
//If field is type array then length is needed otherwise not
final Field[] fields = c.getDeclaredFields();
for(Field field : fields) {
    if(!field.getType().isArray()) {
        field.setAccessible(true);
        final Element firstElement = new Element("Field");
        firstElement.setAttribute("Name", field.getName()).setAttribute("DeclaringClass", field.getDeclaringClass().getName());
        firstElement.addContent(new Element("Value").setText(field.get(obj).toString()));
        eleClass.addContent(firstElement);
    }
    else if (field.getType().isArray()) {
        field.setAccessible(true);

        final Object array = field.get(obj);
        final int length = Array.getLength(array);
        final Element anotherElement = new Element("Field");
        anotherElement.setAttribute("Name", field.getName()).setAttribute("DeclaringClass", field.getDeclaringClass().getName()).setAttribute("Length", String.valueOf(length));
        for(int i = 0; i < length; i++) {
            final Object element = Array.get(array, i);
            anotherElement.addContent(new Element("Value").setText(element.toString()));
        }
        eleClass.addContent(anotherElement);
    }
}
```

Third Refactor: Extract Interface

Multiple Classes or Clients can use this class. To prevent from happening I decided to extract the interface of important methods so that only classes that I specified will be able to use it. I took out the method names and created a different class. Then I implemented that class for SimpleObject.

```
}
@Override
public int getInt() {
    return number;
}

@Override
public double getDouble() {
    return decimal;
}

@Override
public void setDouble(double decimal) {
    this.decimal = decimal;
}

@Override
public void setInt(int number) {
    this.number = number;
}
```