Poznan University of Technology

Object Oriented Programming

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Object Oriented Programming

Agenda

- Interfaces
- Immutability
- Task

Interfaces

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Interfaces

Interface is a contract that object must obey. It consists of methods declarations.

```
1   interface Money {
2     Money multiply(float factor);
3     String balance();
4   }
```

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Interfaces

```
interface Money {
  Money multiply(float factor);
  String balance();
}
```

```
public class Cash implements Money {
  private final float dollars;
  @Override
  public Cash multiply(float factor) { return new Cash(this.dollars * factor); }
  @Override
  public String balance() { return "$" + dollars; }
  public Cash(float dollars) { this.dollars = dollars; }
}
```

```
class Employee {
  private Money salary;
}
```

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Interfaces

The rule here is simple: every public method in a good object should implement his counterpart from an interface. If your object has public methods that are not inherited from any interface, he is badly designed. There are two practical reasons for this. First, an object working without a contract is impossible to mock in a unit test. Second, a contract-less object is impossible to extend via decoration.

Class exists only because someone needs its service. The service must be documented - it's a contract, an interface.

Immutability

immutability (noun, BrE /ɪˌmjuːtəˈbɪlətɪ/):
the fact of never changing or being changed

Oxford Dictionary

Object Oriented Programming

Immutability

A good object should never change his encapsulated state.
Bad example:

```
class Cash {
  private int dollars;
  public void multiply(int factor) { this.dollars *= factor; }
}

Cash five = new Cash(5);
five.multiply(10);
System.out.println(five); // oops! "50" will be printed!
```

Good example:

```
class Cash {
  private final int dollars;
  public Cash multipliedCash(int factor) { return new Cash(this.dollars * factor); }
}

Cash five = new Cash(5);
Cash fifty = five.multiply(10);
System.out.println(fifty); // "50" will be printed :)
```

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Immutability

A good object should never change his encapsulated state.

```
1   final class HTTPStatus implements Status {
2     private URL page;
3     public HTTPStatus(URL url) {
4       this.page = url;
5     }
6     @Override
7     public int read() {
8       return HttpURLConnection.class.cast(
9         this.page.openConnection()
10      ).getResponseCode();
11    }
12  }
```

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Immutability

- Immutable objects are simpler to construct, test, and use.
- Truly immutable objects are always thread-safe.
- They help avoid temporal coupling.
- Their usage is side-effect free.
- They are much easier to cache.
- They prevent NULL references.

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Task

Write a interface and **class (choose one from examples - different than in previous exercise)** in Java, which will be immutable and will implement interface.

Class examples: 1) Movie, 2) Vehicle, 3) Book, 4) Animal, 5) Plant, and 6) Game.

Questions?

Fin