# Static

#### Methods, Attributes, FastJson

YEGOR BUGAYENKO

Lecture #2 out of 8 80 minutes

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Pre-Test

Methods

Attributes

FastJson as Example

Chapter #1:
Pre-Test

[ Entities ]

## How Many Static "Entities" Do You See Here?

```
class FigureUtils {
   static final float PI = 3.1415926;
   static final FigureUtils INSTANCE;
   static {
     INSTANCE = new FigureUtils();
   }
   private FigureUtils() { /* empty */ }
   static float perimeter(Circle c) {
     return 2 * c.radius * PI;
   }
}
```

#### How many?

- three
- four
- five
- six
- maybe seven

Chapter #2:

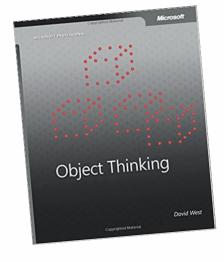
Methods

## What Static Methods Are For?

```
class Circle {
  public float radius;
}

class Circle {
  public float radius;
  float area() {
    return radius * radius * 3.14;
  static float calcArea(Circle c) {
    return c.radius * c.radius * 3.14;
  }
}
```

Most notable Java examples [Bugayenko, 2015a]: FileUtils, IOUtils, and StringUtils from Apache Commons; Files from JDK 7; Iterators from Google Guava.





"Traditional computer thinking treats data as passive and helpless, manipulated and moved by active procedures. Procedures tend to be egocentric and think that all data, its definitions and its values, are properly determined by the procedure currently using that data. The result is data that is inconsistent in definition, inconsistent in value, inaccessible because some other procedure has possession, or needlessly duplicated."

— David West. *Object Thinking*. Pearson Education, 2004. doi:10.5555/984130

## What's Wrong with "Utils"?

- 1) They are unbreakable dependencies
- 2) They are eager, not lazy
- 3) They are not cohesive

## 1) Tight Coupling

```
void paintIt(Circle c) {
  float s = GeometryUtils.calcArea(c);
  float p = s * 5.55;
  // paint it using the "p"
  }
  void paintIt(Circle c) {
   float s = c.area();
   float p = s * 5.55;
   // paint it using the "p"
  }
}
```

Which snippet is easier to test? Try to write a test for the first one, expecting s to be equal to 42.0 [Bugayenko, 2014].

## 2) Imperative, Not Declarative

```
void paintIt(Circle c) {
  float s = GeometryUtils.calcArea(c);
  if (t) { return; }
  float p = s * 5.55;
  // paint it using the "p"
  }

void paintIt(Circle c) {
  float s = new AreaOf(c);
  if (t) { return; }
  float p = s * 5.55;
  // paint it using the "p"
  }

// paint it using the "p"
}
```

Which snippet is more eager to calculate the area of the circle? Which one does it when it's really necessary? [Bugayenko, 2015b]

### 3) Low Cohesion

```
class GeometryUtils {
    static float calcArea(Circle c);
    static float calcPerimeter(Circle c);
    static float calcSinus(Angle a);
    static float calcCosinus(float s);
    // and many more...
    // and many
```

Which class looks more cohesive to you, the utility class GeometryUtils or the Circle?

Chapter #3:
Attributes

[ Literals Singletons ]

#### Public Literals

```
class Print { }
 class Constants {
   public static float PI = 3.1415926;
                                             class TextInFrench { }
   public static String UTF_8 = "utf-8";
                                             3
   public static String LOCALE = "fr";
                                             4 new Print(
   // and many more
                                                new TextInFrench(
                                                   "S'il vous plaît"
6
8 println("S'il vous plaît",
   Constants.LOCALE);
printf("It is %see speech!",
   Constants.LOCALE);
```

We must solve the problem of functionality duplication, not just data duplication [Bugayenko, 2015c].

[ Literals Singletons ]

### Singletons

Forget about singletons; never use them. Turn them into dependencies and pass them from object to object through the operator new [Bugayenko, 2016].

Chapter #4:

FastJson as Example

[ JSONPath ]

## JSONPath

```
public int size(Object rootObject) {
    if (rootObject == null) {
        return -1;
    }

    init();

    Object currentObject = rootObject;
    for (int i = 0; i < segments.length; ++i) {
        currentObject = segments[i].eval(this, rootObject, currentObject);
    }

    return evalSize(currentObject);
}</pre>
```

```
public static int size(Object rootObject, String path) {
    JSONPath jsonpath = compile(path);
    Object result = jsonpath.eval(rootObject);
    return jsonpath.evalSize(result);
}
```

#### Some mind-blowing statistics:

- 3 constructors
- 1 interface implemented
- 59 methods at JSONPath
- 4,363 lines of code
- 34 inner static classes
- 74 times static keyword

https://github.com/alibaba/fastjson/blob/master/src/main/java/com/alibaba/fastjson/JSONPath.java

[ JSONPath ]

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