

Static

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Lecture #2 out of 8

80 minutes

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Pre-Test

Methods

Attributes

FastJson as Example

Chapter #1: Pre-Test

How many static “entities” do you see here?

```
1 class FigureUtils {  
2     static final float PI = 3.1415926;  
3     static final FigureUtils INSTANCE;  
4     static {  
5         INSTANCE = new FigureUtils();  
6     }  
7     private FigureUtils() { /* empty */ }  
8     static float perimeter(Circle c) {  
9         return 2 * c.radius * PI;  
10    }  
11 }
```

How many?

- three
- four
- five
- six
- maybe seven

Chapter #2: Methods

What static methods are for?

```
1 class Circle {  
2     public float radius;  
3 }  
4  
5 class GeometryUtils {  
6     static float calcArea(Circle c) {  
7         return c.radius * c.radius * 3.14;  
8     }  
9 }
```

```
1 class Circle {  
2     public float radius;  
3     float area() {  
4         return radius * radius * 3.14;  
5     }  
6 }
```

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

What's wrong with “Utils”?

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

1) Tight Coupling

```
1 void paintIt(Circle c) {  
2     float s = GeometryUtils.calcArea(c);  
3     float p = s * 5.55;  
4     // paint it using the "p"  
5 }
```

```
1 void paintIt(Circle c) {  
2     float s = c.area();  
3     float p = s * 5.55;  
4     // paint it using the "p"  
5 }
```

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

```
1 void paintIt(Circle c) {  
2     float s = GeometryUtils.calcArea(c);  
3     if (t) { return; }  
4     float p = s * 5.55;  
5     // paint it using the "p"  
6 }
```

```
1 void paintIt(Circle c) {  
2     float s = new AreaOf(c);  
3     if (t) { return; }  
4     float p = s * 5.55;  
5     // paint it using the "p"  
6 }
```

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

```
1 class GeometryUtils {  
2     static float calcArea(Circle c);  
3     static float calcPerimeter(Circle c);  
4     static float calcSinus(Angle a);  
5     static float calcCosinus(float s);  
6     // and many more...  
7 }
```

```
1 class Circle {  
2     float area();  
3     float perimeter();  
4 }  
5 class Angle {  
6     float sinus();  
7 }  
8 class Float {  
9     float cosinus();  
10 }
```

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

Chapter #3:

Attributes

Public literals

```
1 class Constants {  
2     public static float PI = 3.1415926;  
3     public static String UTF_8 = "utf-8";  
4     public static String LOCALE = "fr";  
5     // and many more  
6 }  
7  
8 println("S'il vous plaît",  
9     Constants.LOCALE);  
10 printf("It is %see speech!",  
11     Constants.LOCALE);
```

```
1 class Print { }  
2 class TextInFrench { }  
3  
4 new Print(  
5     new TextInFrench(  
6         "S'il vous plaît"  
7     )  
8 )
```

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

Singletons

```
1 class Canvas {  
2     public static Canvas INSTANCE =  
3         new Canvas();  
4     private Canvas() {}  
5     public void addCircle(Circle c);  
6 }  
7  
8 Canvas.INSTANCE.addCircle(c1);  
9 Canvas.INSTANCE.addCircle(c2);
```

```
1 c = new Canvas();  
2 c.addCircle(c1);  
3 c.addCircle(c2);
```

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

```
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);
}
```

```
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>

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