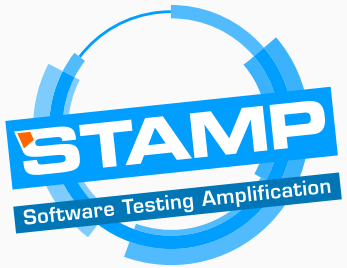
Spoon: Source Code Analysis And Transformation For Java

Benjamin DANGLOT

27th, June 2017

OW2Con'17



History

A library to write your own analysis and transformation in Java.

- 2005: project creation par R. Pawlak and N. Petitprez (INRIA Lille).
- 2008: Phd Thesis C. Noguera.
- 2014: Spoon on Github.
- 2016: Spoon at OW2.


351 stars

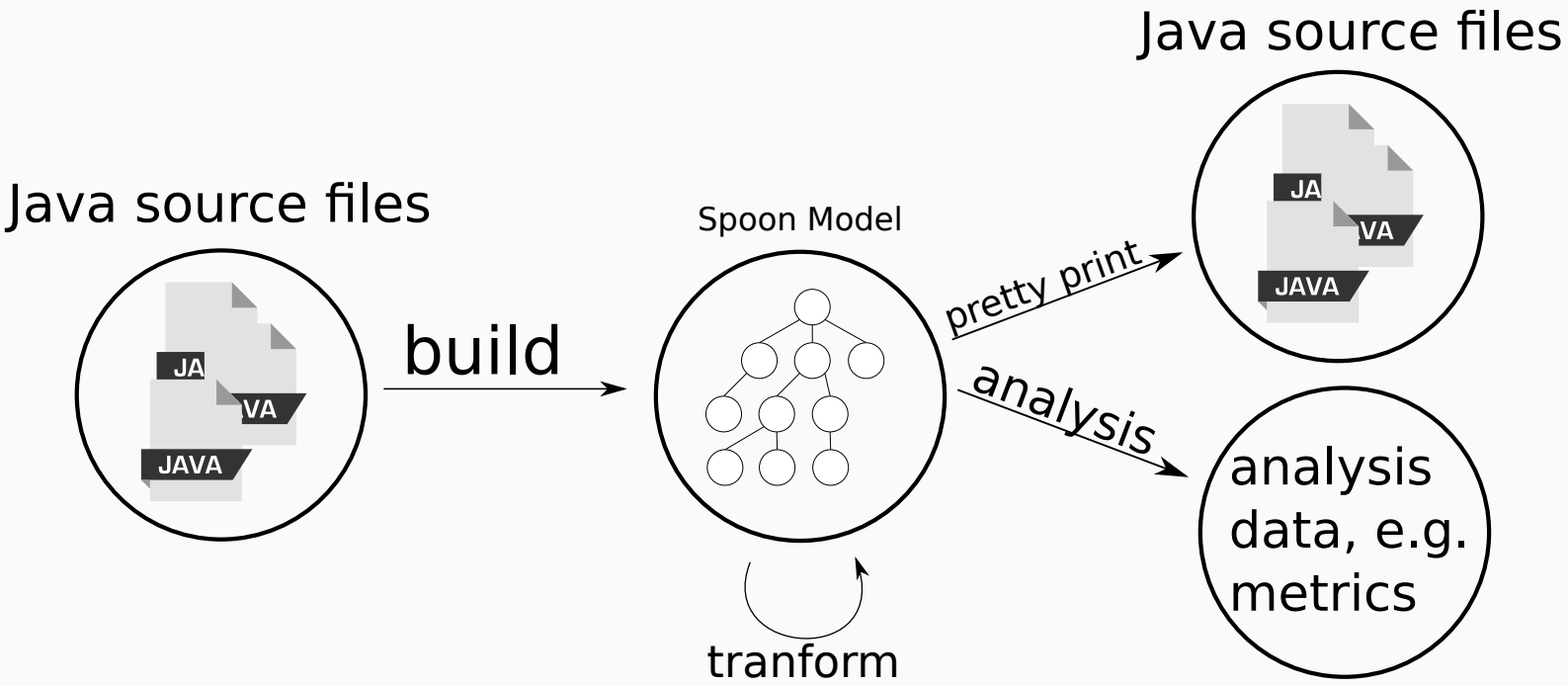

1895 commits since 2014-04-01


30 contributors


21 releases

Spoon:

A library to write your own analysis and transformation in java.



Usage examples:

- test improvement
- transpilation, e.g. Java to Javascript
- detection of bad smells
- automatic refactoring

Spoon:

A library to write your own analysis and transformation in java.

Spoon: Abstract example

A library to write your own analysis and transformation in java.

```
CtClass<?> tacos = factory.Class().get("fr.inria.Tacos")
```

Abstract example

A library to write your own analysis and transformation in java.

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CtClass<?> tacos = factory.Class().get("fr.inria.Tacos")

tacos.getMethods().forEach(System.out::println);
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Abstract example

A library to write your own analysis and transformation in java.

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tacos.getMethods().forEach(System.out::println);

CtMethod methodToBeRemoved =
        tacos.getMethodsByName( s: "removeOnions").get(0);
tacos.removeMethod(methodToBeRemoved);
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tacos.addField(beef);
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Related to: Javapoet, JavaParser and ASM.

Concrete Example

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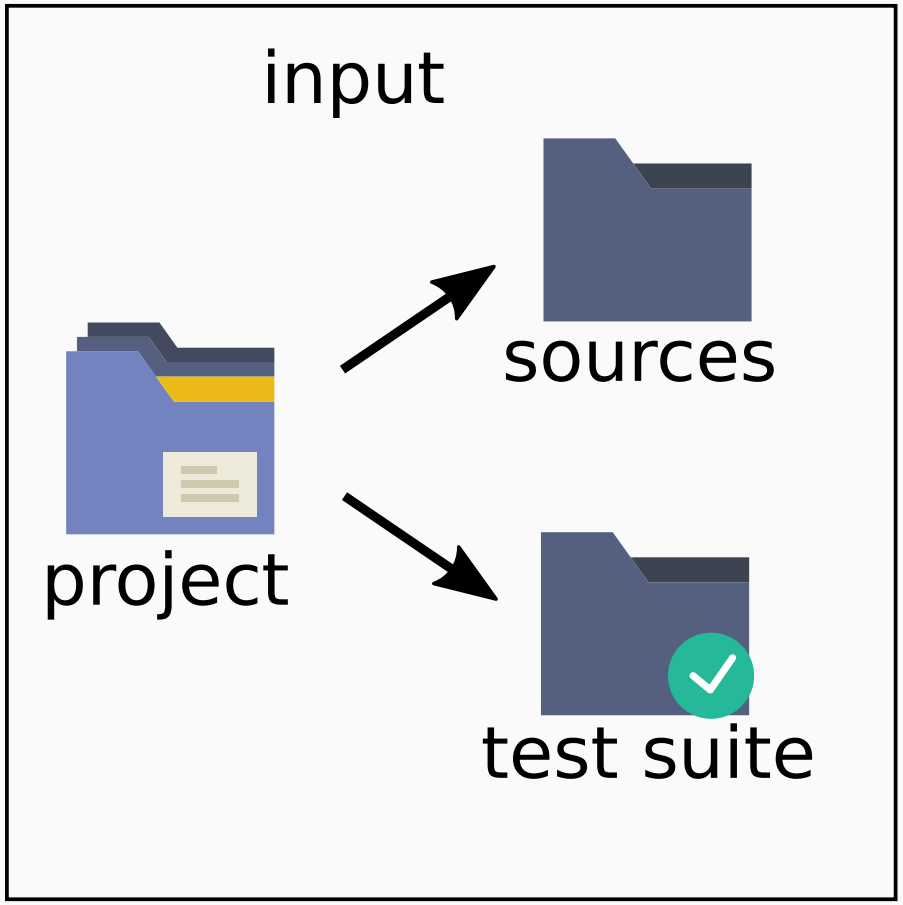
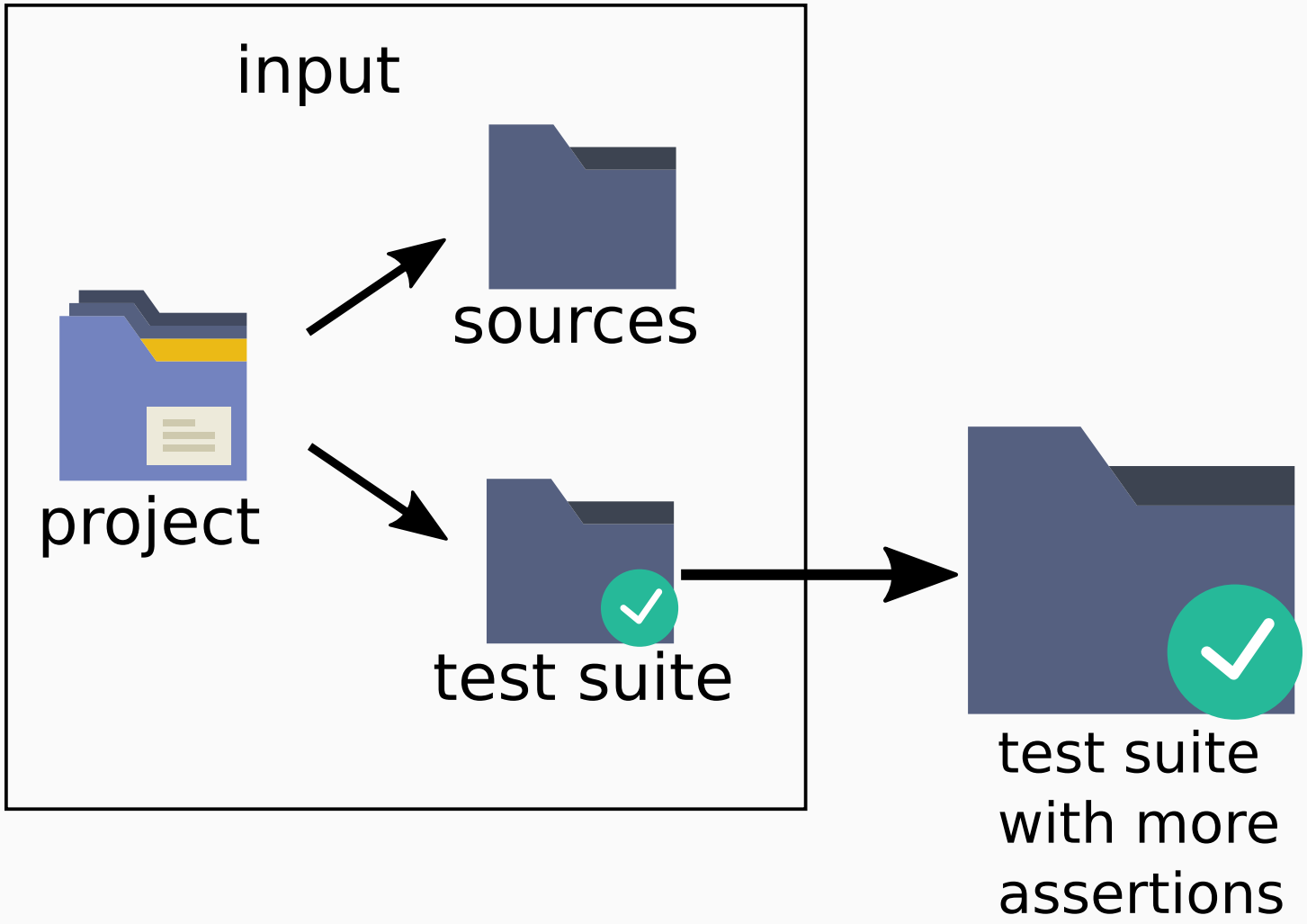


Concrete Example



Concrete Example

Goal: generate all assertions for a test method.

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@Test
public void doYouKnowBenjamin() throws Exception {
    Benjamin benjamin = new Benjamin();
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}
```

Improve the test with 2 new assertions

```java
@Test
public void doYouKnowBenjamin() throws Exception {
    Benjamin benjamin = new Benjamin();
    assertEquals( expected: 24, benjamin.age());
    assertEquals( expected: true, benjamin.isHungry());
    assertEquals( expected: "All code is guilty until proven innocent.",
            benjamin.getQuote());
}
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Workflow

Goal: generate all assertions for a test method.

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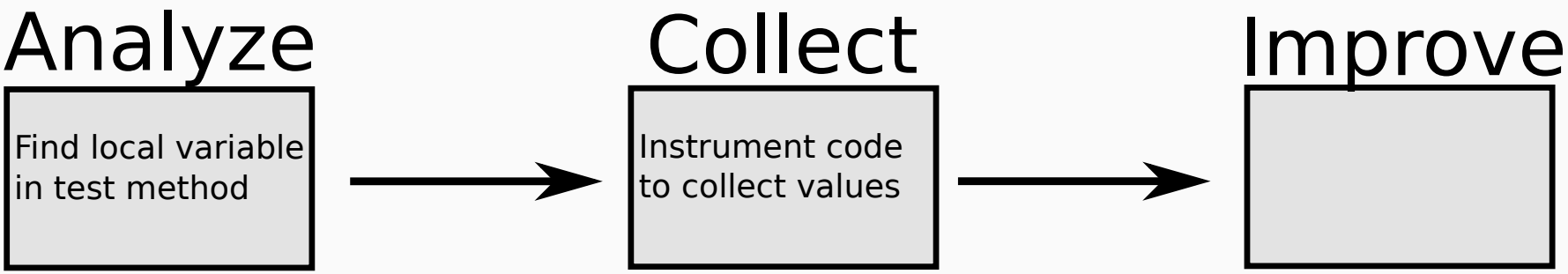

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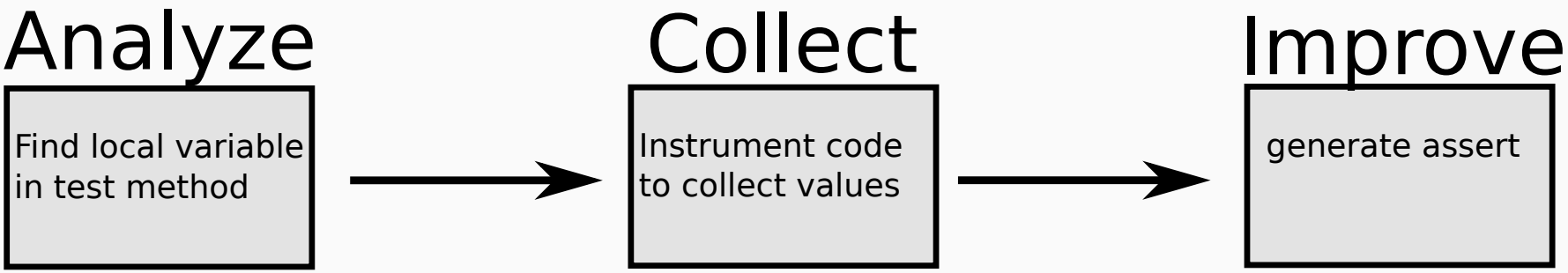
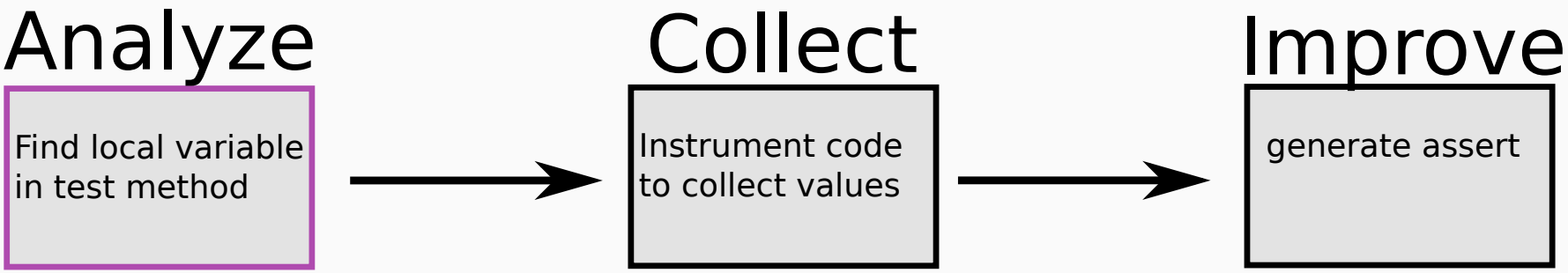


Step 1: Analyze

Find the local variable in the test.



Analyze: goal

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Analyze: code

Find the local variable in the test.

```
List<CtLocalVariable> analyze(CtMethod testMethod) {
    TypeFilter filterLocalVar =
            new TypeFilter(CtLocalVariable.class) {
                public boolean matches(CtLocalVariable localVariable) {
                        return !localVariable.getType().isPrimitive();
                    }
            };
    return testMethod.getElements(filterLocalVar);
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Analyze: output

Local variable in the test found.

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@Test
public void doYouKnowBenjamin() throws Exception {
    Benjamin benjamin = new Benjamin();
     assertEquals( expected: 24, benjamin.age());
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Step 2: Collect

Collect values of accessible fields of the local variable.

Collect: goal

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Instrumentation

```java
@Test
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    Logger.observe( name: "Benjamin#isHungry", benjamin.isHungry());
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}
```

Collect: code

Collect values of accessible fields of the local variable.

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void instrument(CtMethod testMethod, CtLocalVariable localVariable) {
    List<CtMethod> getters = getGetters(localVariable);
    getters.forEach(getter -> {
        CtInvocation invocationToGetter =
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Collect: output

Instrumentaiton to collect values of the local variable.

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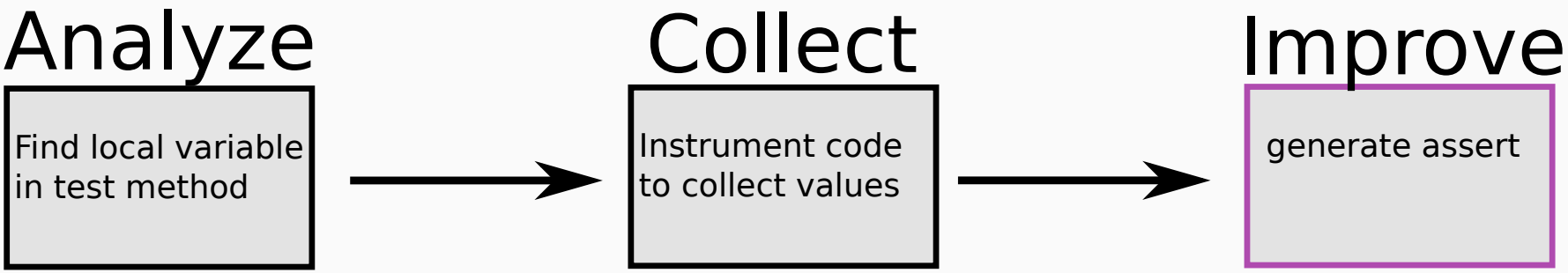
Step 3: Improve

Add assertion on accessible fields of the local variable.



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Add assertion on accessible fields of the local variable.

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void addAssertion(CtMethod testMethod, CtLocalVariable localVariable) {
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        String key = getKey(getter);
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Improve: output

Test method improved with two new assertions

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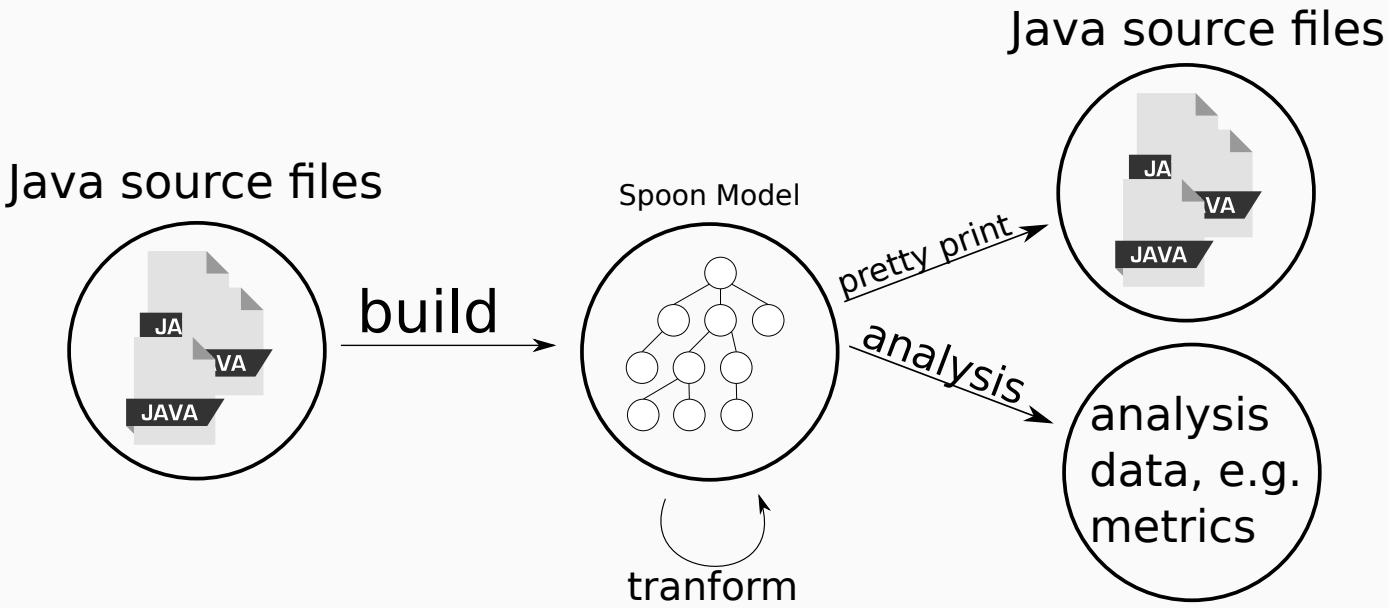

Usage examples:

- test improvement
- transpilation, e.g. Java to Javascript
- detection of bad smells
- automatic refactoring

demo avalaible:

`http://github.com/SpoonLabs/spoon-examples.git`