Modeling Tutorial

Today

Two sessions - after lunch we will look at ModelJUnit

Before lunch:

- System -> model
  - From apparent functionality
  - In more detail - from source code

So-called *constant conditions* - conditions that are never met or are always *true*, for example. In this case the responsible code is not reachable and actually is a *dead* code.

```
attribute = parseAttribute(isempty, asp, php);

if (attribute == null) {
    ...
    return;
}
value = parseValue(attribute, false, isempty, delim);

if (attribute != null) {
    ...
}
else {
    av = new AttVal( null, null, null, null,
                     0, attribute, value );
    Report.attrError(this, this.token, value,
                     Report.BAD_ATTRIBUTE_VALUE);
}
```

Condition 'attribute != null' is always 'true'.

How to model this?

What are our inputs?

Possible outputs?

Which states do we have?

How to model this?

What are our inputs?

- Mouse over
- QuickFix (Alt+Enter, Enter)
- Add correct source code
- Add incorrect source code

Which states do we have?

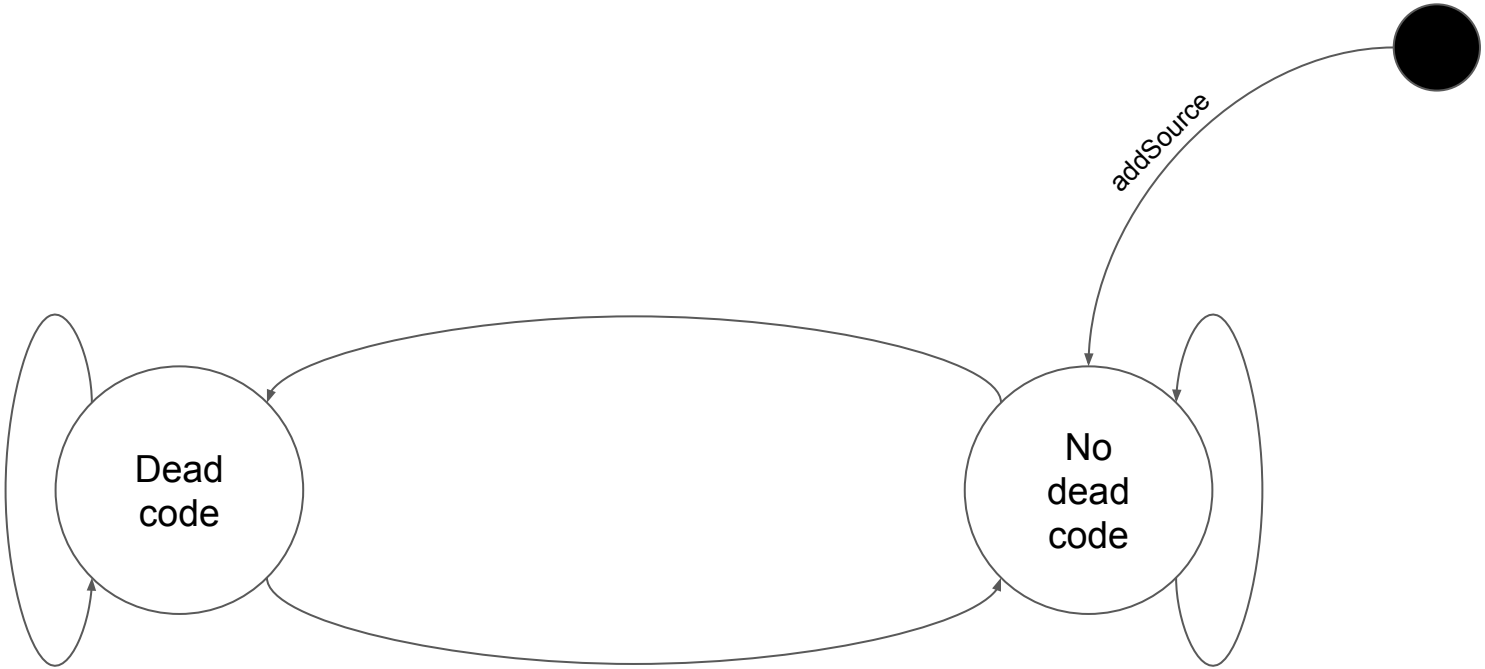
- There's dead code
- There's no dead code

Possible outputs?

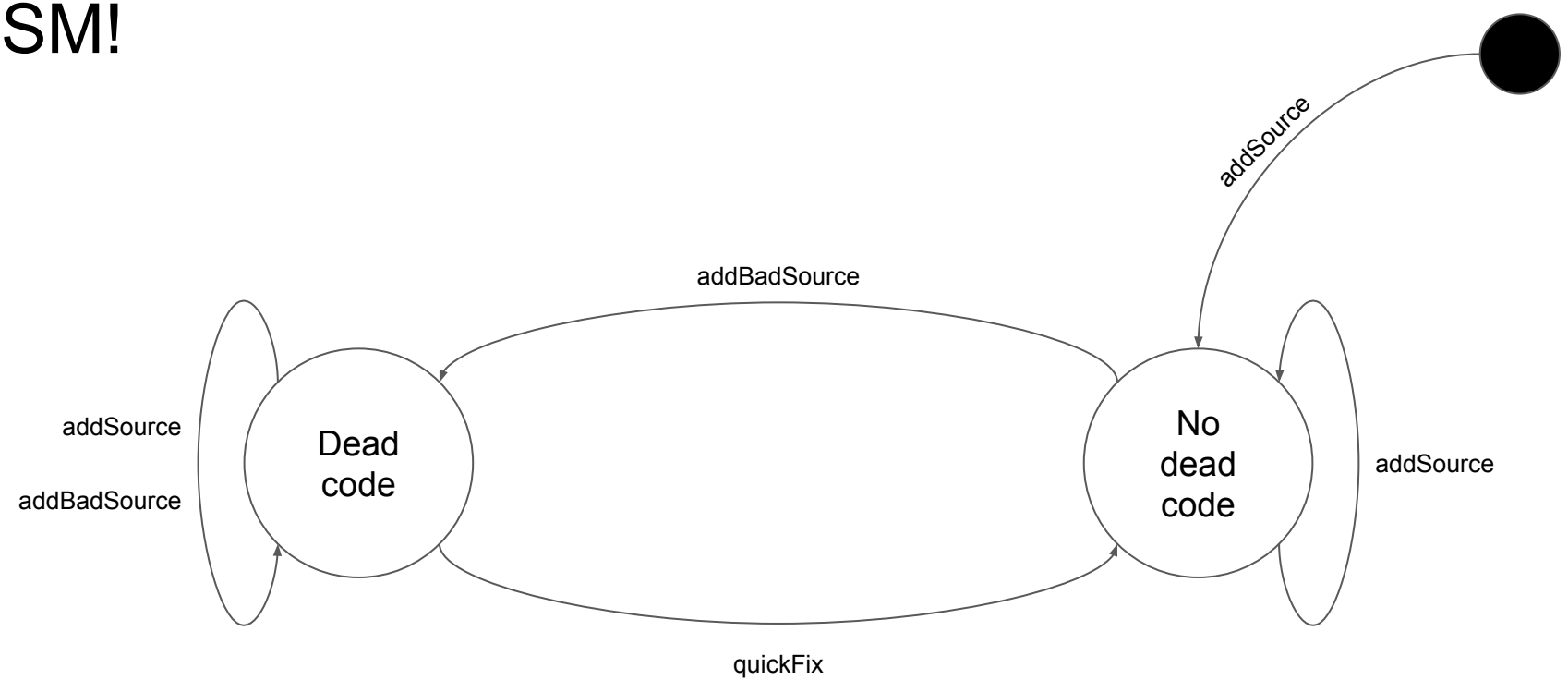
- Add highlighting
- Remove highlighting
- Tooltip

FSM!

FSM!



FSM!


addSource
addBadSource
Dead code
addBadSource
No dead code
addSource
addSource
quickFix

You can also convert code into a model

[NOT A GOOD IDEA IN GENERAL]

- So far you've been given a specification of some sort, and asked to build a model.
  - Source code is also (a very precise) specification!
- Let's look at a simple example:

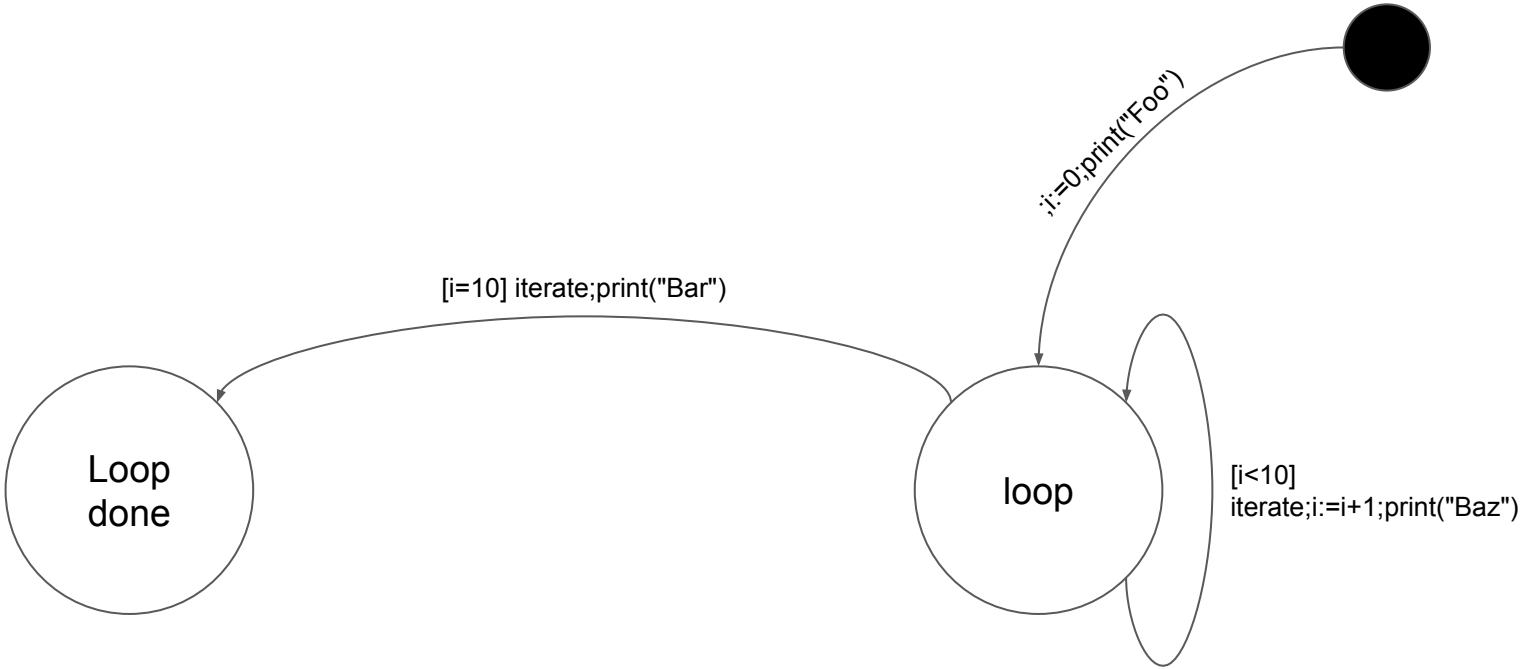
```
public class Looper {
  private int n = 0;
  public void loop() {
    System.out.println("Foo");

    for (int i = 0; i < 10; i++) {
      n = i;
      System.out.println("Baz");
    }

    System.out.println("Bar");
  }
}
```

FSM!

FSM!


;i:=0;print("Foo")
[i=10] iterate;print("Bar")
Loop
done
loop
[i<10]
iterate;i:=i+1;print("Baz")

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FSM!

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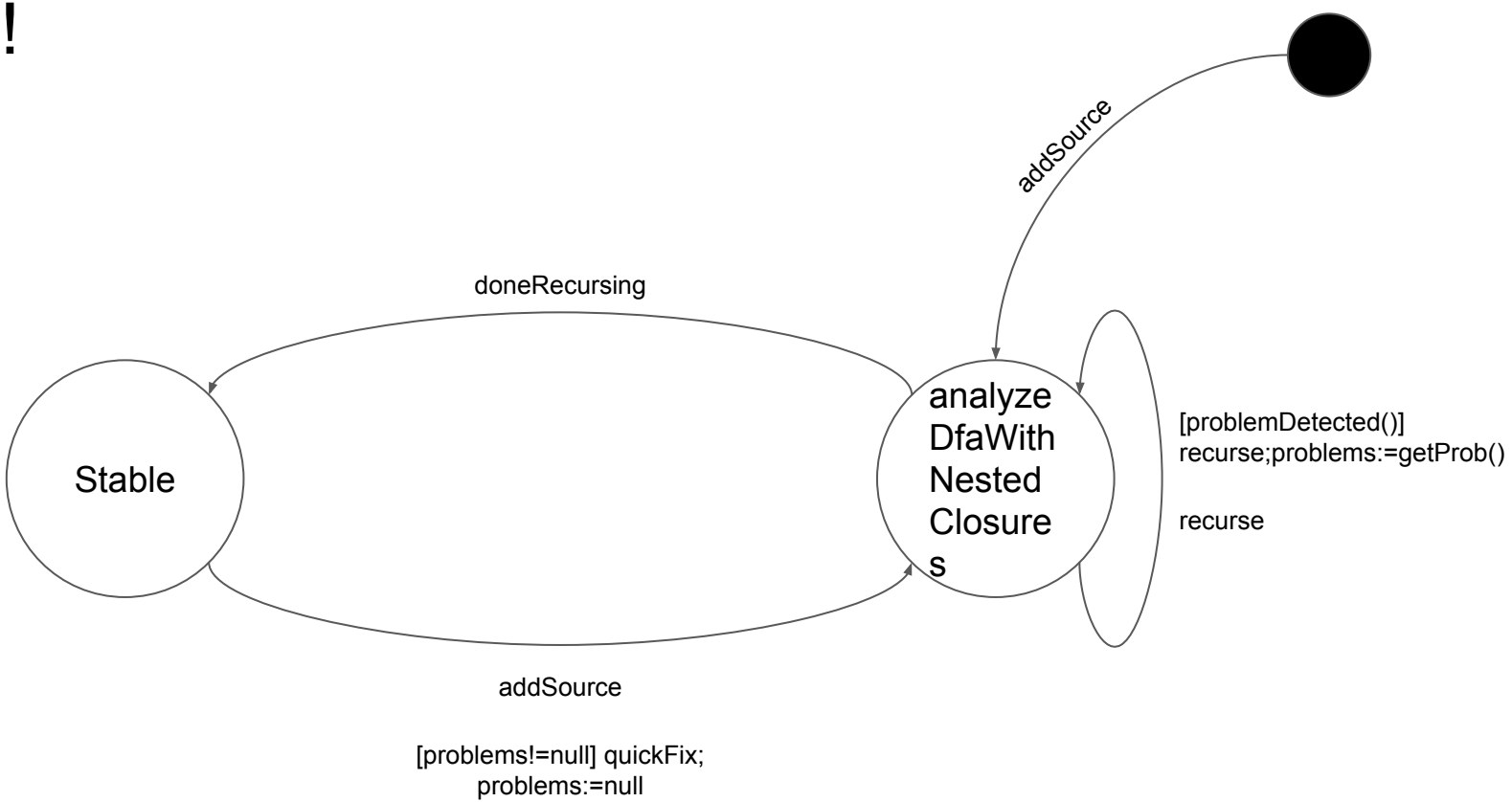
addSource
doneRecursing
Stable
analyze DfaWith Nested Closure s
[problemDetected()]
recurse;problems:=getProb()
recurse
addSource
[problems!=null] quickFix;
problems:=null