Xtreme Test Driven Development

Getting a productivity boost

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http://www.pharo.org

Outline

- TDD on **steroids**
- Live programming at **its best**
- Smart tools
- Absolutely **gorgeous** development flow

Principle

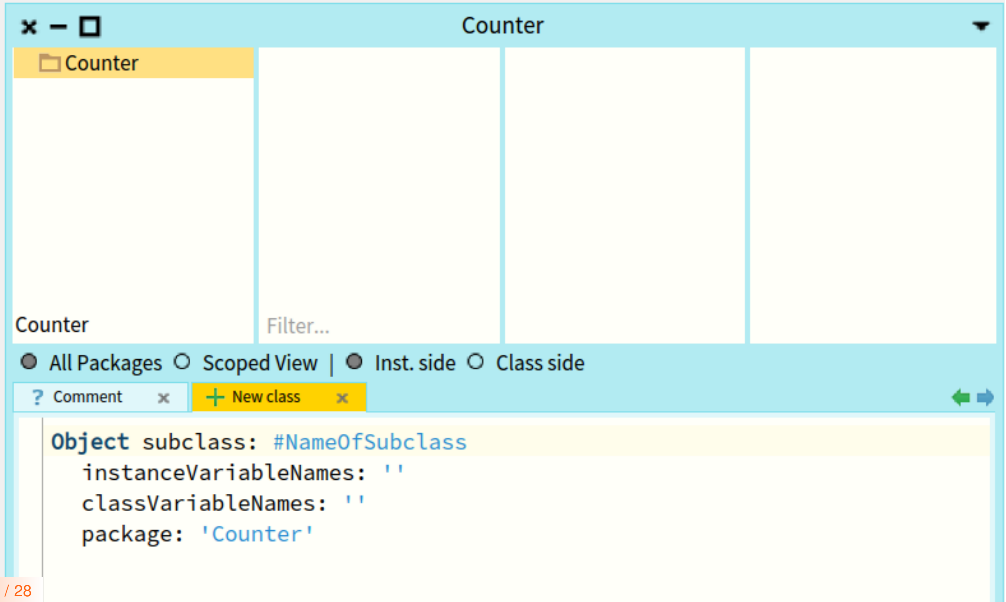
Do **not break** the flow

- Write a test
- When it breaks, define the method **on the fly in the debugger**
- **Resume and continue** until the test is green

Studying an example

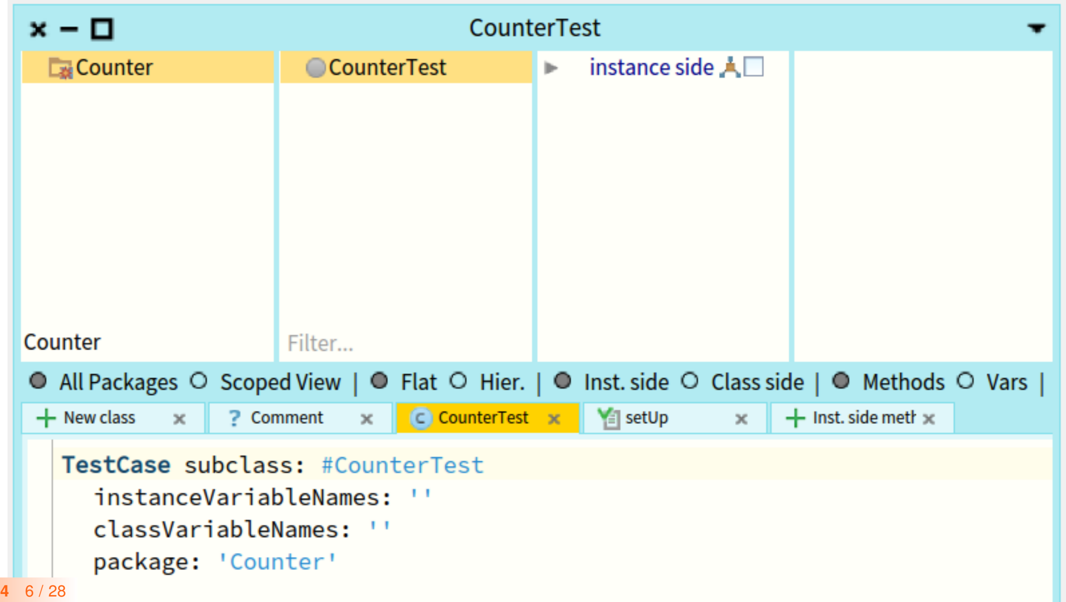
- A dead simple counter. Nothing simpler.
- Focus on the essence of the process!
- You can do it.

An empty package



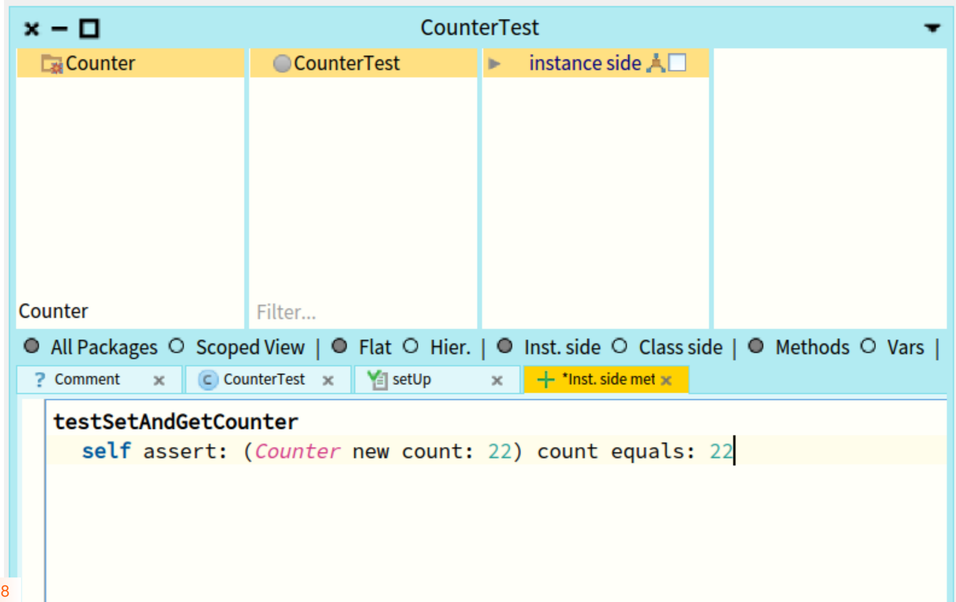
```
Object subclass: #NameOfSubclass
	instanceVariableNames: ''
	classVariableNames: ''
	package: 'Counter'
```

An empty test case class



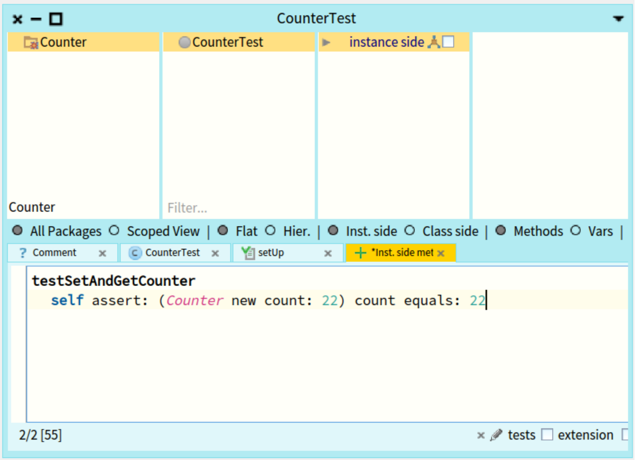
```
TestCase subclass: #CounterTest
   instanceVariableNames: ''
   classVariableNames: ''
   package: 'Counter'
```

A first test



```
testSetAndGetCounter
   self assert: (Counter new count: 22) count equals: 22
```

A first test (II)

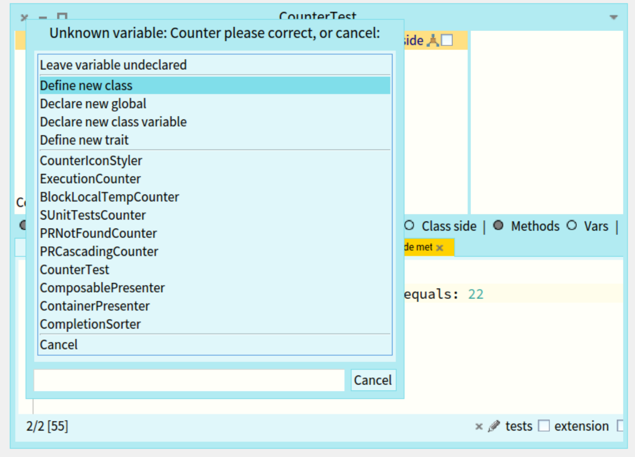


```
testSetAndGetCounter
   self assert: (Counter new count: 22) count equals: 22
```

- Method is about to be compiled
- The system knows the class does not exist!

Define a class

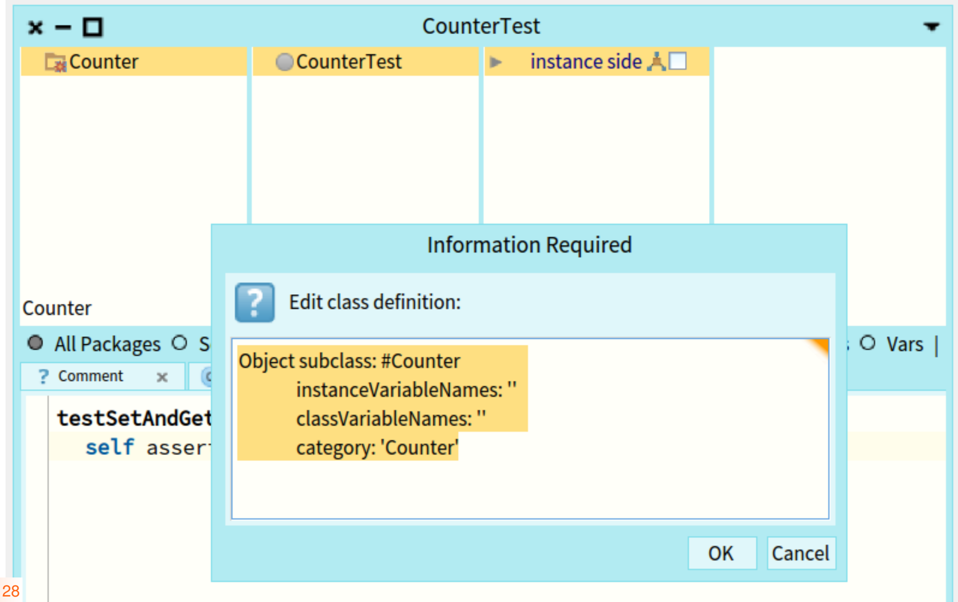
- At compile time...



Unknown variable: Counter please correct, or cancel:

Leave variable undeclared
Define new class
Declare new global
Declare new class variable
Define new trait
CounterIconStyler
ExecutionCounter
BlockLocalTempCounter
SUnitTestsCounter
PRNotFoundCounter
PRCascadingCounter
CounterTest
ComposablePresenter
ContainerPresenter
CompletionSorter
Cancel

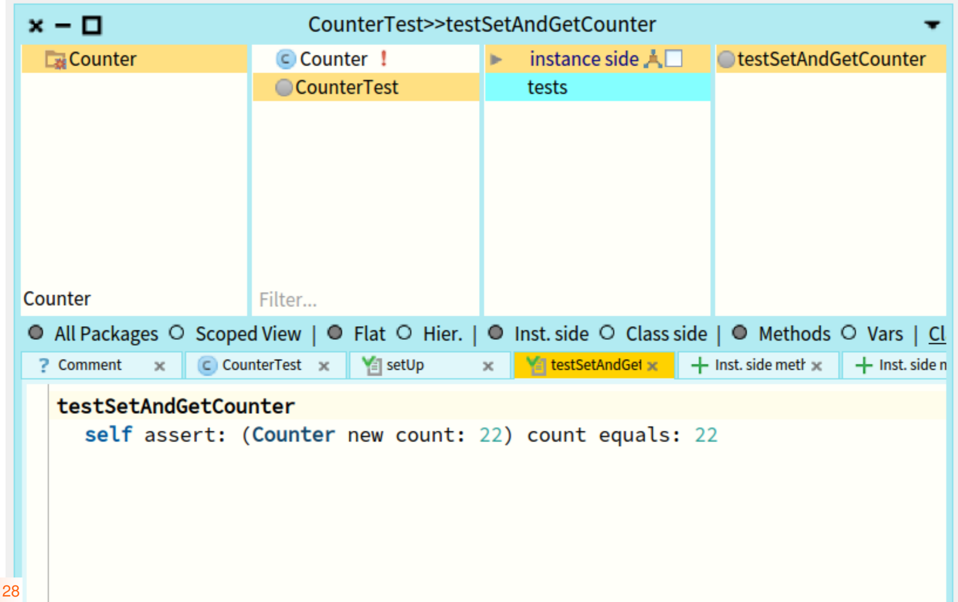
Define a class (II)



```
testSetAndGet
    self assert
```

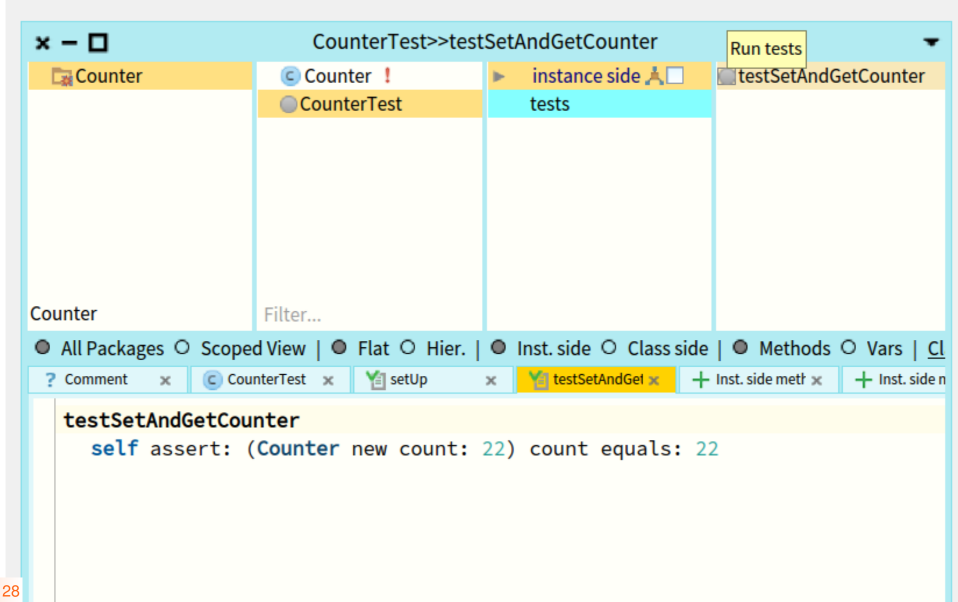
```
Object subclass: #Counter
        instanceVariableNames: ''
        classVariableNames: ''
        category: 'Counter'
```

Test defined but not executed



```
testSetAndGetCounter
  self assert: (Counter new count: 22) count equals: 22
```

Running the test



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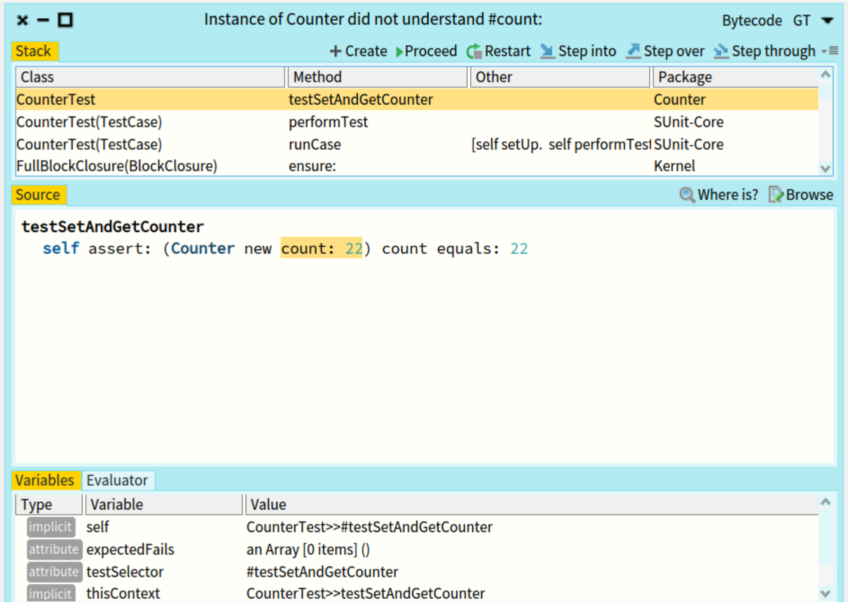
  self assert: (Counter new count: 22) count equals: 22
```

First Error

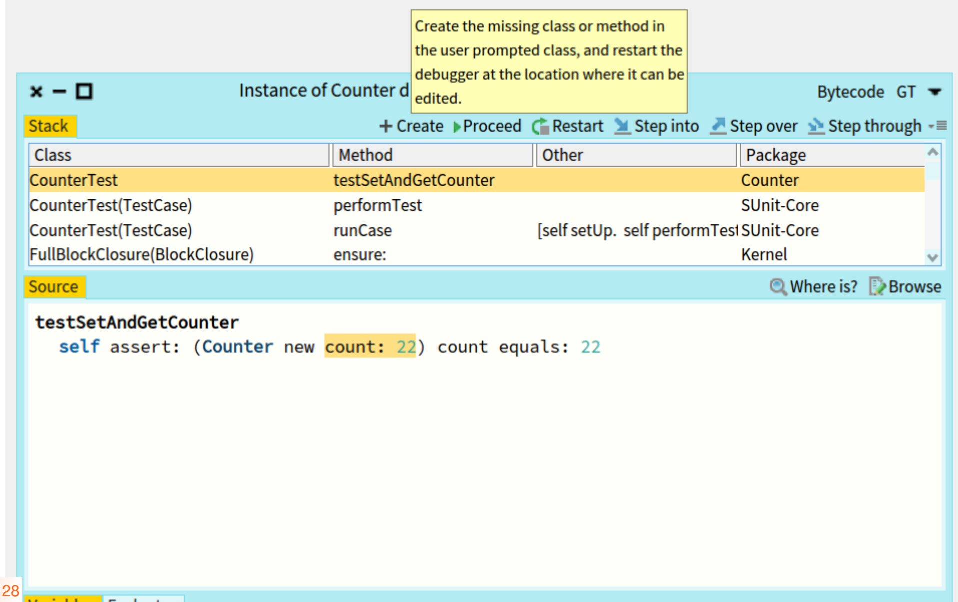


Class	Method	Other	Package
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Core
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Core
FullBlockClosure(BlockClosure)	ensure:		Kernel

```
testSetAndGetCounter
  self assert: (Counter new count: 22) count equals: 22
```

Type	Variable	Value
implicit	self	CounterTest>>#testSetAndGetCounter
attribute	expectedFails	an Array [0 items] ()
attribute	testSelector	#testSetAndGetCounter
implicit	thisContext	CounterTest>>testSetAndGetCounter

Create a method on the fly



Create the missing class or method in the user prompted class, and restart the debugger at the location where it can be edited.

Class	Method	Other	Package
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Core
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Core
FullBlockClosure(BlockClosure)	ensure:		Kernel

```
testSetAndGetCounter
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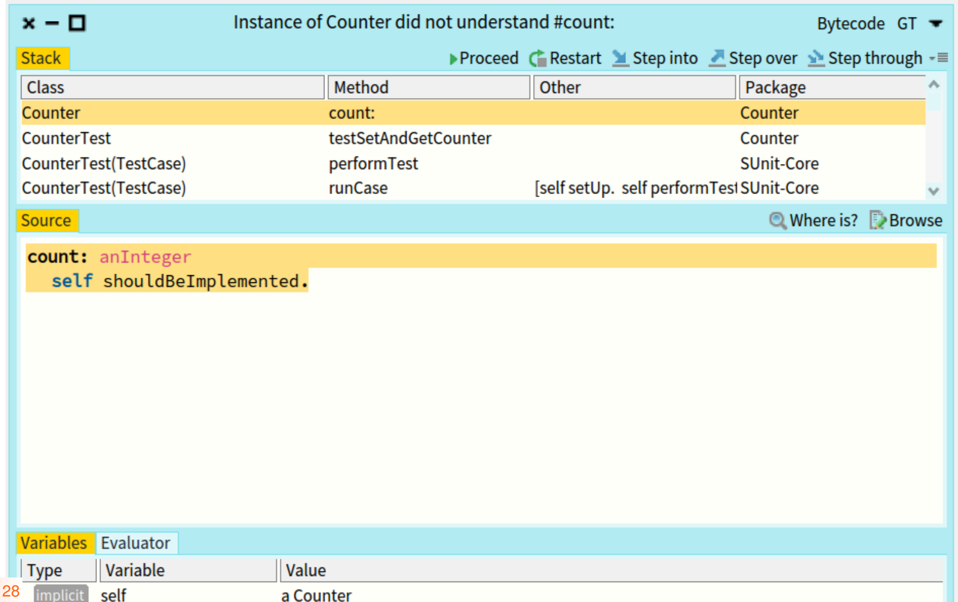
```

Create a method on the fly (II)



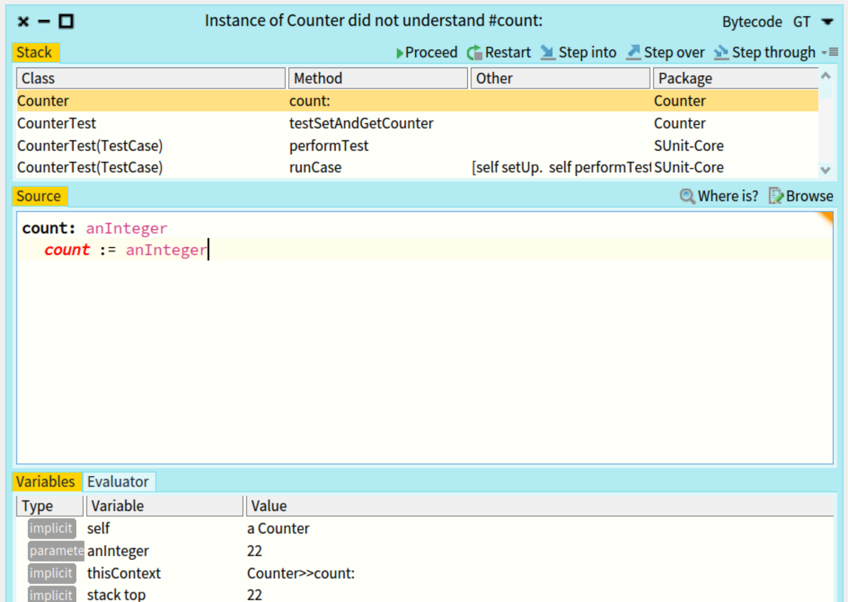
Instance of Counter did not understand #count:

Class	Method	Other	Package
Counter	count:		Counter
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Core
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Core

```
count: anInteger
   self shouldBeImplemented.
```

Type	Variable	Value
implicit	self	a Counter

Edit the method in the debugger



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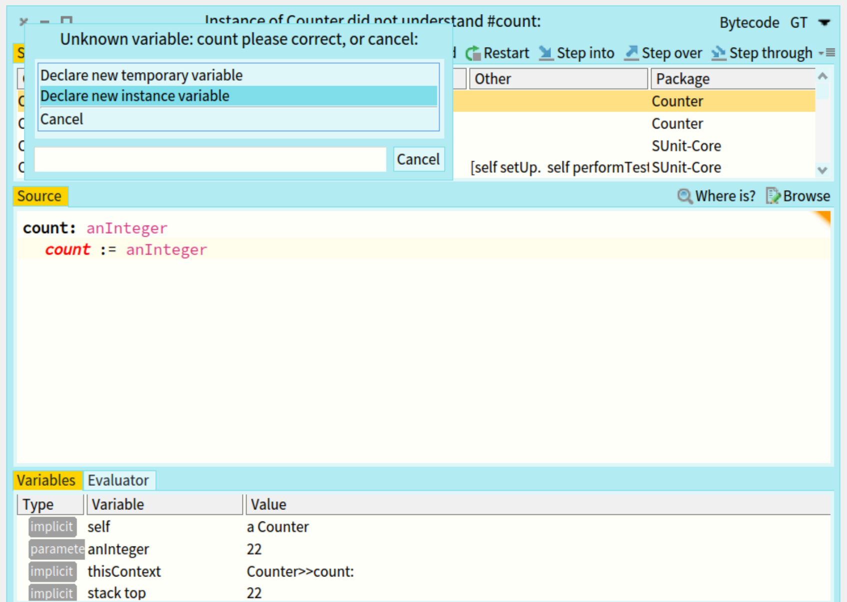
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Core
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Core

```
count: anInteger
   count := anInteger
```

Type	Variable	Value
implicit	self	a Counter
paramete	anInteger	22
implicit	thisContext	Counter>>count:
implicit	stack top	22

Add an instance variable on the fly



Instance of Counter did not understand #count:

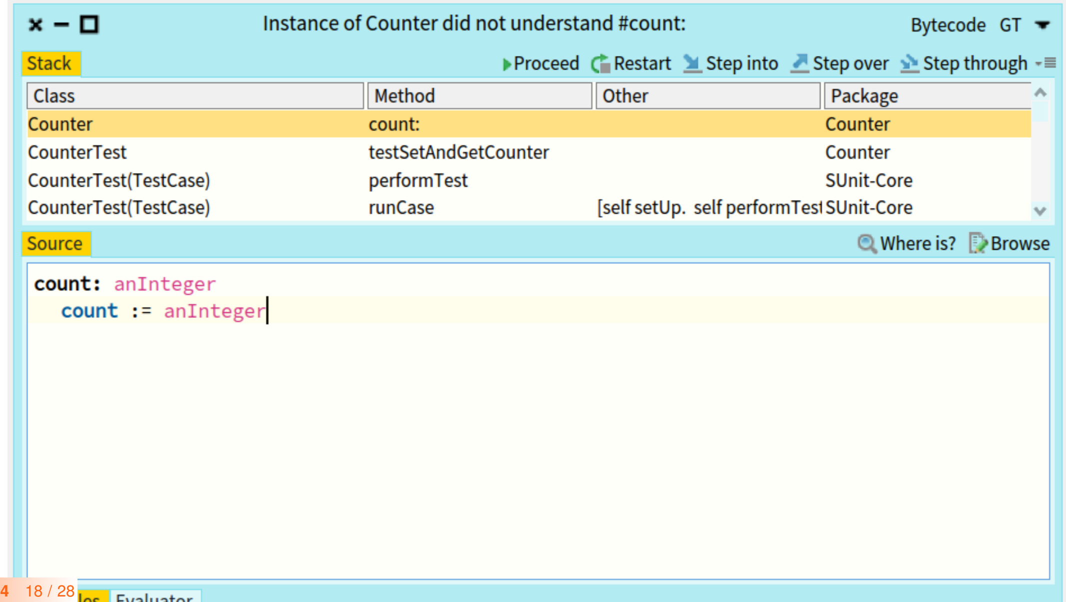
Unknown variable: count please correct, or cancel:

Other	Package
	Counter
	Counter
	SUnit-Core
[self setUp. self performTest	SUnit-Core

```
count: anInteger
  count := anInteger
```

Type	Variable	Value
implicit	self	a Counter
paramete	anInteger	22
implicit	thisContext	Counter>>count:
implicit	stack top	22

Compile....



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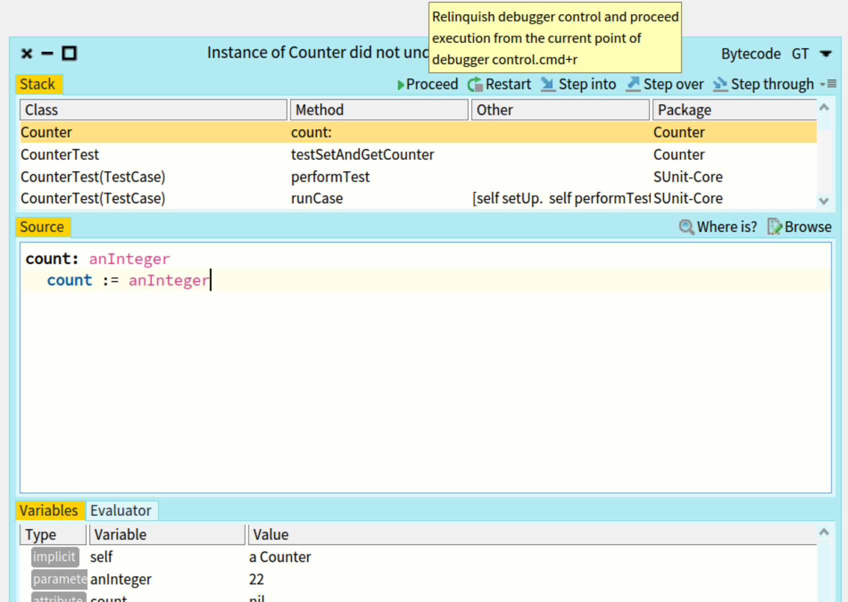
```
count: anInteger
   count := anInteger
```

Continue the execution...



Relinquish debugger control and proceed execution from the current point of debugger control.cmd+r

Instance of Counter did not und

Bytecode
GT
Stack
Proceed
Restart
Step into
Step over
Step through

Class	Method	Other	Package
Counter	count:		Counter
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Core
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Core

```
count: anInteger
   count := anInteger
```

Type	Variable	Value
implicit	self	a Counter
paramete	anInteger	22
attribute	count	nil

Supporting the programmer flow

- The system
  - **created** a new method for us
  - **Removed** the stack element with Error
  - **Replaced** it with a call to the new method
  - **Relaunched** execution
- We edited it and recompiled the method
- The system **Continued** execution

New method

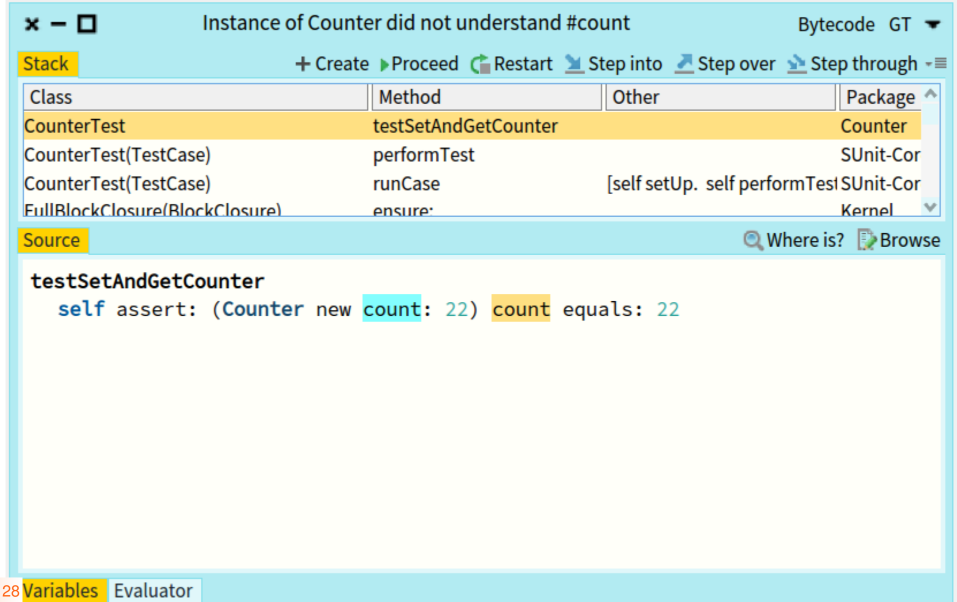
The system:

- Created a new method
- Removed the stack element with Error
- Replaced it with a **call** to the new method

```
count: anInteger
  self shouldBeImplemented
```

- shouldBeImplemented is just an exception so that the debugger stops again

Same story....



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testSetAndGetCounter
   self assert: (Counter new count: 22) count equals: 22
```
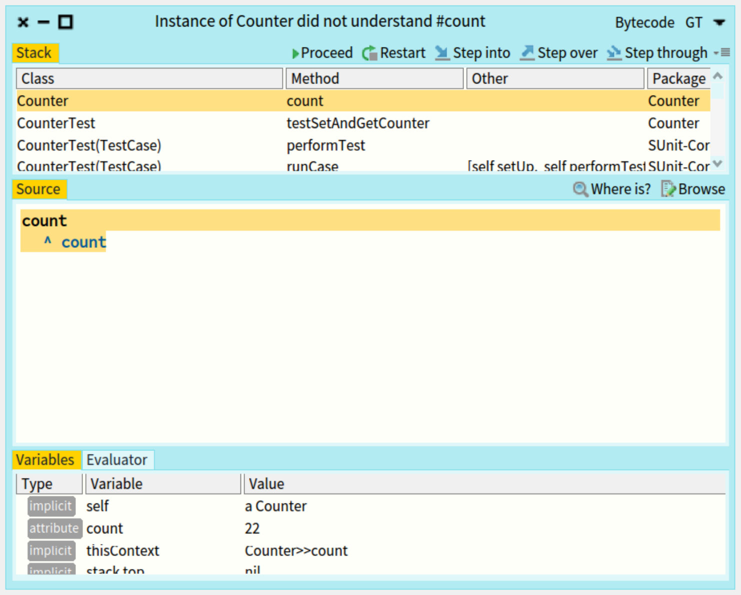

Debugger also precompiles methods



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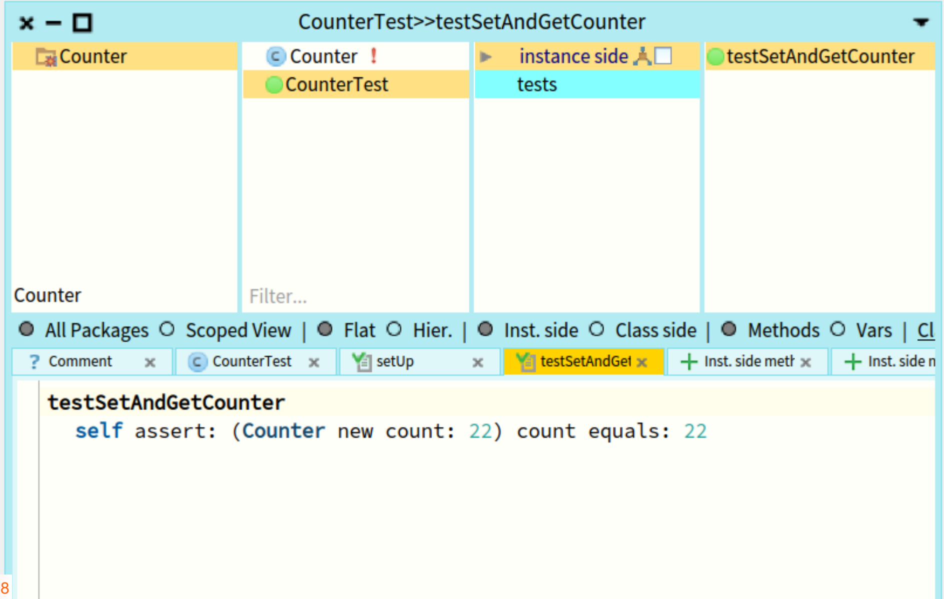
CounterTest	testSetAndGetCounter		Counter
CounterTest(TestCase)	performTest		SUnit-Cor
CounterTest(TestCase)	runCase	[self setUp. self performTest	SUnit-Cor

```
count
	^ count
```

Type	Variable	Value
implicit	self	a Counter
attribute	count	22
implicit	thisContext	Counter>>count
implicit	stack top	nil

Test is green



```
testSetAndGetCounter
   self assert: (Counter new count: 22) count equals: 22
```

One Cycle

- Run all the tests
- Ready to commit
- New test

Why XTDD is powerful

- Avoid **guessing** context when coding
- Much much better context
  - inspect that **specific** instance state
  - talk to that **specific** object
- Inspectable / interactable context
- Tests are not a side effect artifact but the **driving** force

Protip from expert Pharo developers

- Grab **as fast as** possible one object
- **Cristalize** your scenario with a test
- Xtreme TDD
- Loop

Produced as part of the course on http://www.fun-mooc.fr

Advanced Object-Oriented Design and Development with Pharo

A course by

S.Ducasse, L. Fabresse, G. Polito, and P. Tesone

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IMT-Université de Lille

2023