

# Automating Feedback for 1<sup>st</sup> year Programming Courses

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**Programming is a key  
skill for a computer scientist**

50% of our first year CS  
modules teach  
programming



... but programming is a big hurdle for many 1<sup>st</sup> year CS students

~~I'm a Programmar~~  
~~I'm a Programer~~  
~~I'm a Programmor~~  
I write code.

Studies indicate that potential issues are

**constrained lab times**

**large classes**

**insufficient feedback**



**Lab helpers are invaluable but  
resources are limited...**

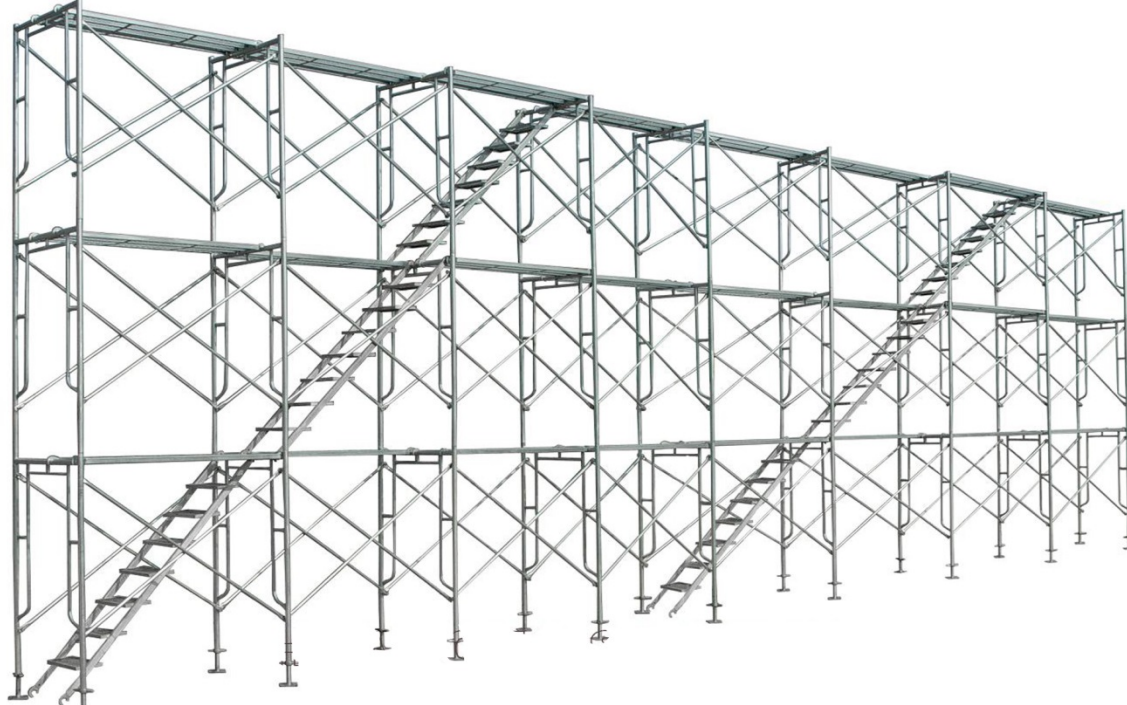




Develop **automated** feedback  
framework that is **timely** &  
**constructive**



**Scaffolding:** feedback in terms  
of clues & tips



# Software testing to check results from running program

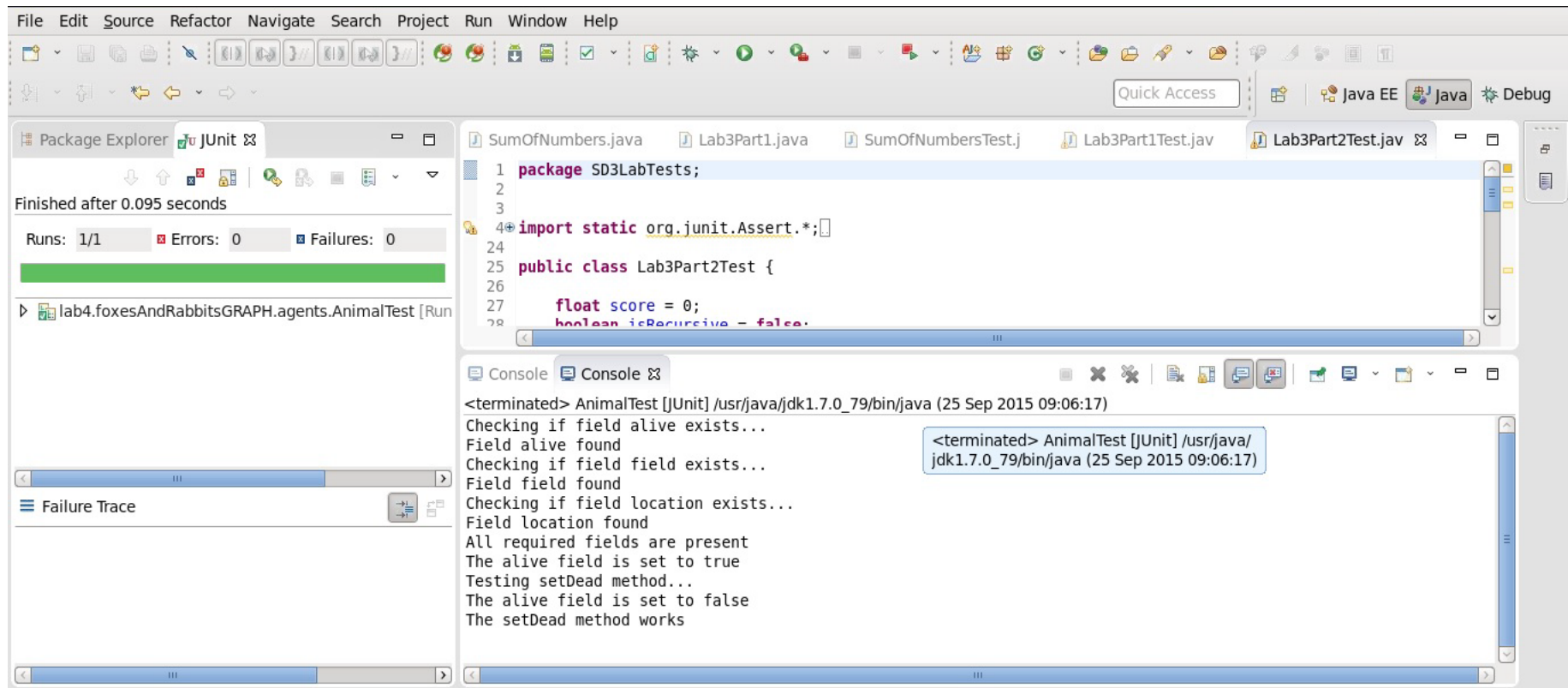




# ASM library to analyse structure of running program



# Resulting tool



[demo during break]

# Resulting tool

The screenshot displays an IDE interface with the following components:

- Menu Bar:** File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help.
- Toolbar:** Contains icons for file operations, navigation, and running/debugging.
- Package Explorer:** Shows the project structure with a tree view. The selected item is `lab4.foxesAndRabbitsGRAPH.agents.AnimalTest`.
- JUnit Results:** A summary bar indicating "Finished after 0.015 seconds", "Runs: 1/1", "Errors: 0", and "Failures: 1". Below this, a red bar highlights the failed test: `test (0.003 s)`.
- Failure Trace:** Displays the error message: `java.lang.AssertionError: The Animal class should contain a variable called alive. Remember that variable names are case sensitive.` The stack trace points to `at lab4.foxesAndRabbitsGRAPH.agents.AnimalTest.test(An`.
- Code Editor:** Shows the source code of `AnimalTest.java`. The `test()` method is visible, which includes a `try` block to check if the class `Animal` exists and contains a field named `alive`. The code uses `Class.forName()` and `Field.getDeclaredFields()` to inspect the class.
- Console:** Shows the output of the test run, including the message `<terminated> AnimalTest [JUnit] /usr/java/jdk1.7.0_79/bin/java (25 Sep 2015 09:13:42)` and the printed text `Checking if field alive exists...`.

[demo during break]



Test **tool** in a  
lab followed by **questionnaire**

[can we go beyond **shallow learning?**]



Extend tool to **automate  
marking** of coursework

[can we go beyond **shallow properties?**]