

CMSC131

Debugging

Testing: What JUnit can do...

We can use JUnit testing to:

- help us write test cases to determine whether code behaves as expected
- allow us to run tests repeatedly with little manual intervention as we fix things
- display things in the Failure Trace such as the value we were expecting versus the value we actually got
- provide a long-term resource for activities such as regression testing

Testing: What JUnit can't do...

We cannot use JUnit alone to:

- show all of the internal details of our object and the parts of the object...
- directly let us walk through our code to see where the error actually occurred...

Testing: What debuggers let us do...

We can set "break points" on specific lines of code on which to pause execution and:

- examine the contents of memory
- decide how to proceed with running/debugging the program

Once paused, we can choose to continue by either stepping "over", "into", and "out of" code segments.

Stepping...

Stepping "over" a line of code executes the entire line and any sub-calls it contains as a single action.

Stepping "into" a line of code executes the line if it is a simple statement or goes "into" the statement and pauses if it is something like a method call.

Stepping "out of" code is used if we are inside a method call and want to execute the remainder of it as a simple action.

Live Demo Time

Let's look at an example class, write some JUnit tests, and try to debug the errors.

Testing Scenarios

Just to recap, when testing we might want to test:

- ...things that the client specifies as example scenarios of input and required output so that we can test that our output matches the correct output.
- ...scenarios that we generate "at random" and run through ourselves (or with our clients) to determine the correct output against which we can test.
- ...so-called "corner case" scenarios which are often extremes (like using the minimum value or the maximum value and then performing operations) or things that happen on boundaries (like if you are dealing with a 2D space, see what happens with things on an axis or at the origin).

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