Testing

Steve Loughran
HP Laboratories
Thursday November 6th, 2006
your code doesn't work
i know this because...
my code doesn't work
it's OK to write code that doesn't work
A problem has been detected and Windows has been shut down to prevent damage to your computer.

The problem seems to be caused by the following file: aries.sys

PAGE_FAULT_IN_NONPAGED_AREA

If this is the first time you've seen this stop error screen, restart your computer. If this screen appears again, follow these steps:

Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or software manufacturer for any Windows updates you might need.

If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to select Advanced Startup Options, and then select Safe Mode.

Technical information:

*** STOP: 0x0000050 (0xFFFFFFF8,0x00000000,0xF9CF5C88,0x00000000)

*** aries.sys - Address F9CF5C88 base at F9CF5000, DateStamp 424bb23f

Beginning dump of physical memory
Physical memory dump complete.
Contact your system administrator or technical support group for further assistance.
especially if it matters
how do you get from "broken" to "shipping"?
A problem has been detected and Windows has been shut down to prevent damage to your computer.
The problem seems to be caused by the following file: arles.sys

PAGE_FAULT_IN_NONPAGED_AREA

If this is the first time you've seen this stop error screen, report your computer. If this screen appears again, follow these steps:
- Check to make sure any new hardware or software is properly installed.
- If this is an installation, tell your hardware or software supplier about this error.
- Use Setup or Install Manager to check your installation, and re-install or update.
- If problems continue, disable or remove any newly installed hardware or software.
- If you're using Windows NT, temporarily turn off NetWare services or any other services not needed on this computer.
- To start Windows NT, insert the boot disk and press # to select Advanced Startup options, and then select Safe Mode.

Technical Information:

*** STOP 0x00000150 0x00000000 0x00000000 0x00000000

*** arles.sys - address 0x00c5c00 base at 0x0035000, basestamp 4246c82f

A missing dump of physical memory

Physical memory dump complete.

Click on the image to view the full text.
proofs of correctness

+ shows an algorithm really works
+ good for concurrency
+ and distributed things

- makes assumptions about system
- needs lots of maths/CS skills
  (Pi-Calculus, The HOL System)
- regression proofs?
Test Driven Development

any feature without a test 
doesn’t exist
JUnit

* unit test framework in Java
  - versions for C++, Python, Ruby...
* simple to learn
* good tool support
* somewhat low-level
* extensions for system testing
public class LessSimpleTest extends TestCase {

    public LessSimpleTest(String s) {
        super(s);
    }

    public void testAssignment() {
        final Date date = new Date();
        Event event = new Event(UUID.randomUUID(),
                                date, "now", "Text");
        assertEquals("self equality failed",
                    event, event);
        assertEquals(date, event.getDate());
        assertNotNull(date.getID());
    }
}
swing GUI
TestRunner
Ant-generated report scales better; reports published
Continuous Integration
System Testing

* deploy, then:
  * HttpUnit, XmlUnit, Cactus
* needs automated deployment, database setup, teardown
* performance testing by comparing timings w.r.t. old runs
* Simulate entire behaviour of the client user/application
Distributed System Testing

* Still a research topic

* Set up complex configurations
* Run tests on remote machines
* Collect results and log data
* Post-mortem analysis
* Virtualization can help

see http://tinyurl.com/y99tez
limitations of testing

- good tests are hard to write
- distributed tests very hard
- different system configurations are still a problem
- status of "tester" below "coder"

___A good test breaks the application___
politics: resistance to change
developers: ignorance, fear

E.E.E. Educate, Evangelise, Encourage

* gently show benefits
* use testing to track down a bug
* retain test for regression testing
* add tests for new code and old problems, not existing codebase
* adopt cruise control, reporting
management: ignorance

"too much time spent on testing"

* out of date with modern processes
* belief that testing slows the schedule
  (only if you follow the ship-and-see process)

E.E.E., then D.D.D:
  Distract, Dissemble, Defeat
Test Driven Standards?

any standard without a test doesn’t exist