Taking Testing Mountain
(By Strategy)

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LibreOffice Conference, September 2018
Tests are good...
Tests are good...

...and more tests are better
Tests are good...
...and more tests are better
We have a problem
We have a problem
So lets go fix those failures
We have a problem

[CUT] filter_tiff_test
Testing file:///data/lo/core/filter/qa/cppunit/data/tiff/pass/CVE-2005-1544-1.tiff:
Tested file:///data/lo/core/filter/qa/cppunit/data/tiff/pass/CVE-2005-1544-1.tiff:
Fail (1ms)
/data/lo/core/unotest/source/cpp/filters-test.cxx:145:TiffFilterTest::testCVEs
equality assertion failed
  - Expected: 1
  - Actual : 0
  - file:///data/lo/core/filter/qa/cppunit/data/tiff/pass/CVE-2005-1544-1.tiff

TiffFilterTest::testCVEs finished in: 1ms
filters-test.cxx:145:Assertion
Test name: TiffFilterTest::testCVEs
equality assertion failed
  - Expected: 1
  - Actual : 0
  - file:///data/lo/core/filter/qa/cppunit/data/tiff/pass/CVE-2005-1544-1.tiff

Failures !!!
We have a problem

```cpp
bool bRes;
if (!bExport)
    bRes = load(rFilter, realUrl, rUserData, nFilterFlags,
               nClipboardID, nFilterVersion);
else
    bRes = save(rFilter, realUrl, rUserData, nFilterFlags,
               nClipboardID, nFilterVersion);
sal_uInt32 nEndTime = osl_getGlobalTimer();

if (bEncrypted)
    CPPUNIT_ASSERT_EQUAL(osl::FileBase::E_None, osl::File::remove(sTmpFile));

fprintf(stderr, "Tested %s: %s (%" SAL_PRIuUINT32 "ms)\n",
        aRes.getStr(), bRes?"Pass":"Fail", nEndTime-nStartTime);
if (nExpected == test::indeterminate)
    continue;
filterStatus nResult = bRes ? test::pass : test::fail;
CPPUNIT_ASSERT_EQUAL_MESSAGE(aRes.getStr(), nExpected, nResult);
```
The Department of Cheesy Talk Titles

Oblique Strategies:
Over one hundred worthwhile dilemmas

- Do something boring
- Look closely at the most embarrassing details and amplify them
- Don't be afraid of things because they're easy to do
- Honor thy error as a hidden intention
- Don't break the silence
- Humanise something free of error
- Is it finished?
- Mute and continue
- What mistakes did you make last time?
- Shut the door and listen from outside
Step 0: Write failing tests

- Test Driven Development
- Makes sure test code is actually executed
  - No forgotten CPPUNIT_TEST(myTest)
- Helps make sure failing test outputs useful information
  - If you care for that from the outset
Step 1: Understand what you test

Subject: Test File: sc/qa/unit/data/functions/fods/chiinv.fods: fails with Assertion
To: libreoffice@lists.freedesktop.org
Date: Wed, 31 Aug 2016 19:30:35 +0100

[...]

Any suggestions on how I can resolve this problem will be appreciated.

The error is

> Testing
> file:///home/master/master/sc/qa/unit/data/functions/fods/chidist.fods:
> Tested
> file:///home/master/master/sc/qa/unit/data/functions/fods/chidist.fods:
> Pass (491ms)
> Testing
> file:///home/master/master/sc/qa/unit/data/functions/fods/chiinv.fods:
> [...]/master/sc/qa/unit/functions_test.cxx:80:FunctionsTest::testFormulasFODS
double equality assertion failed
>  - Expected: 1
>  - Actual  : 0
>  - Delta   : 1e-14
Step 1: Understand what you test

Subject: Re: Test File: sc/qa/unit/data/functions/fods/chiinv.fods: fails with Assertion
To: libreoffice@lists.freedesktop.org
Date: Fri, 16 Sep 2016 12:05:19 +0200

[...]

Turns out, the relevant GCC switches are

- mfpmath=sse -msse2

-mfpmath=sse (instead of the x86-32 default of -mfpmath=387) prevents usage of the extended 80-bit precision for temporary results. (Which caused e.g. the subtraction in ScChiDistFunction::GetValue, sc/source/core/tool/interpr3.cxx, to produce results different from IEEE double, causing the computation of CHIINV(0.999999999999999, 1.00000000000000E+001) in sc/qa/unit/data/functions/fods/chiinv.fods to produce unexpected results.) <https://gcc.gnu.org/onlinedocs/gcc-6.2.0/gcc/x86-Options.html#x86-Options> also claims: "The resulting code should be considerably faster [compared to -mfpmath=387] in the majority of cases and avoid the numerical instability problems of 387 code [...]

Step 2: Wet Concrete Test Code

- PragProg DRY Principle: “Don’t Repeat Yourself”
- But test code is different from code under test:
  - It shall be obvious *what* failed from *where* it failed
    - Consider all you have is: test-file+line/expected/actual
  - Test code shall be easy to debug

- Be redundant, spell it out: don’t be DRY, be *wet!*
- Avoid abstractions: be *concrete!*

- Consider `CPPUNIT_ASSERT_MESSAGE` a red flag
Step 3: Deterministic test code

* mst___ finds that debugging a randomized test crash isn't entirely straightforward...
Step 4: Deterministic environment

commit 5eb9dd46e9b3ba18afd4f6dac580c4b91e715f43
Date: Thu Sep 13 14:49:48 2018 +0200

More temp copies of test docs in Python/UI Tests

[...]

I had cancelled (ctrl-c) a `make check` midway, when it happened to be in the middle of UITest_calc_tests2 and left behind a sc/qa/uitest/calc_tests/data/.~Lock.stableSorting.ods# lock file (which records, among other things, the host name). I then dropped off a VPN, which caused the host name as seen by LO to switch from "alpha" to "alpha.fritz.box", then re-started the build as `make check screenshot` (which was the thing I'd originally intended, but forgot the screenshot target). The new build hung during UITest_calc_tests2's sc/qa/uitest/calc_tests2/stableSorting.py, as loading sc/qa/uitest/calc_tests/data/stableSorting.ods found the lock file with non-matching host name in SfxMedium::LockOrigFileOnDemand, and hung in SfxMedium::ShowLockedDocumentDialog -> UUIInteractionHandler::handle -> (switch to main thread...) -> UUIInteractionHelper::handleLockedDocumentRequest -> ... -> Dialog::Execute, which just blocks in svp mode (which, unlike --headless, doesn't cause Application:::IsDialogCancelEnabled).
Step 5: Feel the pain

- Subscribe to libreoffice-ci@global.libreoffice.org
- All failing builds from the Jenkins bots
  - Most failures are test failures
  - Most failure logs have little useful information
- Score hero points by fixing some long-standing bug that plagues the bots
“Do the washing up”

—Eno/Schmidt, Oblique Strategies