Non-Regression Test Automation

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Regression Automation

Regression Testing

Selective testing of a system or component to verify that modifications have not caused unintended effects (IEEE 610.12)

Common methods of regression testing include re-running previously run tests and checking whether previously fixed faults have re-emerged (Wikipedia)

Non-Regression Testing

Testing of a system or component to find errors

Running of new tests and checking for new faults

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Why Run Regression Tests

Error fix verification

- One time (assuming error was fixed)
- Easy to look for this error
- 15-60% non-fix rates are common

Error return verification

- Frequently run (assuming error might return)
- Unlikely event

Check for unintended side-effects

- "Regression tests" already exist
- But, any test will do

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Manual Versus Automated Regression Tests

Repeats the same exercise

- Does exactly the same thing the same way
- Already explored territory

Automation reduces variability

- Sometimes a good thing
- Not so good for finding new failures
- Limits what you can do

You should look elsewhere for new failures

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Tests That Require Automation

- Buffer overruns (huge sizes, long runs)
- Non-boundary special cases (large number of tests)
- Memory leaks, stack overflows (long series)
- Memory or stack corruption (in memory)
- Resource consumption/exhaustion
- Timing errors (windows of opportunity)

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Non-Regression Automation Examples

- Data driven / data configured
- Model based
- Random walks
- Function equivalence
- A/B Comparison
- Statistical models
- Real-time external monitors
- Cooperating processes
- Duration, life, load testing

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Pseudo Random Numbers

Used for selection or construction of inputs

- With and without weighting factors
- Selection with and without replacement

Statistically "random" sequence

Randomly generated "seed" value

Requires oracles to be useful

Test Case Styles

- Data-driven commercial program
- Real-time monitoring utility
- Driver/stub combination
- Configurable or data-driven custom program
- Individual program/test

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Program Touch-Points

- Public API
- GUI API
- Non-GUI API
- Individual program/tests
- Trusted objects

Test Oracles

- Reference functions
- Computational or logical modeling
- Heuristic functions

What Automation Can't Do (Yet)

- Know all expected results
- Notice things we haven't thought of
- Internal boundary analysis
- Decide new courses of action

Conclusions

- Regression vs. non-regression tests
- Automation of regression tests
- Alternatives to regression automation
- Many styles, approaches, techniques
- Key enabler is the oracle

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Regression Test Or Demo Script

- Conceive and create an exercise
- Run it and inspect the results
- If error – report problem
- If works, record the steps and results
- Stick closely to the script when rerun