"Five Test Automation Fallacies that Will Make You Sick"

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Five Automation Fallacies that Will Make You Sick

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Some Assumptions

• Your goal in testing is to find bugs
• Regression tests do the same thing each
time they’re run
• There is some limit on testing and
automation resources
• We don’t know all the bugs in advance
Five Fallacies

- Automated tests find lots of bugs
- Manual tests make good automated tests
- Results to check are clear and simple
- We know what to expect
- More automated regression tests are always better

Automated Tests Don’t Find Many Bugs

- Most automated tests are regression tests
- Nearly all bugs are found manually while preparing the regression test
- Most bugs found by automated tests are due to gross errors
- Very few interesting bugs are found
Automated Regression Tests
Minimize Chances

• Same exercise each time
• Very limited error checking
• Zero variation
• Dog duty analogy
• Like an automated demo
• Training the code to pass the test

Most Bugs Are Found by First Run of Manual Test

• Automated manual tests
• Run manually before automation
• Estimated 85% to 98% of bugs found this first run
• Most other bugs exposed are not the ones the tests were designed for
Mostly Gross Bugs Are Found by Automated Tests

- CM problems
  - Source control issues
  - Integration bugs
  - Alternating design errors
- Almost anything would expose the bug

Very Few Interesting Bugs Are Uncovered

- Most errors are false alarms
- Gross bugs
- Non-repeatable bugs
- Little evidence besides exercise
- Covering of tracks
Manual Tests Don’t Make Good Automated Tests

- Manual tests assume a ‘human computer’
- Human perception goes way beyond things specified in a test script – for example:
  - 5 senses
  - Time
  - Extraneous coincidental events
- Automating a test restricts what can be checked

What to Check is Clear

- Usually check for positive responses
- Sometimes check for specific errors
- There are many outcome domains we don’t consider
- Anything can happen when bugs are triggered
What to Check is Simple

- Not all results are in machine usable form
- SUTs are frequently too complex to guess arbitrary outcomes
- Comparators can be very complex and expensive
- There are many outcome domains we don’t normally consider
- Anything can happen when bugs are triggered
We Know What to Expect

• Are we checking the best outcomes?
• Do we know all the expected outcomes?
• Anything can happen when bugs are triggered
• We cannot predict or check all possible outcomes

More Automated Tests Are Always Better

• Low marginal value to automated regression tests
• High cost of analysis and false alarms
• 3 to 12 times the cost to create the automated test than the manual test
• More tests mean higher maintenance costs
Automation Efforts

What We Can Do

- Maximize ROE
- Do things that can’t be done manually
- Plan for maintenance
- Identify what’s “interesting”
- Check everything that’s practical
- Check early and often
Maximize ROE

- Return on Expense
- Prioritize
- Provide information
- Keep your charter in mind

*Get the best “bang for the buck”*

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Do Things That Can’t Be Done Manually

- Long random walks
- Large numbers of operations
- Checking intermediate values
- Checking program state
- Automating utility functions
Plan For Maintenance

- Measure the costs
- Budget for them
- Minimize maintenance costs
  - Standardization
  - Abstraction
  - Reuse
- Control test library size

Identify What’s Interesting

- Influencers
- Expected outcomes
- Likely data
- Program state information
- Environmental factors
- Whatever developers need to isolate an error
Expanded Software Testing Model

Test Inputs
- Precondition Data
- Precondition Program State
- Environmental Inputs

System Under Test

Test Results
- Post-condition Data
- Post-condition Program State
- Environmental Results

Check Everything Practical

- Automate comparisons
- Compare before with after for things that shouldn’t change
  - Data
  - Program state
  - Environmental factors
- Look for easy incidental indicators
Check Early and Often

- Input from log files
- Check for errors as the test runs
- Use external monitor routines
- Check invariables
- “Dump the world” when in doubt

Summary

- Believing the fallacies can cause big trouble
- Recognize our limitations
- Plan to maximize ROE
- Extend our reach with automation
- Check everything practical