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"Five Test Automation Fallacies that Will Make You Sick"

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Doug Hoffman (BACS, MSEE, MBA, Fellow of ASQ, Senior Member of ACM, Member of IEEE) has been an independent management consultant in software quality for more than fifteen years and was an engineer and manager at several companies before that. He has published papers on many technical and managerial topics in software quality over the past twenty years. Doug holds certificates from ASQ in Software Quality Engineering (CSQE) and Management of Quality/Organizational Excellence (CMQ/OE). Currently he does training and works with companies to evaluate organizational quality needs, architect test automation environments, and implement improvement solutions. Learn more about Doug at www.SoftwareQualityMethods.com.

Five Automation Fallacies that Will Make You Sick

Better Software
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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

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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

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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

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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

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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

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Mostly Gross Bugs Are Found by Automated Tests

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

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Very Few Interesting Bugs Are Uncovered

- Most errors are false alarms
- Gross bugs
- Non-repeatable bugs
- Little evidence besides exercise
- Covering of tracks

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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

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What to Check is Clear

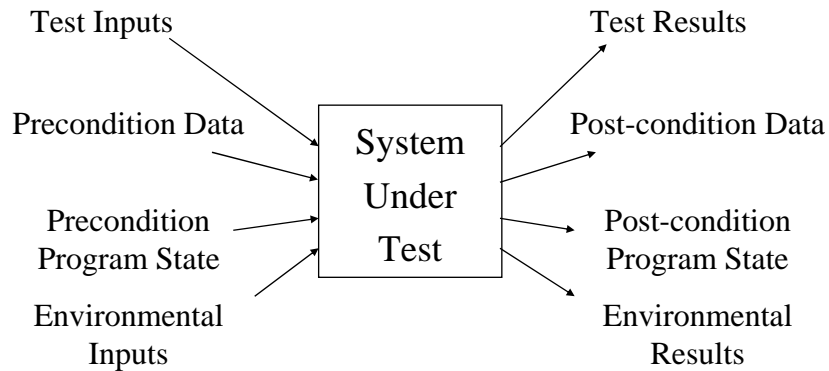
- Usually check for positive responses
- Sometimes check for specific errors
- There are many outcome domains we don't consider
- Anything can happen when bugs are triggered

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Expanded Software Testing Model



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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

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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

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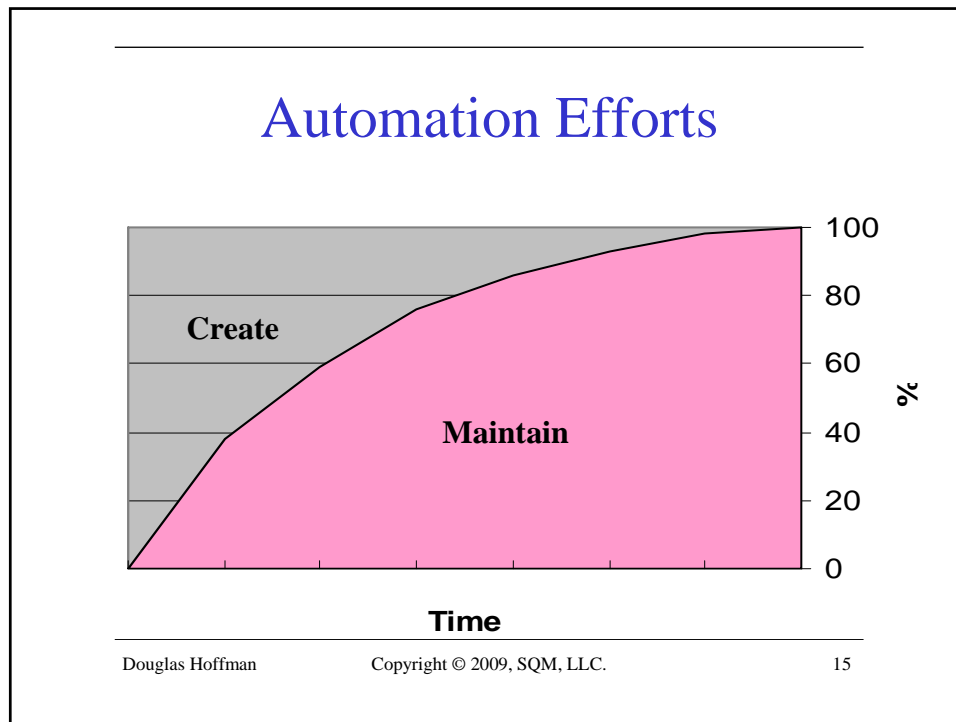
More Automated Tests Are Always Better

- 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

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- ## 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
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Maximize ROE

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

Get the best “bang for the buck”

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

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Identify What's Interesting

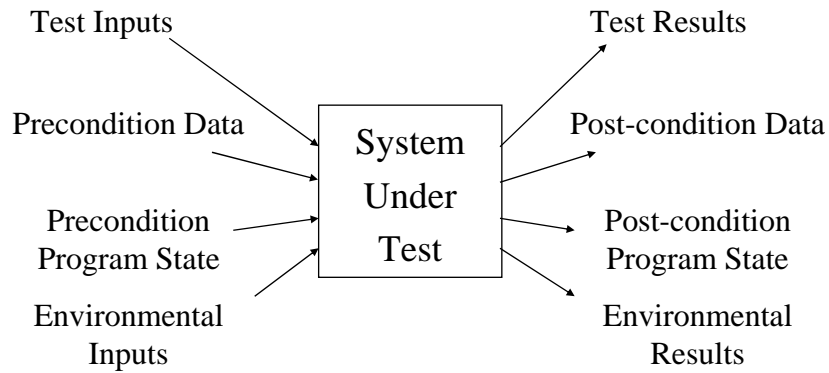
- Influencers
- Expected outcomes
- Likely data
- Program state information
- Environmental factors
- Whatever developers need to isolate an error

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Expanded Software Testing Model



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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

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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

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Summary

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



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