

Shift Left and Friends

And What They Mean for Testers



Replica of the shift left persuasion device (i.e., 2x4)
used by a test manager colleague in 1990s

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Introduction

- ⊕ All the IT world is abuzz with the latest buzz words
 - ⊞ Shift left
 - ⊞ Continuous integration and continuous delivery (CI/CD)
 - ⊞ Continuous deployment
 - ⊞ DevOps
- ⊕ What is all this and what does it mean for testers?
- ⊕ Are you (or should you be) an SDET?
- ⊕ What's going on with automation?
- ⊕ Are you worried?
 - ⊞ Don't worry
 - ⊞ Be happy
- ⊕ A left-shifted tester life is gonna be fun and exciting



What's Shift Left, and Is It My Friend?

- ❖ Basically, outgrowths of Agile, Lean, Kanban, and open source movements of the last two decades
- ❖ Let's unbuzz the buzzwords
 - ❑ Shift left
 - ❑ Continuous integration/continuous delivery (CI/CD)
 - ❑ Continuous deployment
 - ❑ DevOps
- ❖ Automation (not just test automation) is central to making this stuff work
- ❖ So, what does it mean for you as the tester?



Shift left ain't your granddad's waterfall
It really ain't waterfall at all



What Is an SDET and Am I an SDET?

- ✦ Different names for technical test analysts
 - ✦ SDET: Software Development Engineer in Test
 - ✦ SET: Software Engineer in Test
- ✦ SDETs
 - ✦ Are highly technical
 - ✦ Use, build, and customized tools
 - ✦ Read and write scripts and code
- ✦ The next step in the long-term trend requiring technical skills for testers
- ✦ What SDETs do...



The SDET doesn't just tell time. The SDET knows how the clock works inside and why



SDETs Automate Testing and More

- ⊕ Yes, SDETs automate testing
- ⊕ Know how to automate through:
 - ⊠ GUI
 - ⊠ CLIs
 - ⊠ APIs
 - ⊠ Data layer
 - ⊠ Network layer
- ⊕ Automate at multiple levels
 - ⊠ Unit
 - ⊠ Unit integration
 - ⊠ System
 - ⊠ System integration
- ⊕ Augment manual tests with automated tests
- ⊕ But there's more than automation...



GUI focused test automation: a wrong turn whose time has come and gone



Unit Test and Code Coverage Coaching

- ⊕ SDETs should coach devs
- ⊕ Good unit testing practices
 - ⊕ White-box techniques
 - ⊕ Black-box techniques
 - ⊕ Tool support
- ⊕ Key code coverage measures
 - ⊕ Statement
 - ⊕ Branch
 - ⊕ MC/DC
- ⊕ These techniques can
 - ⊕ Contribute to better testing
 - ⊕ Lead to false confidence when misused
- ⊕ Coach on concepts, not just tools

```

void ObjTree::AddObj(const Obj& w) {
    // Make sure we want to store it
    if (!(isReq() && isReq() && (isNort() || (isFlat() && isFreq())))) {
        return;
    }
    // If the tree is currently empty, create a new one
    if (root == 0) {
        // Add the first obj.
        root = new TObjNode(w);
    } else {
        TObjNode* branch = root;
        while (branch != 0) {
            Obj CurrentObj = branch->TObjNodeDesig();
            if (w < CurrentObj) {
                // Obj is new or lies to left of the current node.
                if (branch->TObjNodeSubtree(LEFT) == 0) {
                    TObjNode* NewObjNode = new TObjNode(w);
                    branch->TObjNodeAddSubtree(LEFT, NewObjNode);
                    break;
                } else {
                    branch = branch->TObjNodeSubtree(LEFT);
                }
            } else if (CurrentObj < w) {
                // Obj is new or lies to right of the current node.
                if (branch->TObjNodeSubtree(RIGHT) == 0) {
                    TObjNode* NewObjNode = new TObjNode(w);
                    branch->TObjNodeAddSubtree(RIGHT, NewObjNode);
                    break;
                } else {
                    branch = branch->TObjNodeSubtree(RIGHT);
                }
            } else {
                // Found match, so bump the counter and end the loop.
                branch->TObjNodeCountIncr();
                break;
            }
        }
        // while
    } // if
    return;
}

```

SDET: Help devs test this kinda stuff



Get Inside the Matrix

- ❖ Swallow the red pill and wake up to what's really happening while you test
- ❖ Learn how OS options affect app behavior
- ❖ Use dynamic analysis tools to watch
 - ❑ Memory
 - ❑ CPU
 - ❑ Disk
- ❖ Check for memory leaks

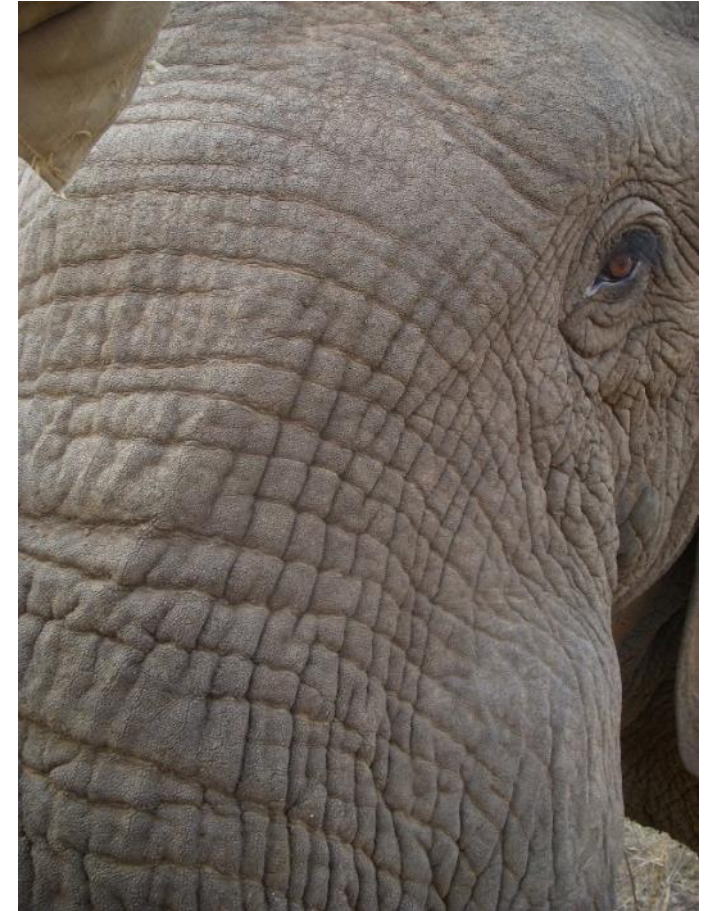


Bulletproof your apps from inside
(Image ifc.com)



Little Data, Big Data, All Kinds of Data

- ✦ For certain apps, data is central to what they do, so focus testing there
- ✦ Know how to:
 - ✦ Work with data directly and via tools
 - ✦ Create and use full and partial test oracles on data
 - ✦ Automate directly and indirectly at the data layer
 - ✦ Review metadata, database design (e.g., ER diagrams), etc.
 - ✦ Test replicated and distributed databases
- ✦ Data, data structures, and data tools (SQL, no-SQL, tree, etc.) are highly technical



Data is big. Really big



An SDET Gets Security

- ⊕ Like data, security test is highly technical and complex
- ⊕ Know how to:
 - ⊕ Check security settings on IDS/IPS, firewalls, etc.
 - ⊕ Use static analysis tools
 - ⊕ Sniff network traffic
 - ⊕ Participate in code security and design security reviews
 - ⊕ Evaluate encryption and password implementations
 - ⊕ Test complex authentication and authorization scenarios, including role-based security
- ⊕ Skills in both app and network security will be in high demand for the foreseeable future

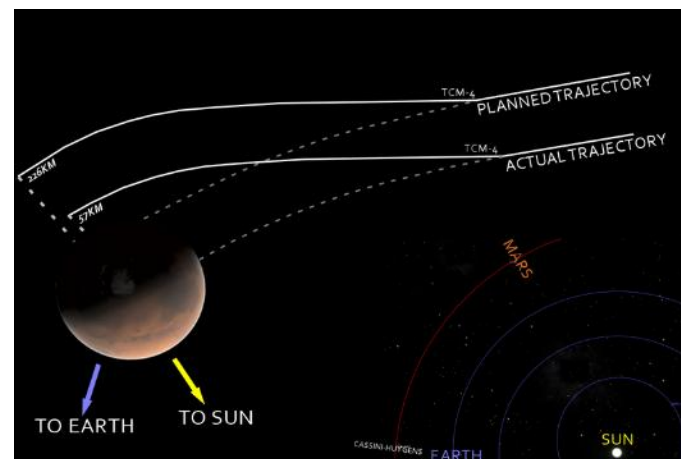


Security: ever more critical in a risky world...



Really, Truly Do Integration Testing

- ❖ Everything talks to everything else (especially in mobile)
 - ❖ Integration testing still under-performed and misunderstood
 - ❖ Some wreckage on Mars can help explain it
- ❖ The places in between need a champion, and the SDET can do it
- ❖ Know how to:
 - ❖ Apply white-box, black-box, and other techniques to design important interoperability and other integration tests
 - ❖ Identify direct (e.g., API) and indirect (e.g., data layer) integration points
 - ❖ Analyze interfaces, data sources, and data sinks as part of integration test coverage analysis
- ❖ Virtualization can help, but false negatives are a risk





Do Stuff at Random (Sort Of)

- ⊕ Test design techniques are useful, but not everything is predictable
- ⊕ Further, hackers sometimes use chaos
- ⊕ The answer: random testing
- ⊕ Know how to:
 - ⊞ Use fault injection/fuzzing tools on config and/or data files
 - ⊞ Create and unleash dumb monkeys
 - ⊞ Test for randomness in data sequences
- ⊕ Randomness is especially useful in testing reliability, security, and more

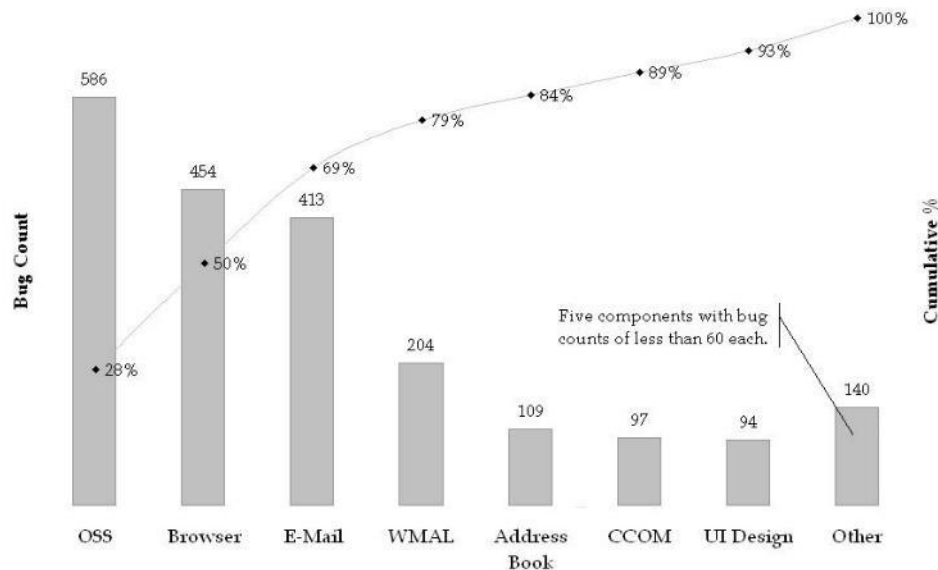
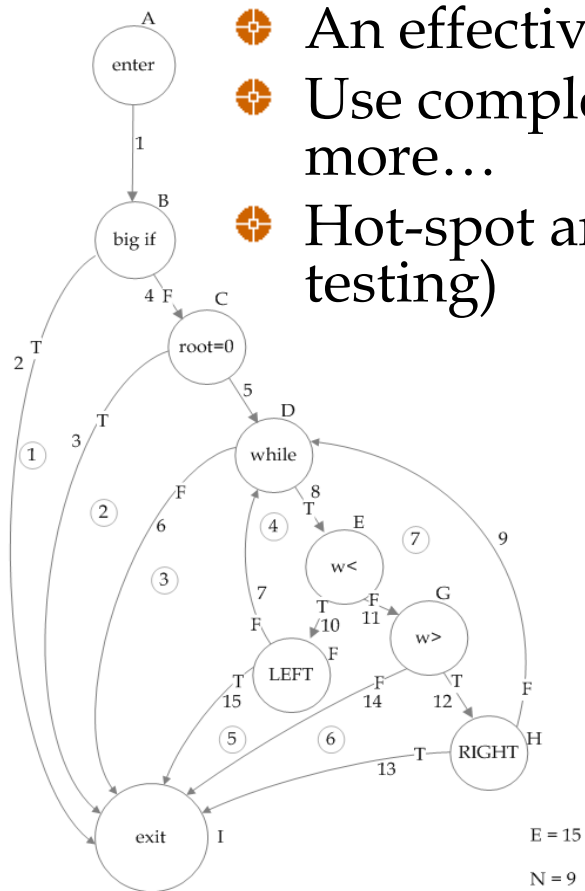


Random. It's your friend.



Predict and Find Bug Clusters

- An effective bug hunter knows where to hunt bugs
- Use complexity analysis, defect and incident data, and more...
- Hot-spot analysis especially useful (e.g., regression testing)





Learn from Challenger and Columbia

- ✦ Learn from others' mistakes
- ✦ Two more lessons from NASA
- ✦ Challenger
 - ❖ Engineers predicted O-ring problem
 - ❖ Presentation was not convincing
 - ❖ Lesson: Effectively communicate about risk
- ✦ Columbia
 - ❖ Engineers knew about ice strikes
 - ❖ Deferred action since “nothing bad happened on previous launches” and “nothing can be done anyway”
 - ❖ Lessons:
 - Do not extrapolate risk probabilities from small samples
 - Evaluate risks and test results from the user/customer perspective
- ✦ Note: NASA's safety record is amazing: in this most risky of ventures, they have only lost 17 people (never from a software failure)



Video: CNN. GIF: giphy.com



Laugh When People Say Testing is Dead

- ⊕ Testing is **not** dead, though it's provocative to say so
- ⊕ In fact, the SDET is the original tester, now cool again
- ⊕ Beizer and Myers were SDETs before SDETs were cool
- ⊕ I got my start as an SDET, and I still am an SDET
- ⊕ Now, as IT shifts left, it's your time to become an SDET
- ⊕ And, if someone says, "Testing is dead," laugh at them
- ⊕ After all, it's rude to eat them like an undead zombie
- ⊕ Plus, they are just wrong, as testing is more important than ever



Devs see you this way? You're doing it wrong
(Film: Dawn of the Dead. GIF: giphy.com)



Conclusion

- ✦ Shift left and friends: best practices that are really old friends
- ✦ To make them your friends, you need to be an SDET (even if your title is something else)
- ✦ The ISTQB and ASTQB are working hard on new technical tester syllabi (e.g., Advanced Agile and Performance Tester)
- ✦ If you take advantage of the technical opportunities open to you, you can thrive in a shift left world
- ✦ If you don't get technical, experience may hit you like my colleague's 2x4, so, as Ren would say...
- ✦ **SHIFT LEFT!!!**



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Address: RBCS, Inc.
31520 Beck Road
Bulverde, TX 78163-3911
USA

Phone: +1 (830) 438-4830

E-mail: info@rbc-us.com

Web: www.rbc-us.com

Twitter: @RBCS, @MisterSDET, @LaikaTestDog

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