To Automate or Not?

Presented by:
Barb Martens

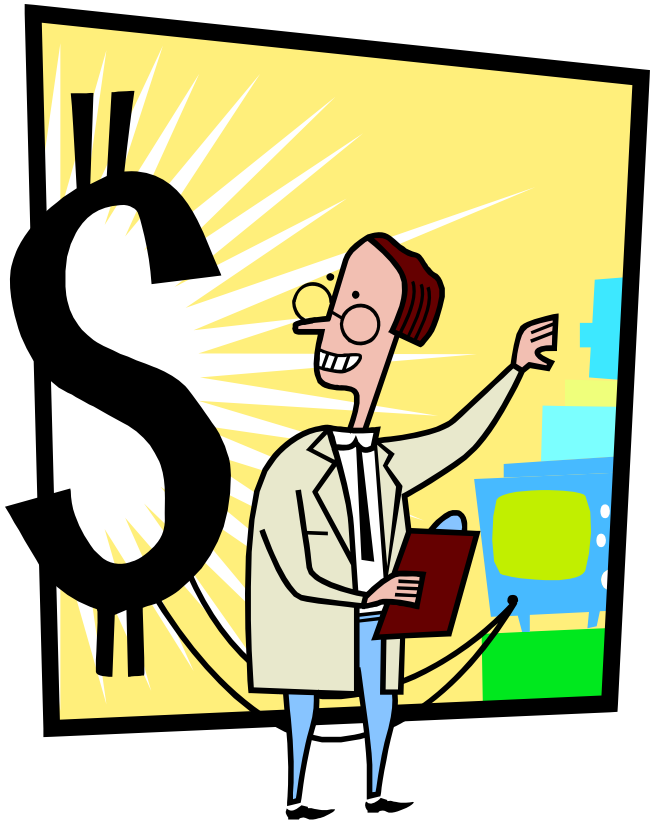
May 18, 2009

Agenda

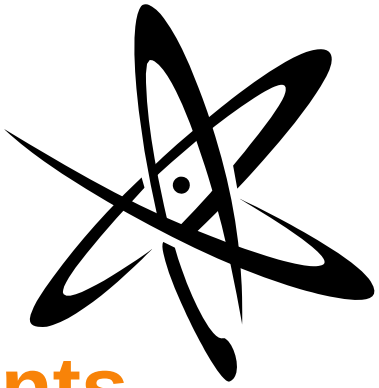
- Overview of Testing
- Why Do We Automate?
- What Can We Automate?
- What Is The Advantage Of Automation?

Overview Of Testing

- Requirements Decomposition
- Condition Identification
- Test Case Definition
- Grouping Cases Into Scripts
- Defining Test Environment
  - (Data And Date)
- Expected Results Definition
- Preparation For Execution
- Execution Again And Again
- Verify



Requirements Decomposition



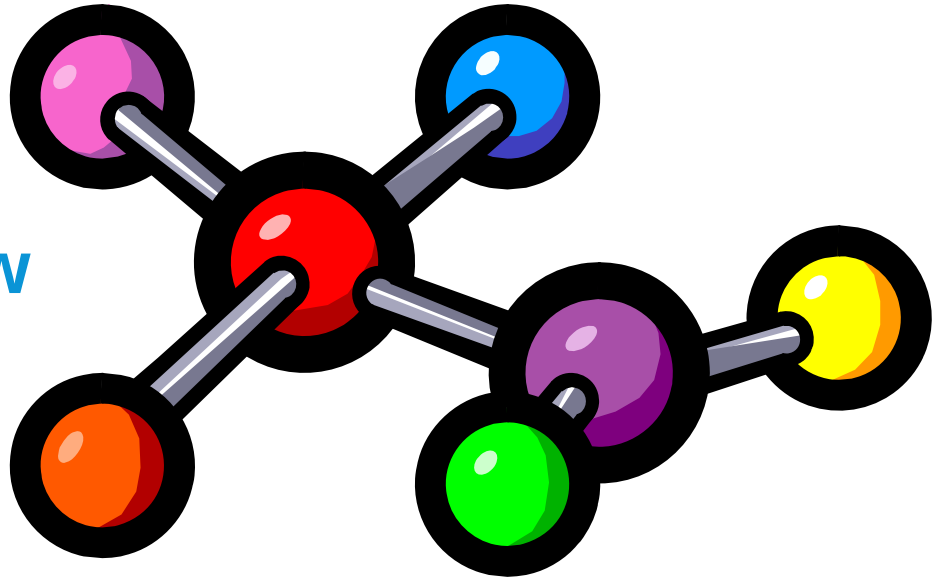
- The Act Of Breaking Requirements Down To Their Testable Level
- Ability To Divide Or Split A Requirement To A Level Where You Can Associate One Or A Small Number Of Test Cases To A Single Requirement

Condition Identification
Test Case Definition

- Reviewing Requirements To Identify The Acceptable And Non Acceptable Values Or Situations
- Developing Test Cases To Validate The Conditions. These Test Cases Will Eventually Be Executed To Verify The Application Delivers The Correct Functionality

Grouping Cases Into Scripts Or Runs

- Grouping Cases Into Logical Sets
  - All Negative Cases
  - All Positive Cases
  - Normal Business Flow
  - Edit Criteria
  - Day One, Day Two



Defining Test Environment (Data And Date)

- Determining Method of Initial Database Population
  - Extract From Other Databases Or
  - Build As You Execute
- Creating “Seed” Tables
  - What Values Need To Be There For Cases To Work Appropriately
- Creating Data Building Strategy
  - Add Before
  - Change Or Delete
- Relating Data To Cases

Expected Results Definition

- **Based On The Conditions And The Data Determine The Outcome Of The Test Cases And Document The Expected Results.**
- **If Calculations Are Part Of Result Figure Them Out * *NOW*, While You Have Time.**
- **Not During Execution When Close Enough Isn't The Right Way To Go**

*** If You Have An Existing Application Use It**

Preparation

- **Getting Ready To Start Execution:**
  - **Loading Data**
  - **Creating Log-ins**
  - **Setting Dates**
  - **Assigning Printers**
  - **Loading Code And Establishing Environment**

Execution (Again and Again)

- Execute
  - Find Defects
  - Demote Code
  - Go Back To Prep Stage
- Re-execute
  - Find Defects
  - Demote Code
  - Go Back To Prep Stage

Verify

- **Check The Output Against The Expected Results If This Was Not Done During Execution**
  - **Verify Database Changes**
  - **Printed Results**
  - **Account Balances**
  - **Inventory Changes**

What Do We Automate?

- Requirements Decomposition
- Condition Identification
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- Defining Test Environment (Data And Date)
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Why Do We Automate?

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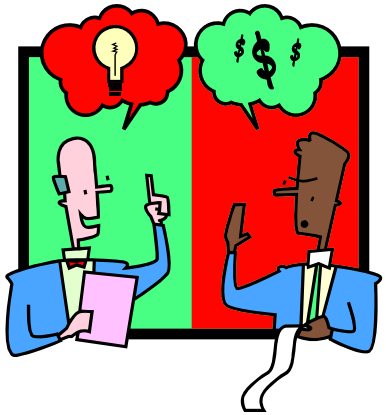
Why Do We Automate?

Speed

- Faster, Quicker

Save Cost

- People And Machine



Ensure Coverage

- Code And Requirements

Why Do We Automate?

Speed

- **Faster**
  - **Can We Run The Cycles Faster?**
  - **Can We Verify The Cycles Faster?**
  - **Can We Debug The Issues Faster?**

Why Do We Automate?

Speed

- **Quicker**
  - **How Quick Can You Do That?**
  - **Is There A Quicker Way To Do That?**
  - **Take A Quick Look At It**

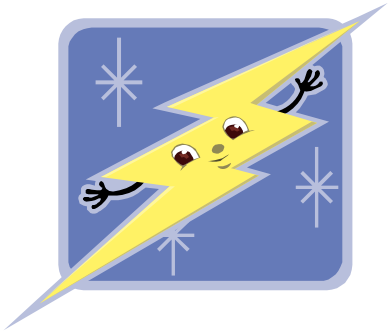
Is There A Difference Between Faster And Quicker?

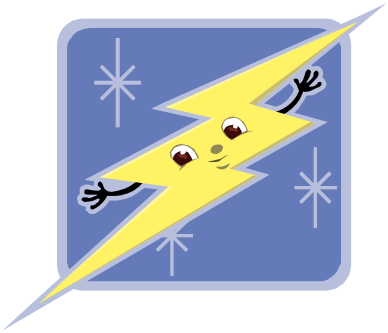
Why Do We Automate?

- **Faster**
  - Lasting Or Taking A Relatively Short Time
  - Allowing Rapid Movement
- **Quick – Nimble**
  - Moving Swiftly And With Skill
  - Done Or Doing Something Without Delay

We Automate:

To Accomplish Things In The Shortest Time Span With The Least Amount Of Expended Effort.





Why Do We Automate?

Speed

- Faster, Quicker

Save Cost

- People and Machine

Ensure Coverage

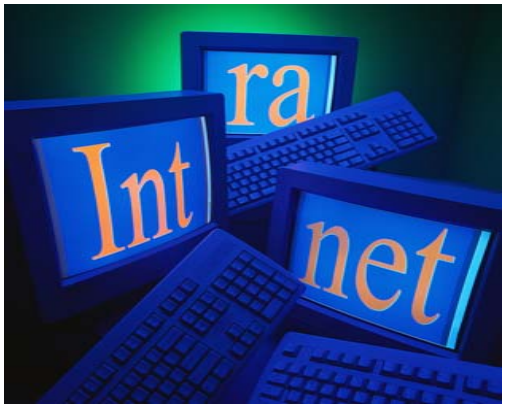
- Code and Requirements

Why Do We Automate?

People Cost

- **Direct Costs = Hours**
  - Since We Are Automating It Will Take Less "People" Hours
  - Those Hours Can Be Spent On Other Things
- **Indirect Costs = People May Become Dissatisfied**
  - People Won't Be Bored By Repetition
  - Less Likely To Change Jobs

Why Do We Automate?



Machine Cost

- **Direct Cost = Cycles And Bandwidth**
  - **Since We Are Automating It Will Run Faster, No Interruptions**
- **Indirect Cost = Off Shift Processing**
  - **We Can Run Off Shift And Not Impact Daytime Performance**

Why Do We Automate?

Ensure Coverage

- **Code And Requirements**
  - **Code Coverage**
    - Can Automate And Produce Reports Of Unexecuted Code
  - **Requirements Coverage**
    - Traceability - Requirements To Test Cases To Execution Reports

What Can We Automate?

???

Can We Automate…

Test Cases? YES

Test Scripts? YES

Test Suites? YES

Verification? YES

YES

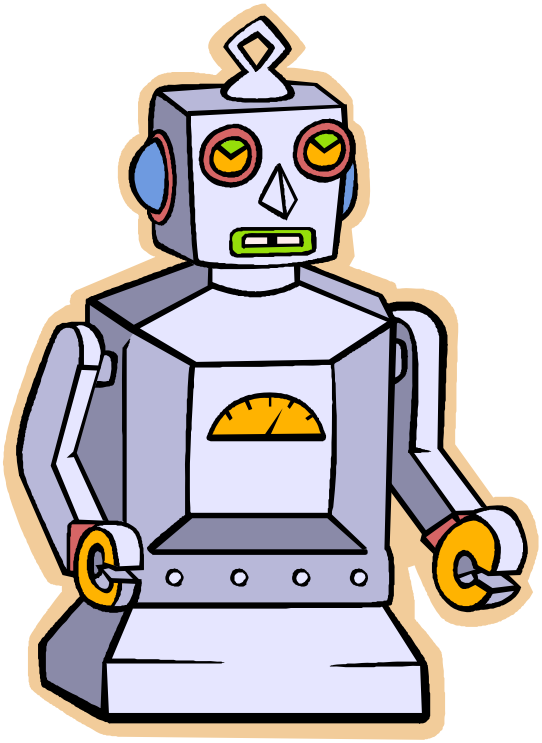
Test Case Behavior

The Test Cases' Desired Behavior Is A Result Of A Combination Of Data Values In The Test Case And Its Interaction With The Values In Various Data Stores.

To Automate or Not

- **Depends On Our Ability To Automate The Data And The Expected Results.**
- **Inquiry Is Usually The Easiest Transaction To Automate, You Can Grab Data For The Search Criteria And Plug It In And Go.**
  - **This Will Work For Limited Load And Performance Testing.**

What Should We Automate?



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What Is The Advantage Of Automation?

Automation No Brainers

- Performance And Load Test
  - With Simple Transactions
  - Grab Data And Go
- Regression Test
  - Where You Have Predefined Test Beds That Do Not Change Or Age
    - Otherwise You Don't Know What You Are Testing
  - Or You Have An Automated Solution To Manage The Data And Dates

Otherwise…

You Need To Develop Test Harnesses

Or

Maintenance Processes

Or

Don’t Automate

What Is A Test Harness?

"In Software Testing, A Test Harness Or Automated Test Framework Is A Collection Of Software And Test Data Configured To Test A Program Unit By Running It Under Varying Conditions And Monitoring Its Behavior And Outputs. It Has Two Main Parts: The Test Execution Engine And The Test Script Repository ."

From Wikipedia

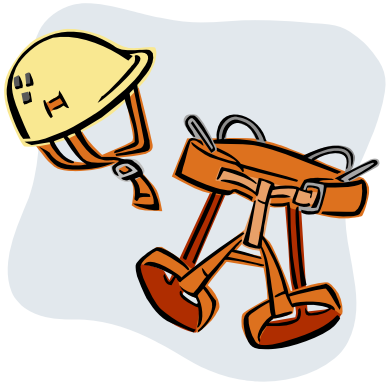
What Is A Test Harness?

“Test Harnesses Allow For The Automation Of Tests. They Can Call Functions With Supplied Parameters And Print Out And Compare The Results To The Desired Value. The Test Harness Is A Hook To The Developed Code, Which Can Be Tested Using An Automation Framework.”

From Wikipedia

What Is A Test Harness?

“A Test Harness Should Allow Specific Tests To Run (This Helps In Optimizing), Orchestrate A Runtime Environment, And Provide A Capability To Analyze Results.”



From Wikipedia

What Is A Test Harness?

The Typical Objectives Of A Test Harness Are To:

- Automate The Testing Process.
- Execute Test Suites Of Test Cases.
- Generate Associated Test Reports.
- A Test Harness May Provide Some Of The Following Benefits:
  - Increased Productivity Due To Automation Of The Testing Process.
  - Increased Probability That Regression Testing Will Occur.

From Wikipedia

Application Under Test

Sample Of A Test Harness

Hierarchical Test Case Data

"Compared with flat test case data and relational data, hierarchical XML-based test case data is most appropriate when you have relatively complex test case input or expected results, or you are in an XML-based environment (your development and test effort infrastructure relies heavily on XML technologies). Here is a sample of XML-based test case data. "

http://msdn.microsoft.com/en-us/magazine/cc163752.aspx

Sample Of A Test Harness

“Copy Code

```
<?xml version="1.0" ?>
<TestCases>
<case caseid="0001">
        <input>Ah Kh Qh Jh Th</input>
        <expected>RoyalFlush</expected>
 </case> <case caseid="0002">
      <input>Qh Qs 5h 5c 5d</input>
      <expected>FullHouseFivesOverQueens</expected>
 </case> ...
</TestCases>
```

Because XML is so flexible there are many hierarchical structures we could have chosen. For example, the same test cases could have been stored as follows: “

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http://msdn.microsoft.com/en-us/magazine/cc163752.aspx

Sample Of A Test Harness

“Copy Code

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 </TestCases> “
```

http://msdn.microsoft.com/en-us/magazine/cc163752.aspx

Contents of a Basic Test Harness

A Basic Test Harness Will Contain At Least The Following Elements:

- **Application Basics,**
- **Test Launching,**
- **Result Reporting.**
- **It May Also Include A Graphical User Interface, Logging, And Test Case Scripting.**
- **The Harness Will Include Code To Start The Program, Open Any Required Files, Select Which Cases Are Run, Etc.**

Contents of a Basic Test Harness

The Next Thing You Need Is A Way To Actually Launch The Tests.

The Harness May Provide Some Extra Services To The Test Cases By Allowing Them To Be Called In A Specified Order Or To Be Called On Independent Threads.

http://www.testingreflections.com/node/view/3655

Contents of a Basic Test Harness

The Third Basic Pillar Of A Test Harness Is A Way To Inform The User Of Which Cases Pass And Which Fail.

http://www.testingreflections.com/node/view/3655

Contents of a Basic Test Harness

Usually There Is A Summary At The End Of How Many Cases Passed Or Failed. This Could Be Textual Or Even A Big Red Or Green Bar .

http://www.testingreflections.com/node/view/3655

So Is It Worth It To Automate Just Performance And Load Testing?

Why Performance And Load Test

From 2007

High levels of panic...

"The glitch that caused the near-instant drop of 200 points almost caused a high level of panic, which analysts believe pushed the day price down even further."

Dow Jones could now face a flurry of lawsuits...

"Dow Jones, the company which calculates the US industrial average, was having to defend itself yesterday against accusations that its incompetence exacerbated Tuesday's panic.

Because of the volume of trading, Dow's computers fell behind the market and when they finally caught up, the index appeared to plunge almost 200 points all in one go. The sudden drop intensified panic among already jittery traders.

Why Performance And Load Test

May 3, 2006 - Perhaps They Should Have Tested More - National Grid, GE

Posted in QAGlitch hurt storm response
National Grid says software faltered during February wind damage

By LARRY RULISON, Business writer
Click byline for more stories by writer.
First published: Tuesday, May 2, 2006

ALBANY -- National Grid said problems with a computer software system delayed its efforts to get accurate information to the public during February's wind storm that knocked out power to more than 121,000 Capital Region customers.

Not Just Performance

---------- Forwarded message ----------
From: **American Airlines** <americanairlines@email.aa.com>
Date: Fri, Apr 24, 2009 at 7:13 PM
Subject: <ERROR>, Low Fares Starting At $36* Each Way, Based On Round-Trip Purchase
To:

Having trouble viewing this email? View in Web Browser | View on Mobile Device
Please add americanairlines@email.aa.com to your address book. Complete Details.

Points to Ponder

- Not All Cases Can Be Automated
- Industry Standards Indicate Automation 65%
- Automation Is Not Just Record And Playback That Is Where It Starts
- Automation Frameworks Result In Less Maintenance Efforts
- Automation Always Starts With Manual Execution Of Cases
- Automation Starts With A Stable Code Base

For Your Attention And Interest

Questions???