

# Testing is More Than Checking

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Special acknowledgements to Cem Kaner, James Bach, and Jerry Weinberg

## I'm Michael Bolton



**Not the singer.**



**Not the guy  
in Office Space.**



**No relation.**

## The Comforting Link Between Cause and Effect




**Screw you, buddy; *we're* better.**




# Disappearing Aircraft?

## Flight Itinerary

Flight	From	To	Stops	Aircraft	Fare Type
AC597	Toronto, Pearson Int'l (YYZ) Sat 16-Oct 2010 13:10 - Terminal 1	Las Vegas, Mccarran Int'l (LAS) Sat 16-Oct 2010 14:54 - Terminal 2	1	319	Tango Plus W
 AC597: This flight includes a stop in null.					
AC5233*	Las Vegas, Mccarran Int'l (LAS) Tue 19-Oct 2010 19:15 - Terminal 1	San Francisco, San Francisco Int'l (SFO) Tue 19-Oct 2010	0	320	Tango Plus L

aircanada.com

## Itinerary

From	To
Toronto, Pearson Int'l (YYZ) Sat 16-Oct 2010 13:10 - Terminal 1	Las Vegas, Mcca Sat 16-Oct 2010 14:54 - Termina
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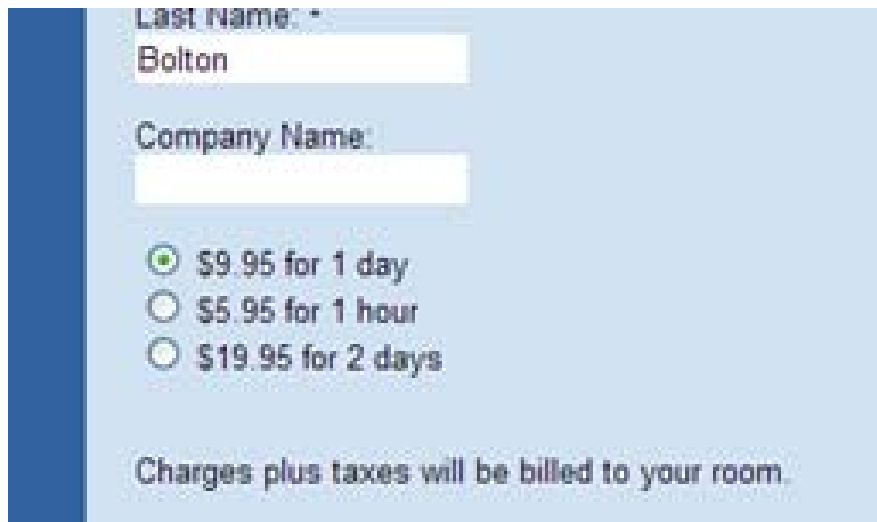
aircanada.com

## Why yes, we'll sell you Internet access.



Hyatt Regency, 2008

## But if you can't do math, it's five cents extra.



Hyatt Regency, 2008

ads

## Verify Java Version

ownload  
r computer  
stem, click

Check to ensure that you have the recommended version of  
After clicking the button below, a security prompt may appear  
to continue.

ads

s

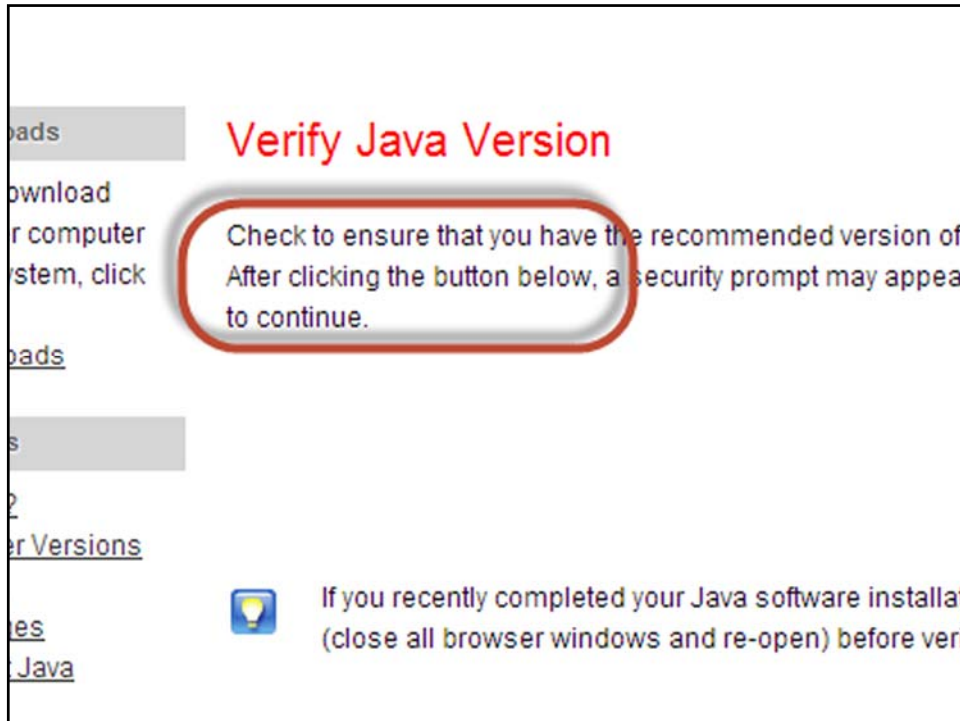
2

er Versions

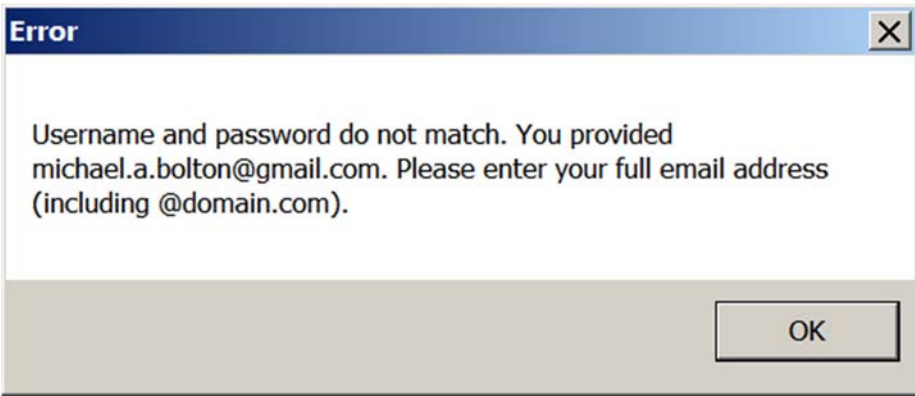
es

Java

If you recently completed your Java software installation  
(close all browser windows and re-open) before verifying



## Google Doesn't Recognize Gmail?

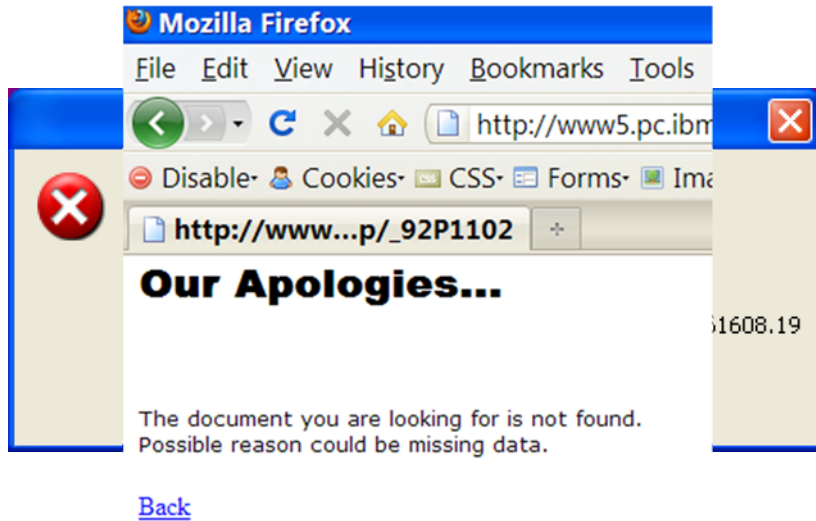


Username and password do not match. You provided michael.a.bolton@gmail.com. Please enter your full email address (including @domain.com).

OK

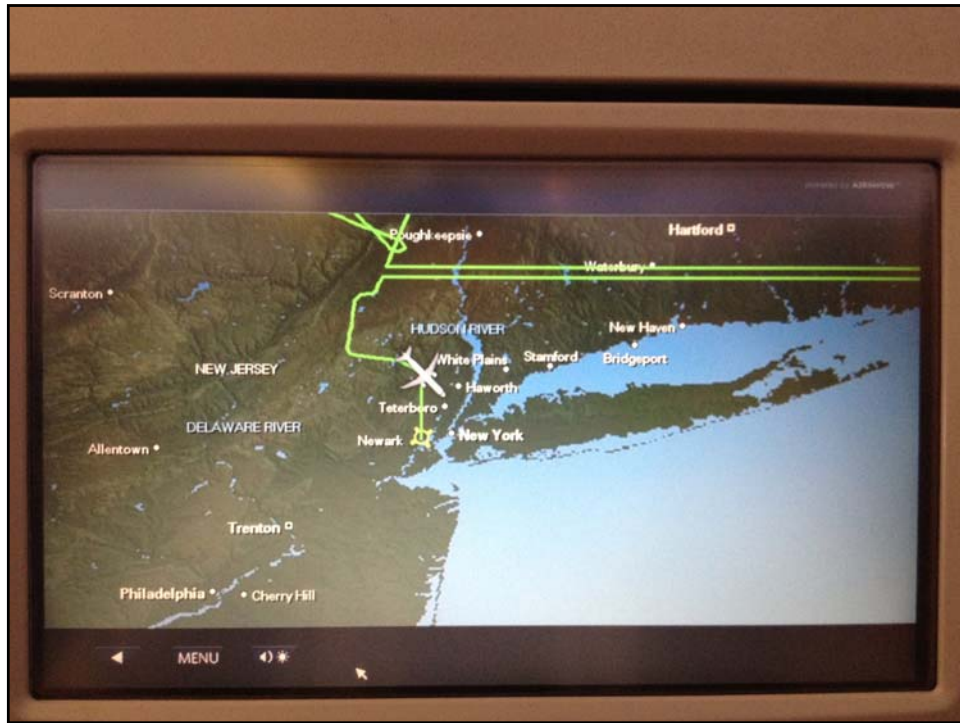
Google Calendar Update

## What was your first clue?



IBM





## The Key Questions of Testing

Is there a problem here?

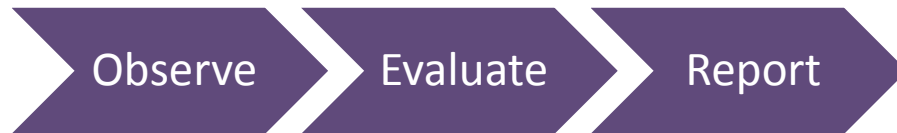


Are we okay with this?

## Call this “Checking” not Testing

operating a product to check specific facts about it...

means



Interact with the product in specific ways to collect specific observations.

Apply algorithmic decision rules to those observations.

Report any failed checks.

## A Check Has Three Elements

1. An *observation* linked to...
2. A *decision rule* such that...
3. both observation and decision rule can be applied algorithmically.

A **check** can be performed

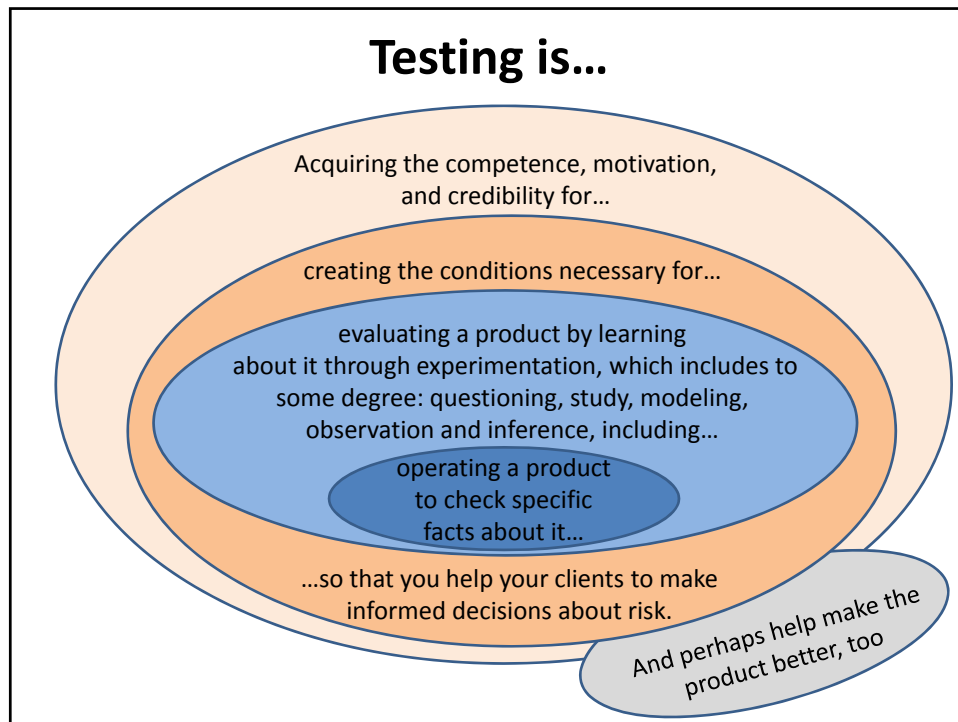


by a machine that *can't* think (but that is quick and precise)



by a human who has been instructed *not* to think (and who is slow and variable)





## Tools Can Do FAR More Than Checking

- Test generation (data and script generators)
- System configuration (setup; rapid changes)
- Test execution (harnesses and test scripts)
- Logging (action capture, video capture)
- Probes (identifying internal states)
- Monitoring (coverage analysis, profiling)
- Visualization (blink testing, highlighting)
- Test management (but keep tools lightweight)
- and yes, oracles (automated checking)

## BUT Testing CANNOT Be Encoded

“Test Cases Are Not Testing:  
Toward a Culture of Test Performance”  
James Bach & Aaron Hodder

<http://www.testingcircus.com/documents/TestingTrapeze-2014-February.pdf>

## What Is Testing?

- Excellent testing is not merely a branch of computer science
  - testing *includes* computer science, mathematics, technical domains
  - BUT... focus only on programs and functions, and you leave out questions of *value* and other relationships that include people
- To me, excellent testing is more like *anthropology*— interdisciplinary, systems-focused, investigative, storytelling



Biology



Archaeology



Language



Culture

## **Why Testing Cannot Be Encoded Harry Collins on Software Testing**

“Computers and their software are two things. As collections of interacting cogs they must be ‘checked’ to make sure there are no missing teeth and the wheels spin together nicely. Machines are also ‘social prostheses’, fitting into social life where a human once fitted. It is a characteristic of medical prostheses, like replacement hearts, that they do not do exactly the same job as the thing they replace; the surrounding body compensates.

## **Why Testing Cannot Be Encoded Harry Collins on Software Testing**

“Contemporary computers cannot do just the same thing as humans because they do not fit into society as humans do, so the surrounding society must compensate for the way the computer fails to reproduce what it replaces. This means that a complex judgment is needed to test whether software fits well enough for the surrounding humans to happily ‘repair’ the differences between humans and machines. This is much more than a matter of deciding whether the cogs spin right.”

*Abstract, “Machines as Social Prostheses”, EuroSTAR 2013*

**Driving is partly technical,  
but it's also highly social.**



Dear Google...  
I've just been to China.



Good luck with your car thing.  
Love, Michael

<http://www.china-mike.com/wp-content/uploads/2010/12/chinese-traffic-chaos-small.jpg>

## Plus what happens when the Google Car meets the Microsoft Car?



## A Computer Program

A set of instructions  
for a computer.

*See the Association for Software Testing's  
Black Box Software Testing Foundations course, Cem Kaner & James Bach*

## A House



A set of building materials,  
arranged in the  
"House" design pattern.

## A House



Something for *people* to live in.