Emotions and Oracles

Michael Bolton

STAR West

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Who I Am

Michael Bolton

(not the singer, not the guy in Office Space)

DevelopSense, Toronto, Canada

mb@developsense.com
+1 (416) 992-8378
http://www.developsense.com

I solve testing problems that other people can't solve.

A Plug

WReST

The Workshop on Regulated Software Testing

Indianapolis

November 16-17

See John McConda or
Karen N. Johnson

(Google 'em)

Background

- Discussions with Pradeep Soundararajan
- Discussions with Jerry Weinberg
  - including the Satir Interaction Model
- A question on the Agile Testing list
- Two discussions with B.J. Rollison

Each of these experiences led me to believe that,
as a culture or community,
we might be missing something important.

Disclaimers

- I am not an academic
- I have lots of questions
- I do not believe that I have useful answers or sensible prescriptions
- People are welcome, encouraged, to follow up on these questions
- People are welcome, encouraged, to leave if they don't like works in progress

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Skill + Heuristics Makes Testing Powerful

This...

-Idea
-Idea
…
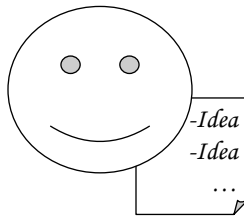
A heuristic is a fallible method for solving a problem.

...not this.

1. Do this
2. Then do this
3. Then do this
4. Then do this
5. And then this…

Hey! Testing is not a clerical process.

Heuristics and Oracles

- Heuristic: a fallible method for solving a problem or making a decision
- Oracle: a heuristic mechanism or principle by which we might recognize a problem
  - all oracles are heuristic
- A perceived problem based on some oracle doesn't guarantee a problem, but it points to a potential problem

When we see a problem, it's always a problem *with respect to some oracle*.

All Oracles Are Heuristic

- We often do not have oracles that establish a definite correct or incorrect result, in advance.
  That's why we use abductive inference.
- No single oracle can tell us whether a program (or a feature) is working correctly at all times and in all circumstances.
  That's why we use a variety of oracles.
- Any program that looks like it's working, to you, may in fact be failing in some way that happens to fool all of your oracles. **That's why we proceed with humility and critical thinking.**
- You (the tester) can't know the deep truth about any result. **That's why we report whatever seems *likely* to be a bug.**

Consistency ("this agrees with that")
an important theme in oracles

- **History:** The present version of the system *is consistent* with past versions of it.

- **Image:** The system *is consistent* with an image that the organization wants to project.

- **Comparable Products:** The system *is consistent* with comparable systems.

- **Claims:** The system *is consistent* with what important people say it's supposed to be.

- **User's Expectations:** The system *is consistent* with what users want.

- **Product:** Each element of the system is *consistent* with comparable elements in the same system.

- **Purpose:** The system *is consistent* with its purposes, both explicit and implicit.

- **Statutes:** The system *is consistent* with applicable laws.

- **Familiarity:** The system *is not consistent* with the pattern of any familiar problem.
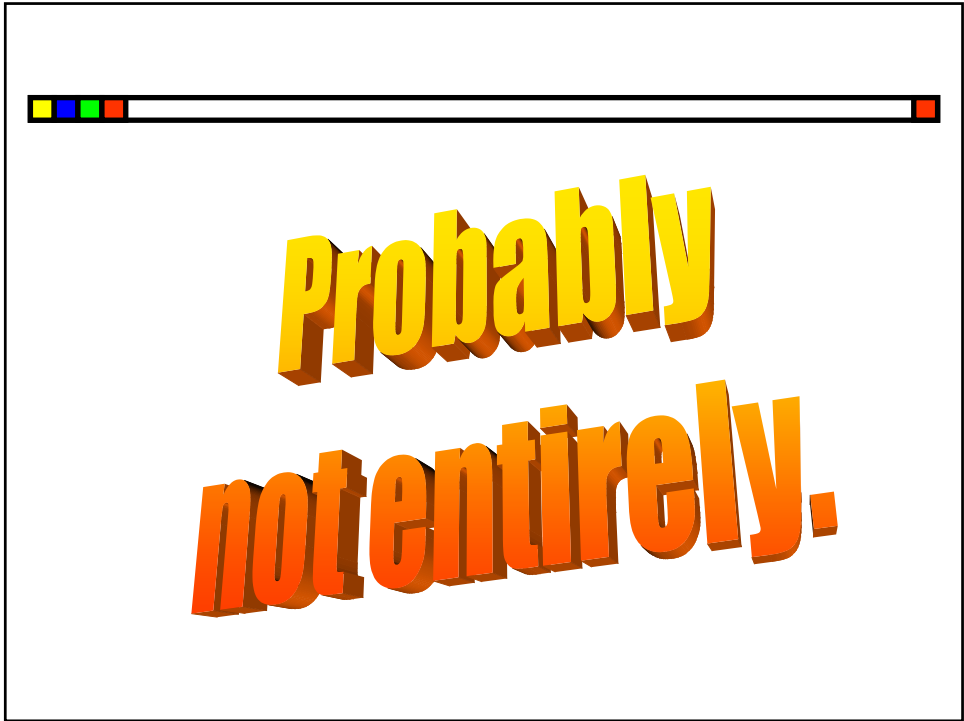
Consistency heuristics rely on the quality of your models of the product and its context.

Noticing Problems

- Simply run the program, and observe it
- Make comparisons based on the list of consistency oracles
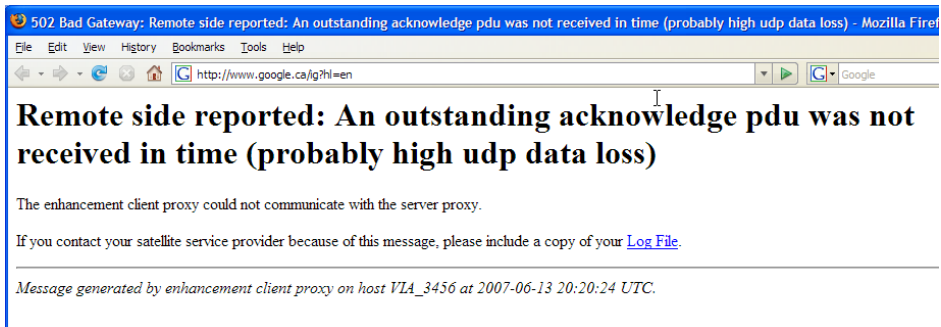- This is a very logical, objective, dispassionate process.

Right?

Probably not entirely.

How Do You View These Problems?

- This error message was observed by an end user (me) on a moving train as I tried to connect to the onboard Web access.


502 Bad Gateway: Remote side reported: An outstanding acknowledge pdu was not received in time (probably high udp data loss) - Mozilla Firef

File   Edit   View   History   Bookmarks   Tools   Help

http://www.google.ca/ig?hl=en

Remote side reported: An outstanding acknowledge pdu was not received in time (probably high udp data loss)

The enhancement client proxy could not communicate with the server proxy.

If you contact your satellite service provider because of this message, please include a copy of your Log File.

Message generated by enhancement client proxy on host VIA_3456 at 2007-06-13 20:20:24 UTC.
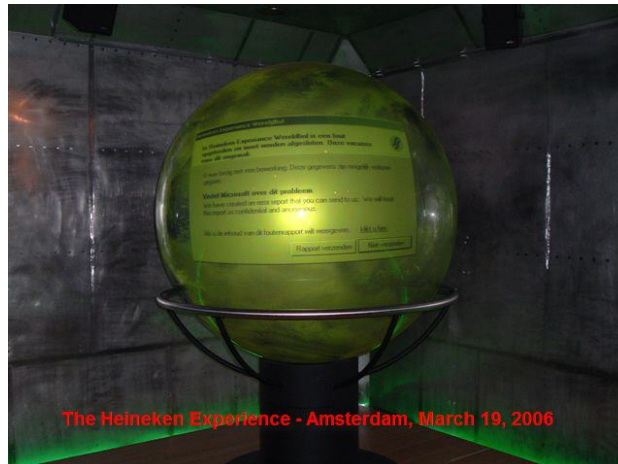
How Do You View These Problems?

- This email message was received from a conference promoter that is oriented towards government organizations
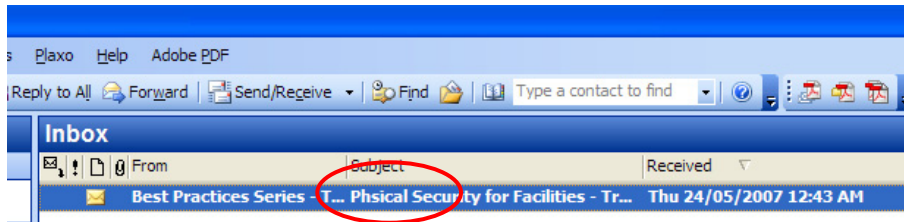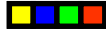

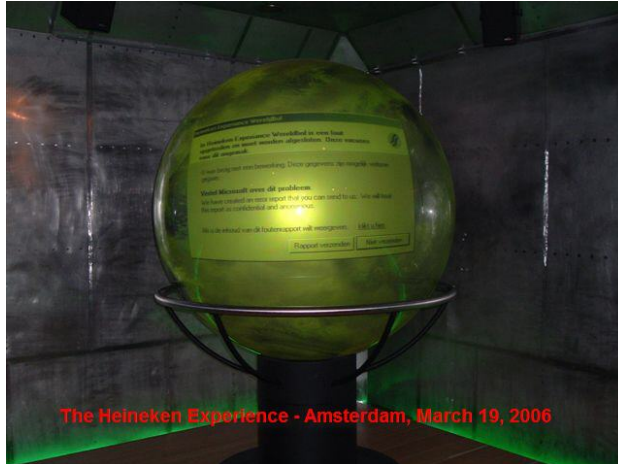# How Do You View These Problems?
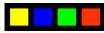
- Intended to be a map of the world…

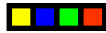The Heineken Experience - Amsterdam, March 19, 2006

How Do You View These Problems?

- …and on one level, maybe it is.

The Heineken Experience - Amsterdam, March 19, 2006

How Do You View These Problems?

Broadcast TV Channel in Delhi
March 17, 2006

How Do You View These Problems?
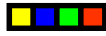
• Note this is a broadcast TV channel in 2005

How Do You View These Problems?

**THE NEXT SLIDE MAY
GREATLY DISTURB
SOME VIEWERS**

YOU ARE *ACTIVELY* ENCOURAGED
TO LOOK AWAY.

CONTINUE TO WATCH *SOLELY*
AT YOUR OWN RISK.

NO, I'M NOT KIDDING

How Do You View These Problems?

- An ambiguous question
  - How do you *see* these bugs?
  - How do you *notice* these bugs?
  - How do you *feel* about them?
  - What do you *think* about them?

What happened for you?

Emotions and Oracles

- I'm going to suggest that

> Emotions are
> a potentially valuable source of information
> as we're testing.

- I'll suggest ways in which this principle may help us to better our testing.
- I'm a member of the Context-Driven School, so…
- I'll also suggest ways in which the principle can fail.

What is Emotion?

- No single accepted definition
- Study of emotion includes
  - psychology
  - neuroscience
  - artificial intelligence
- Distinguished from *reason* by Descartes and the dualists
  - …but lately we find that the distinction between reason and emotion is not as clear as it seems
- Central to our decision-making processes

Types of Basic Emotions

- anger
- fear
- disgust
- sadness

- surprise
- joy
- acceptance
- curiosity

Note how few of these are considered positive!

(which, by the way, is meta-emotion—
how we feel about feelings)

Emotions seem to have emerged in the mammalian brain to arbitrate action when complex situations and motivations, plus limited information, are in play.

(Maybe) Not-So Basic Emotions

- Frustration
- Impatience
- Irritation
- Embarrassment
- Amusement
- Glee
- Schädenfreude

What is Emotion?

- a complex psychophysical process that
- appears to arise spontaneously—that is,
- not by conscious effort—and
- evokes an often involuntary
- psychological response and
- physical expression,
- related to feelings, perceptions or beliefs,
- about things or relations between them
- in reality or in the imagination.

adapted from Wikipedia; useful, if not authoritative

What is Emotion? (Damasio)

- Complicated collections of chemical and neural responses, forming a pattern
- Lead to creation of circumstances advantageous to the survival of the organism
  - that is, they're about sustaining life
- Biologically determined by evolutionary history
  - but learning and culture alter expression of emotion
- All the devices can be engaged automatically, without conscious deliberation
- Our physiological and emotional responses may kick in even when we're not aware of a conscious trigger for them

What If We Didn't Have Emotions?

- Individuals suffered neurological damage lost a certain class of emotions
- They *also* lost the ability to make rational decisions

- "Selective reduction of emotion is at least as prejudicial for rationality as excessive emotion."
- "Emotion probably assists reasoning, especially when it comes to personal and social matters involving risk and conflict."
- "Well-targeted and well-deployed emotion seems to be a support system without which the edifice of reason cannot operate properly."

Antonio Damasio

Components and Stages of Emotion
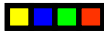
- physiological arousal
  - the startle reflex; "waking up";
- behavioural expression
  - tensing up, gritting teeth, blushing
- conscious experience and expression
  - recognizing the state; thinking or talking about it

Arousal

- defined by Wikipedia as a physiological and psychological state of being awake.
- important in regulating consciousness, attention, and information processing.
- prepares people for fight-or-flight actions
- develops slowly—takes two to three seconds after the interruption
- resolved as people compare the current situation with their experience

Arousal

- According to Weick and some of his citations, arousal is triggered by interruptions of ongoing activity
- *What* activity?
  - Testing activity?
  - Or productive, end-user style activity?
- Might this be one reason why testers miss problems that users find?

How We React

- We perceive some stimulus
- We react emotionally
- We start a process of sensemaking
- We (try to) impart meaning to what we see
- We ascribe significance to the meaning that we have inferred
- We respond
  - one way of responding is to go back to meaning

We Act Before We Know

- Running away is important to the survival of terrestrial animals, so we react based on incomplete information
- Our brains decide first whether objects *count*, then decides what they *are*
- Our bodies and our emotions are stimulated before reason kicks in
- Our emotions can be easily fooled in a given context

Emotions Are Heuristic

- A bad feeling about something might mean that it *is* bad.
- A good feeling about something might mean that it *is* good.
- An emotional response to something might be valid.

**...but maybe not.
What can we learn?**

Common Cognitive Biases

- Assimilation Bias
  - allowing experience and exposure to a situation to condition your evaluation of new information

- Reasoning Bias
  - preferring information based on logic and reason to information derived from emotions

- Representativeness Bias
  - the idea that one part of something stands reliably for the whole, or that one instance of something determines the way that all other instances should be

Common Cognitive Biases

- Fundamental Attribution Error
  - the idea that someone or something is consistent with our current observation in all situations, irrespective of context

- Anchoring Bias
  - "dropping anchor" on an idea; staying locked into a hypothesis or theory, and ignoring potentially new evidence for a different theory

- Automation Bias
  - trusting or preferring the result of a process because the process was automated; diminishing the human element

Using Emotion To Help Overcome Bias

- Your biases may cause you to miss bugs

- An emotional reaction is a trigger to learning

- When you find yourself suppressing or ignoring an emotional response, you may also be suppressing an opportunity to learn
  - Your emotional resistance to your anchor being pulled up may be trying to tell you something

- When you find yourself mildly concerned about something, someone else could be *very* concerned about it

An emotion is a signal; consider looking into it

Emotional Triggers

What might they be telling us?

- Impatience ⇨ an intolerable delay?
- Annoyance ⇨ a missing feature?
- Confusion ⇨ insufficient testability?
- Frustration ⇨ a poorly-conceived workflow?
- Amusement ⇨ a threat to someone's image?
- Surprise ⇨ inconsistency with history?

Meaning and Significance

- *Presence* of the emotion is an indicator of a potential problem (meaning)
- *Intensity* of an emotion is an indicator of the possible threat (significance)
- Because emotional reactions vary from person to person, so too will assessments of meaning and significance

Refocusing or Stopping Heuristics

- When we're curious or puzzled
- When we're fearful or disgusted
- When we're intimidated or paralyzed
- When we're satisfied or comfortable
- Might we derive meaning or significance from an *absence* of emotional responses?
  - When we're *not* emotionally invested
  - When we're *not* excited by a bug

Problems With Applying Emotions

- When we have an emotional response, it might not be about the product
  - it might be about ourselves
  - it might be about the people around us
  - it might be about our situation
    - e.g. the "Snakes on Everything" moment
- Emotions don't have hard measures
  - The language-squishing hypothesis
  - The experience-stretching hypothesis

Our clients are human

- *Our* humanity as testers helps to reveal important information about our products.
- Emotions provide a rich source of oracles—principles or mechanisms by which we recognize problems.
- I'll wager that any time we've seen a bug, our emotions were a big factor in recognizing or interpreting it.
- Why do so many in our profession seem to be so oblivious to the value of emotions?

Further Reading

- Sensemaking in Organizations (Weick)
- Stumbling on Happiness (Gilbert)
- The Feeling of What Happens (Damasio)
- Emotional Intelligence (Goleman)
- This is Your Brain on Music (Levitin)
- Mind Hacks (Stafford and Webb)
- Mind Performance Hacks (Hale-Evans)
- Tools of Critical Thinking (Levy)

Emotion and Risk

- "…both risk detection and risk avoidance are not mediated in the thinking part of the brain but largely in the emotional one (the "risk as feelings" theory). The consequences are not trivial; it means that rational thinking has very, very little to do with risk avoidance. Much of what rational thinking seems to do is rationalize one's actions by fitting some logic to them."
  - Nassim Nicholas Taleb, Fooled by Randomness