

Designs and Needs

Adding perspectives to our Software and our Testing

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Functionality is the primary dimension



- Functionality is often the primary focus for many projects and teams
 - Many are managed and rewarded for delivering it
 - Many of these teams don't take time to consider the variety of users, or quality aspects

People like us



- We create software for people ‘like us’
- We may consider ourselves as representatives of the ‘user’
- Our expectations, limitations, bias, etc. act as blinkers

Varieties of Users



LANGUAGE

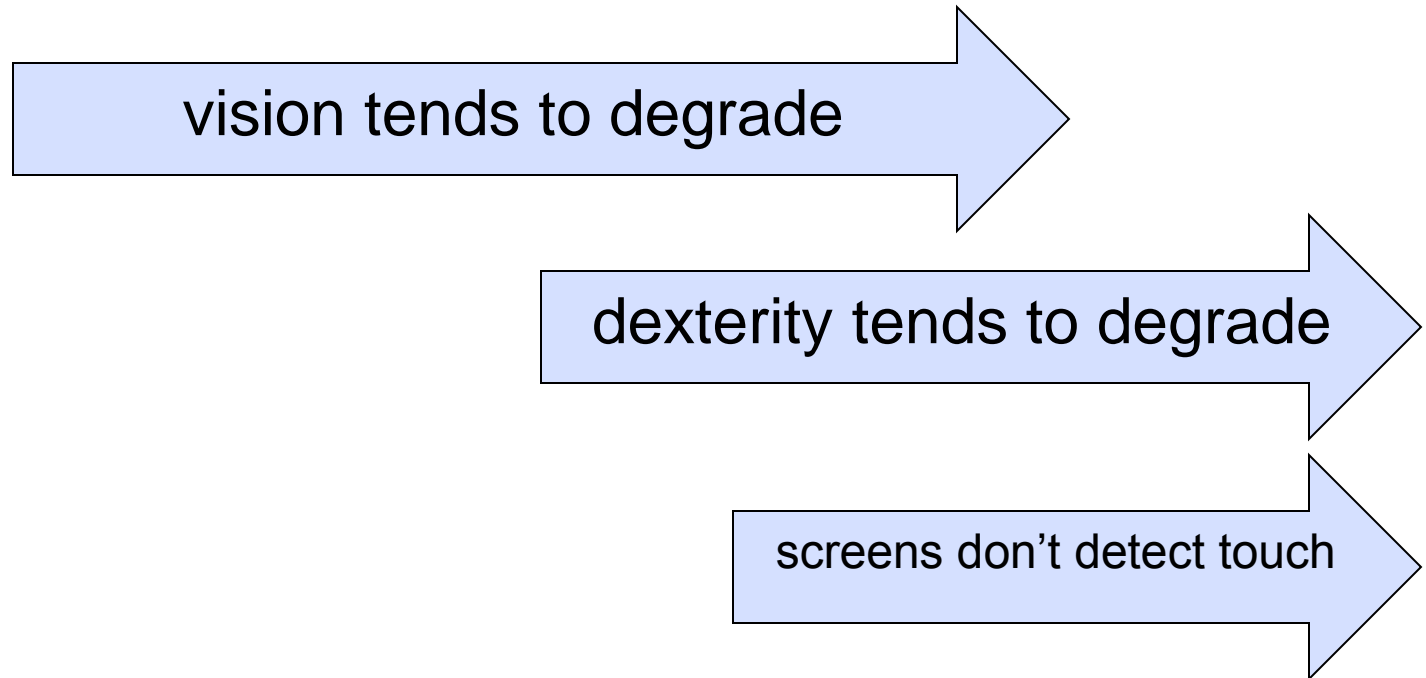
AGE

CONFIDENCE

(DIS)ABILITIES

NEEDS

An example: Age



Forgetfulness?

Varieties of Usage

LOCATION

(IN)ATTENTION

ENVIRONMENT

CONCENTRATION

MODES OF INTERACTION

User-Centric Qualities



- Usability
- Safety
- Accessibility
- Security
- Performance
- Suitability



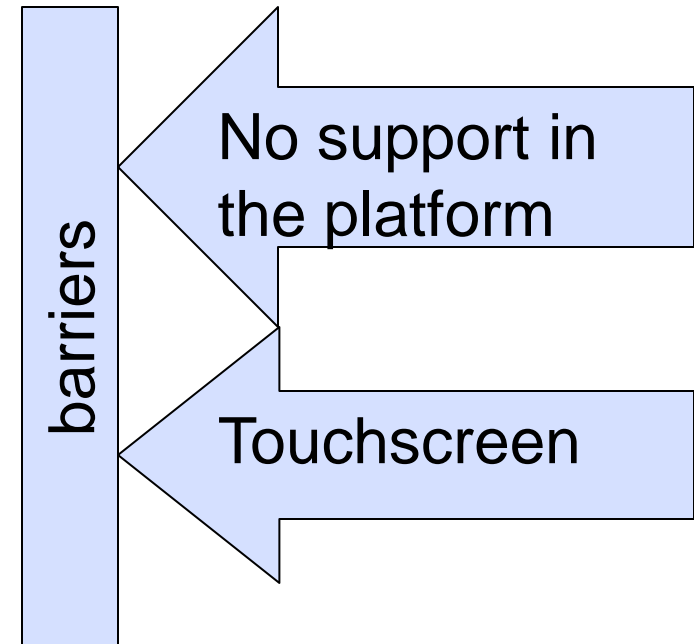
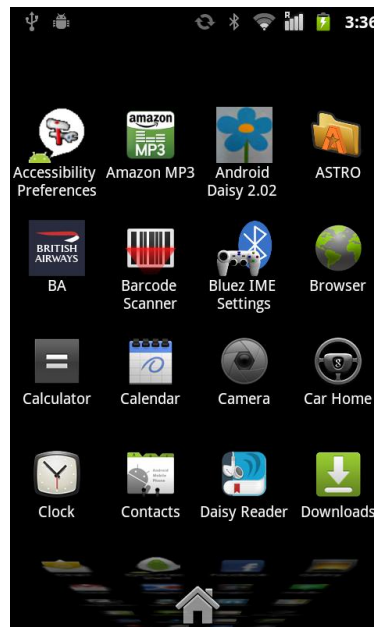
Designing for Users: an example of

RETHINKING THE PROBLEM

The eyes-free project

The original problem

How to make an Android phone accessible for blind users?



Approach

- Gesture UI
- Compass-point gestures
- Shake to delete
- Relative offsets
- Free and Open Source

<http://code.google.com/p/eyes-free/downloads/list>

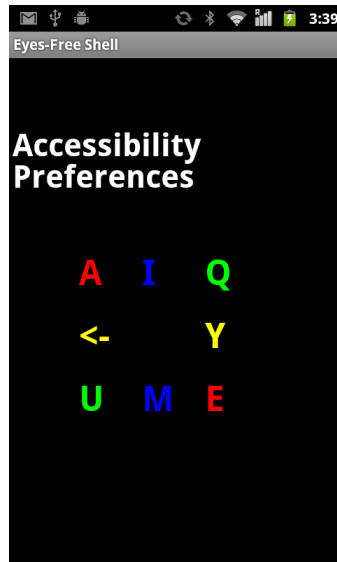


Eyes-free Shell: Home

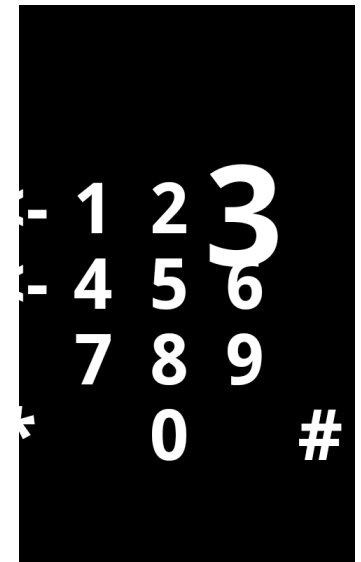
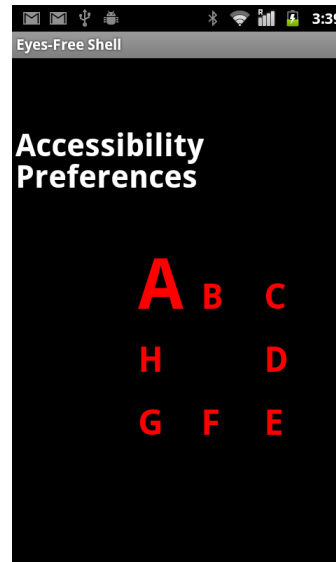
Eyes-free screenshots



Scroll using
the Track-ball



Or use gestures: Letters



Numbers

Additional benefits



- Enables users to interact without *looking* at their phone
- Adapts to where each gesture is started
- Good PR

http://www.nytimes.com/2009/01/04/business/04blind.html?pagewanted=1&_r=1&ref=business



On To Testing

USER EXPERIENCE TESTING

What we want to achieve

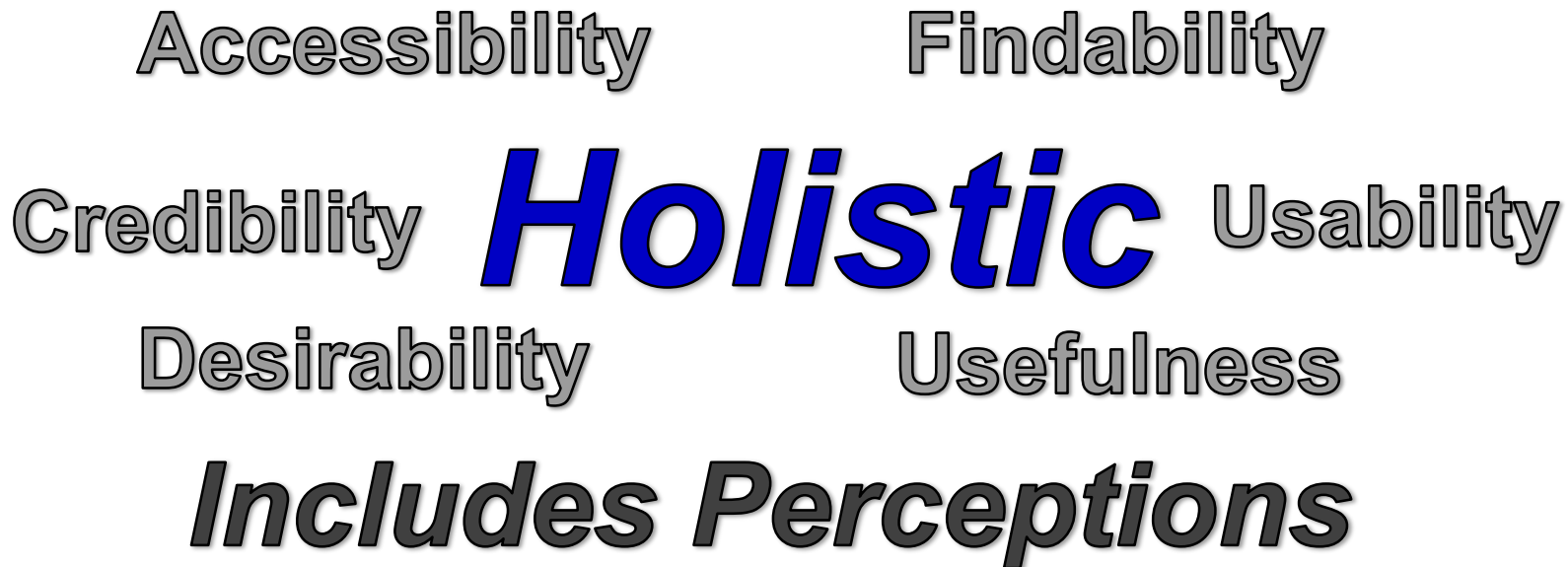


*To automatically detect (some)
issues that may adversely
affect the User Experience*

UX = User Experience



- Dynamic, based on *using* the system



- We focus on the Human + Computer Interactions

Using Heuristics*



1. When I navigate by tabbing I should return to where I started in a reasonable number of key-presses
2. Flow should be consistent through web-forms
3. Look-alike & work-alike across web browsers
4. I should not be able to bypass the security of the site from links in the UI

* *Fallible, but useful, guide/approach/practice*

Equivalence of input paths

Mouse

- Clicks...

New

Dropdown

Select

Send

4 inputs

Keyboard

- Keystrokes

Tab

Space

Down-arrow

Enter

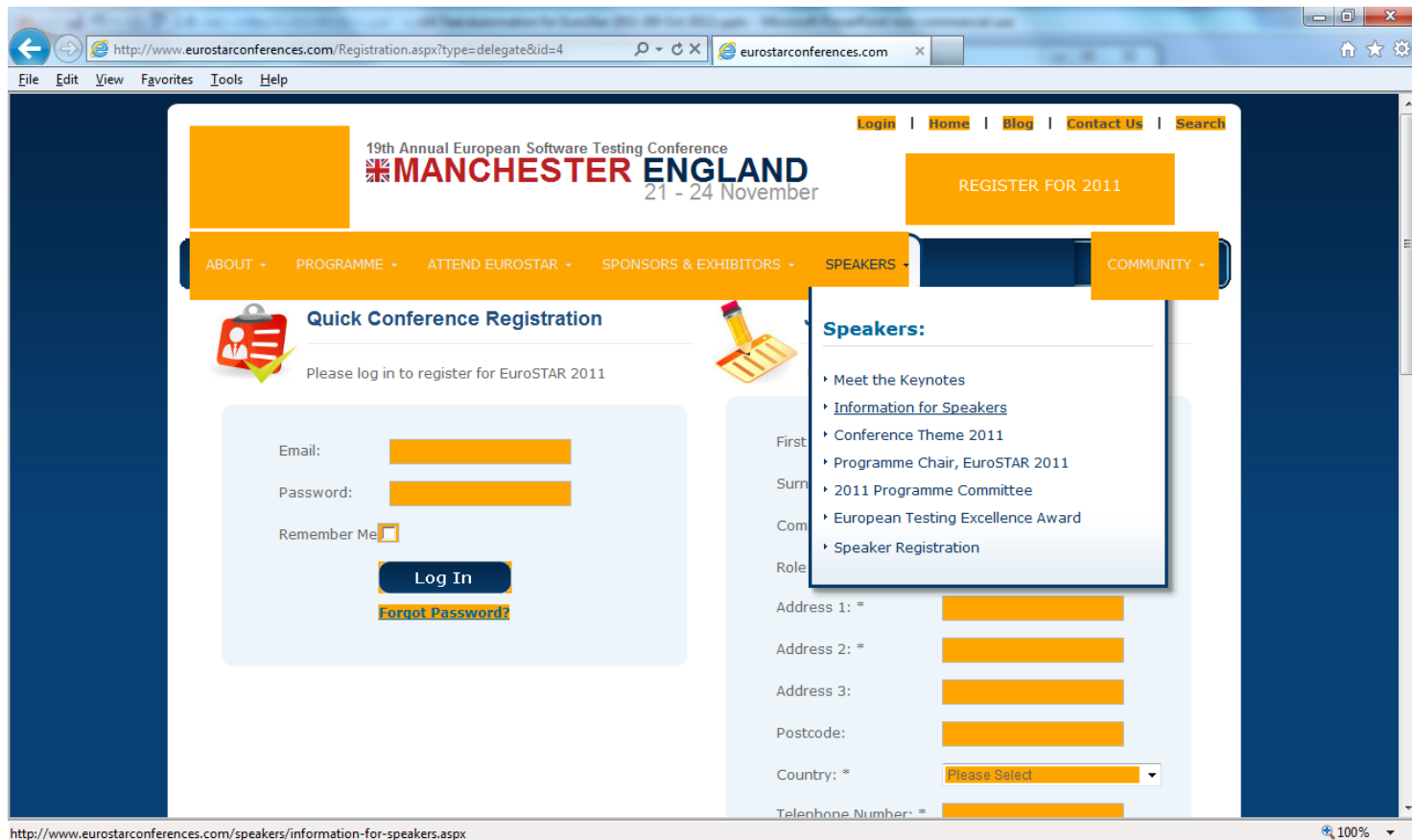
Tab

Enter

10 inputs

A real example: Information for Speakers

Mouseover; click = **2 steps** 13 Tabs + 22 Tabs = **35 steps**



Automated exploration and discovery*



- Automating heuristic tests
 - Web accessibility testing
 - Fighting layout bugs
 - BiDi checker
- Using Crawling tools
 - Crawljax

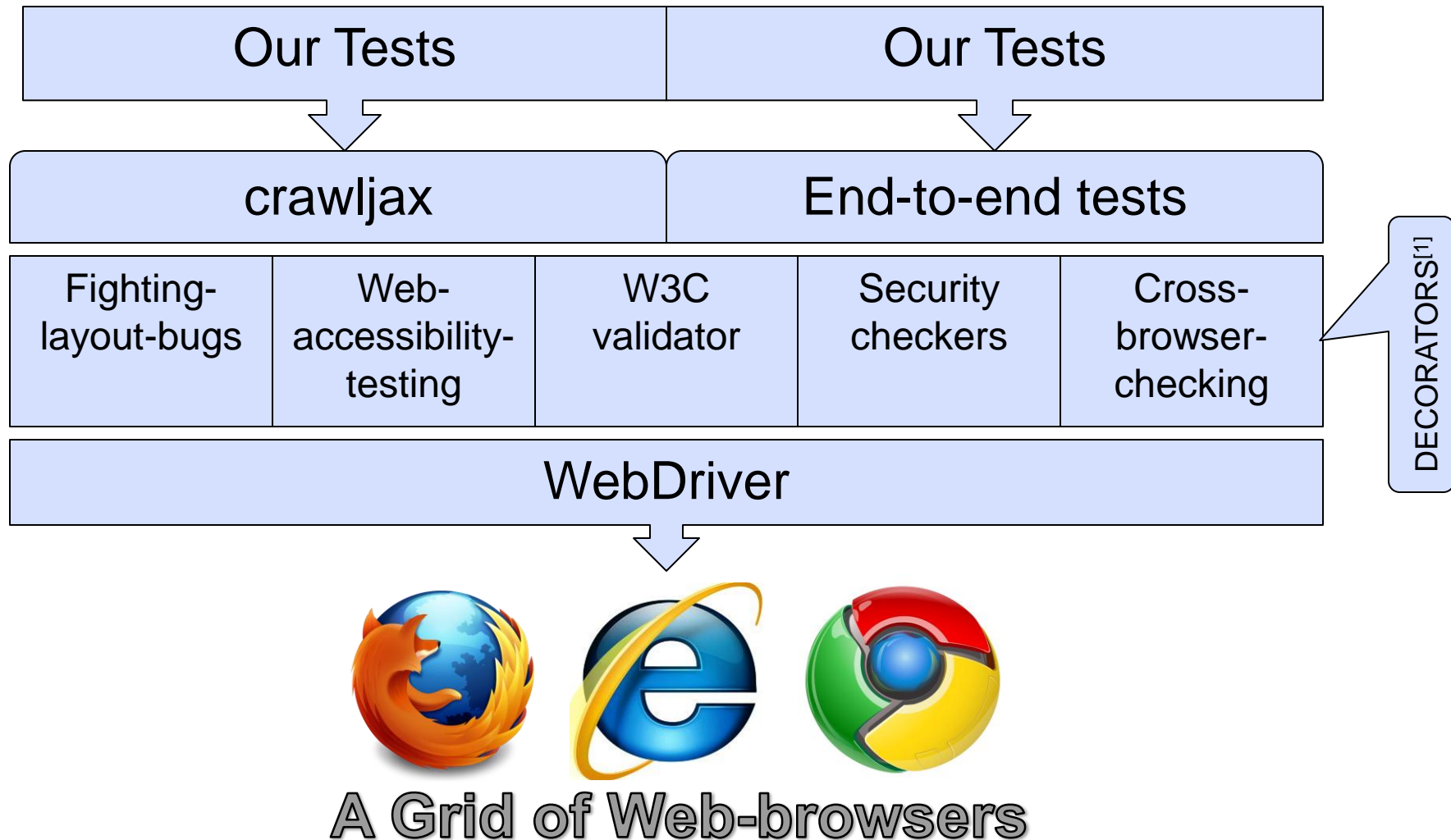
** We're working on complementary work on interactive exploration and discovery*

Man & Machine



- Fully automated execution, human inspection
- Interactive testing, aided by tools

The moving parts...





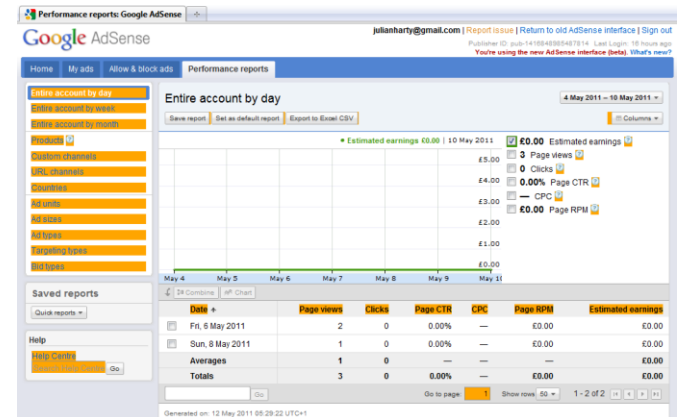
DEMO

Sample screenshots

<http://www.eurostarconferences.com/Registration.aspx?type=delegate&id=4>



<http://www.google.co.in>



<http://adsense.google.com>

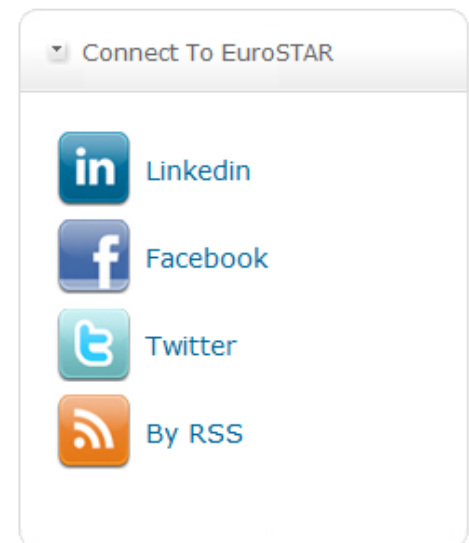
And what about Static Analysis?



- Don't overlook the value of static analysis (but don't rely on it either...)
- Find ways to filter the reported results
- We've created automated Accessibility Tests, which check the contents of pages using WCAG guidelines.

Problems detected:

```
{"testName":"checkMouseEventHaveKeyboardEvent","description":  
"Check that elements that have mouse actions also have keyboard actions.",  
  
"severity":"error","elementCode":"<a href=\"\#\"  
onclick=\"window.open('/Content/Terms-and-conditions.aspx',  
'termsAndConditions','width=1000,height=600,resizable=yes,toolbars=0,menubar=no,scrollbars=yes,status=no'); return false;\"> Click here to read terms  
and conditions</a>"}  
"checkTitleIsNotEmpty" for the entire page  
  
"testName":"checkAltTextOnImage","description":  
"Check that visible images have alt text",  
"severity":"error","elementCode":  
"<img src=\"/themes/Eurostar/images/ico-linkedin.png\" />"
```



Now what?



“Sure, Accessibility is important:
file it with the rest of the things
we *should* do...”

What *should* be done seldom gets done...

3 Improvements for the price of 1

- Accessibility + Testability
 - Both need to interpret the contents in the browser
 - Improving one often improves the other
- Accessibility + SEO*
 - Both find value in descriptive labels



`alt=""`

`alt="picture"`

`alt="Mens Black ..."`

Happiness



- Improved Accessibility: Users are happier
- Improved Testability: We're happier
- Improved SEO: Business is happier

Beware of (over-)trusting test automation



- Automation as servant, not master, of our software delivery
 - Inaccurate results
 - “Beware of Automation Bias” by M.L. Cumming^[1]
- Automated tests and checks miss more than they find
- Make behavior easier to assess
 - Screenshots and contents of DOM to verify after tests ran
 - Automated video recordings

[1] <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.2634&rep=rep1&type=pdf>

What we think we're testing...

The screenshot displays the eBay.co.uk homepage with a multi-colored header bar. The top navigation includes links for Buy, My eBay, Sell, Community, Contact us, and Help. The eBay logo is on the left, followed by a personalized greeting: "Hello, (julian1964). (Not you?)". To the right is the "eBay Buyer Protection" badge with a "Learn more" link.

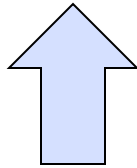

The main search bar contains a dropdown menu set to "All Categories", a "Search" button, and a link to "Advanced" search. On the left, a vertical "All Categories" menu lists various product types with expandable arrows.

The central banner features a large advertisement for the "The new iPhone 4 in white", showing the front and back of the device. A pink circular badge says "NOW ON EBAY". To the right of the iPhone is a "Shop now >" link. Further right is a "DAILY DEALS" section titled "DON'T MISS TODAY'S DEALS", featuring two product tiles: "Bench Men's Overton Jeans" with a 60% off badge and "Timberland Men's Shoes" with a 55% off badge. Both include price details and "Free P&P".

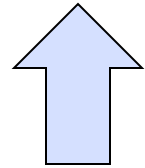
Below the main banner is a section with three columns: "Your recent searches" (listing items like macbook air, bmw f800, etc.), "Shop safely on eBay" (promoting eBay Buyer Protection, Top-rated Sellers, and PayPal), and "Sign in" (with "Sign in" and "Register" buttons). To the right of this is a "You're in safe hands when you shop on eBay" banner with the eBay Buyer Protection logo.

At the bottom, a "Suggestions for you" section shows a carousel of laptop images. To the right is a "GRAB A BARGAIN" section with a clock icon and the text "Find items ending soon", with a "Check it out >" link.

What our automated test actually interacts with...



Enter text here



'click'

(Some of the) things our automated tests may miss...

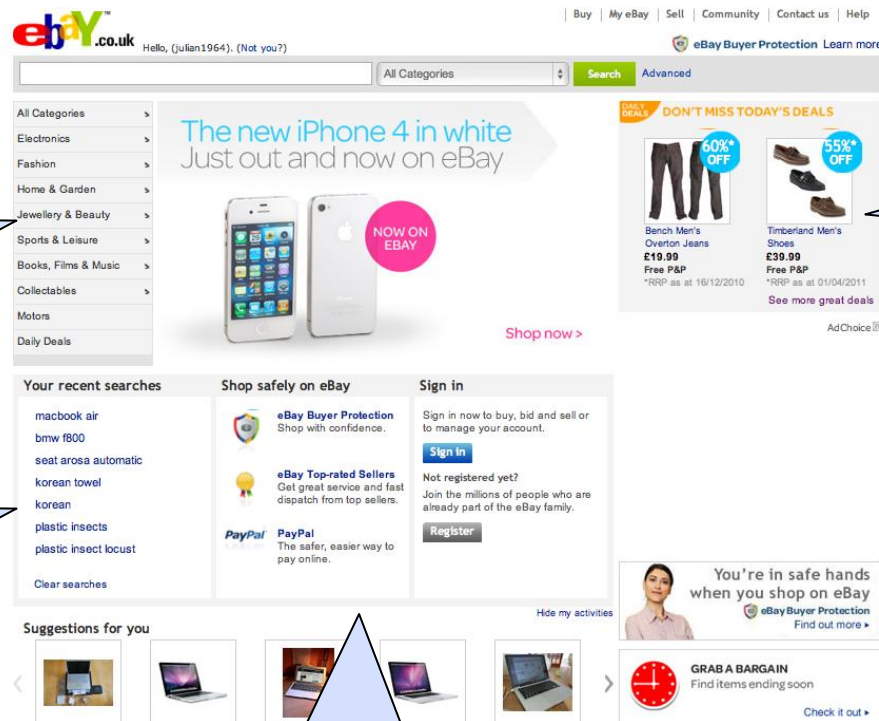
Navigation

History

Promotions

Problem
JavaScript
CSS and
HTML

Layout,
Rendering &
Formatting



Beware of poor-quality automated 'tests'

- `AssertTrue(true) ;`
- No/Inadequate/Too many Asserts
- Poor code design
- Falsehoods (False positives / negatives)
- Focus on:
 - Improving the quality of your automated tests
 - Finding ways to improve the quality, & testability, of the code being tested

Increasing the signal-to-noise of test results



- Suppress unwanted ‘warnings’
 - C.f. static analysis tools
- Increase potency of tests
- Consider dumping ineffective tests

Conclusion



*We care enough
about our users to
change what we do*

Further reading and research



The opensource project

<http://code.google.com/p/web-accessibility-testing>

Finding Usability Bugs with Automated Tests

<http://queue.acm.org/detail.cfm?id=1925091>

Fighting Layout Bugs

<http://code.google.com/p/fighting-layout-bugs/>

Experiences Using Static Analysis to Find Bugs

<http://www.google.com/research/pubs/pub34339.html>

My blog

<http://blog.bettersoftwaretesting.com/>

“Beware of Automation Bias” by M.L. Cummings

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.91.2634&rep=rep1&type=pdf>

Designing and Engineering Time by Steven Stow

ISBN 978-0-321-50918-5

Questions now?

Questions later...

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