Software Quality Group of New England

Risk-based Testing:

Because You Can't Test Everything

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Agenda

Testing is an infinite process of comparing the invisible to the ambiguous in order to avoid the unthinkable happening to the anonymous

- Why you can't test everything
- Introduction to risk-based testing
- A practical example
- Discussion

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Software as an infinite state machine

Infinite?

- In a large application there are
  - Hundreds of threads of control
  - Thousands of variables
  - Millions of possible values for these variables
- This causes a combinatorial explosion of discrete states the pushes the number, for all practical purposes, beyond counting

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Software as an infinite state machine

Problems with testing large apps

- Time
- Cost
- Quality
- Sanity

- The question then becomes one of differentiating the important test cases from the unimportant ones
- But what makes a test case important?

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Introduction to Risk-based Testing

What not to do

- Guess at the relative importance of test cases
- Conduct a broad sweep across as much functionality as possible

Instead

- Apply the concept of risk!

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Introduction to Risk-based Testing

Risk – a definition

- exposure to the chance of injury or loss
- a hazard or dangerous chance

Huh?

- Doesn't that contradict the notion of Quality?
- Shouldn't we avoid injury at all costs?
- Hazard? Dangerous? Are you kidding?

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Introduction to Risk-based Testing

Risk – it's everywhere!

- At home
- On the roads
- At our workplace

Risk – deal with it!

- Analyze it
- Mitigate it
- Use it intelligently

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Risk Analysis

- What could happen as a result of a failure and how likely are these?
  -
  -
  -
  -
- This estimate gives you the probability of any given event occurring

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Risk Analysis

- How bad would the consequences be should one of these event occur?
  -
  -
  -
  -
- This estimate gives you the impact of any given event occurring

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Risk Analysis

- At one end of the spectrum, a risk event with rare probability and minimal impact is of low concern
- At the other end, a risk event with often probability and maximal impact is of high concern
- But what about all the combinations in between?

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A Risk Analysis Tool Specifically for Testing

- Google developed a model called ACC Analysis
  -
  -
  -
- The intersection of these three characteristics in a tool called Google Test Analytics helps testers determine which test cases are important

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Attributes

- Attributes are the adjectives and adverbs of the system
- They answer questions like
  -
  -
    business?
  - What core value does it deliver?
  - Why is it interesting to customers?

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Attribute Examples

- Fast
- Secure
- Stable
- Simple
- Web-centric
- Searchable
- Customizable
- No technical knowledge necessary

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Components

- Components are the nouns of the system
- They answer questions like
  - What is the system composed of?
  - What is the valid list of targets for test cases?
- Don't be too concerned about completeness
- Don't be too concerned about detail

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Component Examples

- Nav Bar
- Sitemap
- Settings
- Page View
- Audit Trail
- Search
- Plugins
- Printing

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Capabilities

- Capabilities are the verbs of the system
- They answer questions like
  - What can the system do?
  - What actions do the system perform at the command of the user?
  - What are the system's responses to various input?
- The key to Capabilities is that they are testable!

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Capability Examples

- Search for items by keyword
- Display available inventory
- Add items to shopping cart
- Collect credit card data
- Process monetary transactions
- Calculate shipping cost
- Defer a purchase for a later date
- Generate an invoice

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Using the ACC Model in the GTA Tool

- Capabilities are tied to Attributes and Components in Google Test Analytics in the form of a table
- Components form rows
- Attributes form columns
- In each cell, the number of capabilities provided by that component to satisfy that attribute is recorded
- Not every row/column intersection is applicable

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A Practical Example

	Searchable	Sharing	Quick	Simple	Customize	Rich Content
Nav Bar	1	1	n/a	1	n/a	n/a
Sitemap	n/a	1	1	1	1	n/a
Settings	1	11	1	n/a	n/a	n/a
Page View	1	3	1	1	4	12
Audit Trail	1	2	1	1	n/a	n/a
Search	n/a	2	1	n/a	1	1

A Practical Example

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Discussion

- ACC?
- GTA?
- Risk-based testing in general?

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