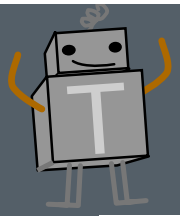

Agile Test Development

STP Conference 2007
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Scope of This Workshop

- Test development,
  - not agile system development or Extreme Programming (XP)
- Goal is practical concepts and experiences
  - not necessarily intended to add to the discussions about agile methods
- Topical approach
  - offering ideas, concepts, experiences, not the ultimate life cycle
  - input welcome

Topics for this Workshop

- Agile test development
  - focus on “test development”, as opposed to “testing”
- Efficient Test Automation
  - allowing for short test life cycles
  - introducing Action Based Testing as an example
- Agile test development techniques
  - in particular Soap Opera Testing
- Case studies

“Waterfall” Life Cycle

- Establish requirements
- Design and develop system
- Test the system
- Production and maintenance

Agile System Development

- Establish requirements (global)
- Develop tests
- Develop the system, test driven
- Production and maintenance

The "Values" concept in Extreme Programming

- Communication
- Simplicity
- Feedback
  - key contribution from tests (unit tests and functional tests)
- Courage
- Respect

Additional option
"Chief Programmer Teams"

- From the classic "Mythical Man Month" by Fred Brooks
  - Brooks law: "Adding manpower to a late software project makes it later"
- One chief, one assistant, plus supporting disciplines
  - compared to surgical teams
  - based on the assumption that one good programmer is 5-10 times more effective than a mediocre one

The "Surgical Team"

- *Surgeon/Chief Programmer*, who does actual development, design, testing, and documenting.
- *Copilot*, the Surgeon's right hand man.
- *Administrator*, who handles money, space, equipment, etc.
- *Editor*, a technical writer who finishes the Surgeon's documentation.
- *Secretaries*, one each for the Administrator and Editor.
- *Program Clerk*, who manages technical records for the team
- *Tool-smith*, who manages custom tools for the team and the development environment.
- *Tester*, who defines and executes test cases.
- *Language Lawyer*, a programming language expert for some programming language of interest.

Agile "Home Ground"*

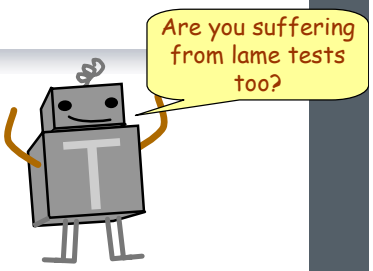
- Low criticality
- Senior developers
- Requirements change very often
- Small number of developers
- Culture that thrives on chaos

*Barry Boehm and Richard Turner
Balancing Agility and Discipline: A Guide for the Perplexed
Addison-Wesley, 2004

Plan-driven "Home Ground"

- High criticality
- Junior developers
- Low requirements change
- Large number of developers
- Culture that demands order

Why Better Test Development?

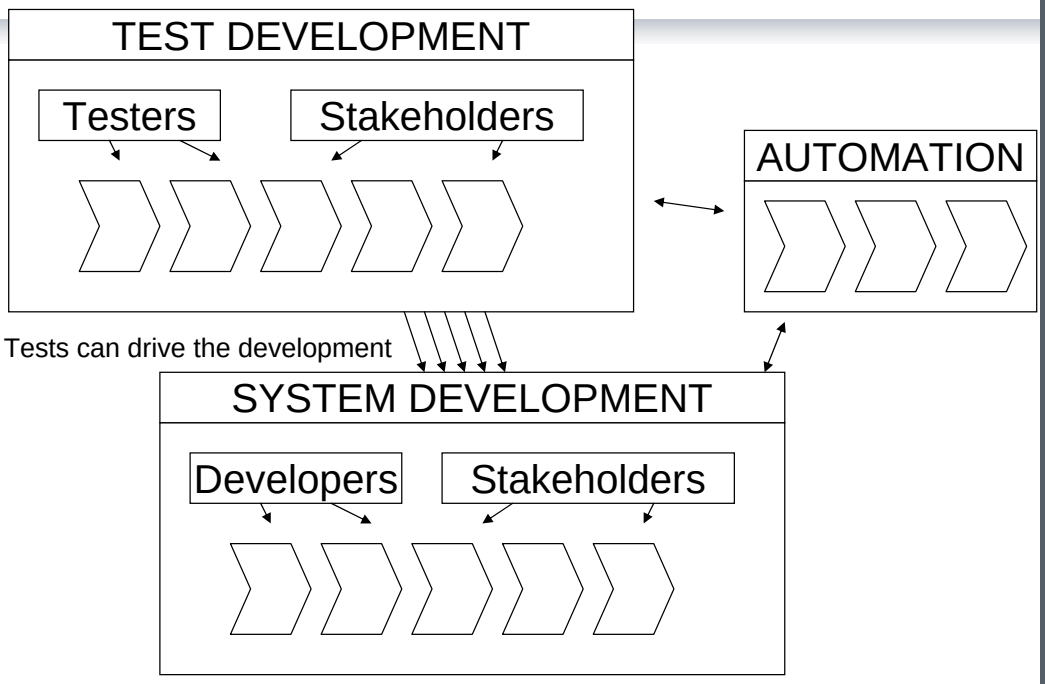


- Many tests are “mechanical” now
  - blindly follows specs or reqs
  - which is good, but lacks aggression
  - I call these “medium ambition level”
- To make tests with a higher “ambition level” you need
  - understanding of the system under test, and the “business under test”
  - analytical understanding of “what could go wrong”
  - creativity, and the commitment to use it
- Poor test development results in
  - cumbersome automation
  - tedious retest cycles, loosing the agile advantage

Why Agile Test Development

- Informational reasons
  - tests are a natural means of communication with users, capturing “agreement” on specs and their meaning
  - tests capture business, functional and technical information, favoring frequent interaction
- Planning reasons
  - tests are individual, they can be developed as small units, independently from
    - system under test
    - each other
  - test development is sensitive to overall planning; it needs to be flexible
  - in methods like XP functional tests are input for system development
- In fact “agile” is a natural way to develop good tests
  - test development is often agile even in waterfall projects

Agile Test Development



Recommendations

- Have a global test design (this may differ from XP)
  - keep it short and simple: focused on breakdown of the tests
  - this global test design can (and usually should) be revisited during the project
- Split between (1) test requirements and (2) test cases
  - In my experience test requirements are easier to create and communicate about
- Make the automation a separate activity
  - test developers are not bogged down by it
  - use a keyword driven approach, like Action Based Testing
- Use your stake holders (specialists, power users, etc) wisely
  - focus the efforts on the relevant tests
  - don't bother them more than needed
    - avoid involving them in low and medium ambition level tests
  - various kinds of input:
    - how does this work
    - what do we need to test
    - what is interesting to test / how can we break the system

Role of Automation

- Automation can allow tests to support agile system development
  - for unit tests, but also for functional tests
- Automation is separate from test development
  - usually doesn't need user interaction (only some with testers)
  - in keyword methods like Action Based Testing the automation focuses on actions, not on tests

Action Based Testing

- Provides a framework for effective automation
- Based on a notion that a test can be broken down in a number of consecutive actions (keywords)
- Both actions and their data are in products, called "Test Modules"
  - Excel spreadsheets for easy development and communication
  - test data is explicit or with a place holder
  - explicit checks with specified expected result values
  - most actions are "high level", omitting as many unneeded details as possible
- Instead of implementing test cases, the automation concentrates on the programming individual actions

Separation of Tests and Automation

	number	name	quantity
new product	P-9009	Sledge Hammer	5
	number	quantity	
add quantity	P-9009	20	
add quantity	P-9009	3	
add quantity	P-9009	6	
	number	quantity	
check quantity	P-9009	34	

Test Module
(Excel Spreadsheet)

Actions

Automation →

…
add quantity
check quantity
new product
…

Example of "Old and New" Formats

Most values are implicit. The tester has to figure them out during execution….

Same instruction is repeated over and over again…

Current format

Enter a user id that is greater than 10 characters, enter proper information for all other fields, and click on the "Continue" button	An error message should be displayed stating that "User Id must be less than 10 characters".
Enter a User Id with special character's), enter proper information for all other fields and click on the "Continue" button	An error message should be displayed indicating that "User Id cannot contain some special characters".
Enter the information, with a password of 4 characters and click on the "Continue" button	An error message should be displayed with "Password must contain at least 5 characters".

ABT format

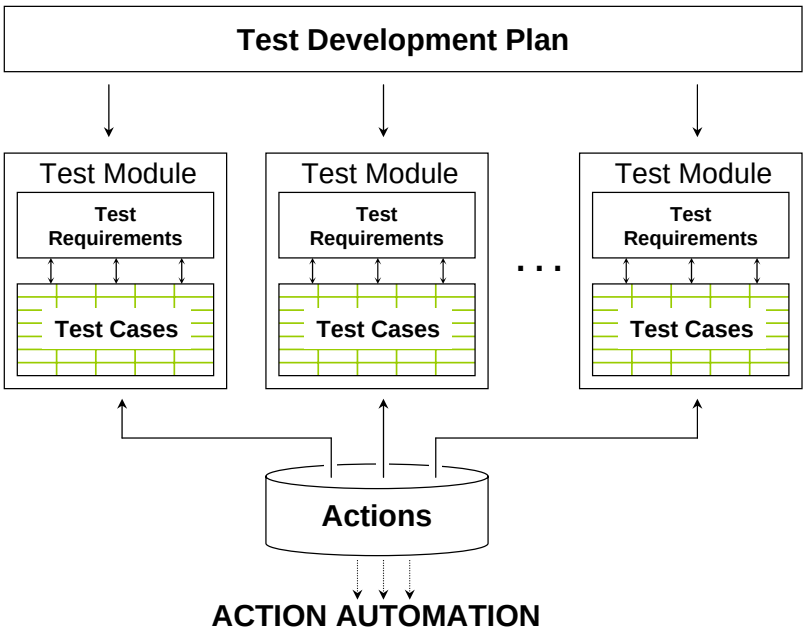
check registration dialog	user id	aaaaabbbbbc	message: User Id must be less than 10 characters
check registration dialog	user id	résoudre	message: User Id cannot contain some special characters
check registration dialog	password	test	message: Password must contain at least 5 characters

Use of Test Requirements

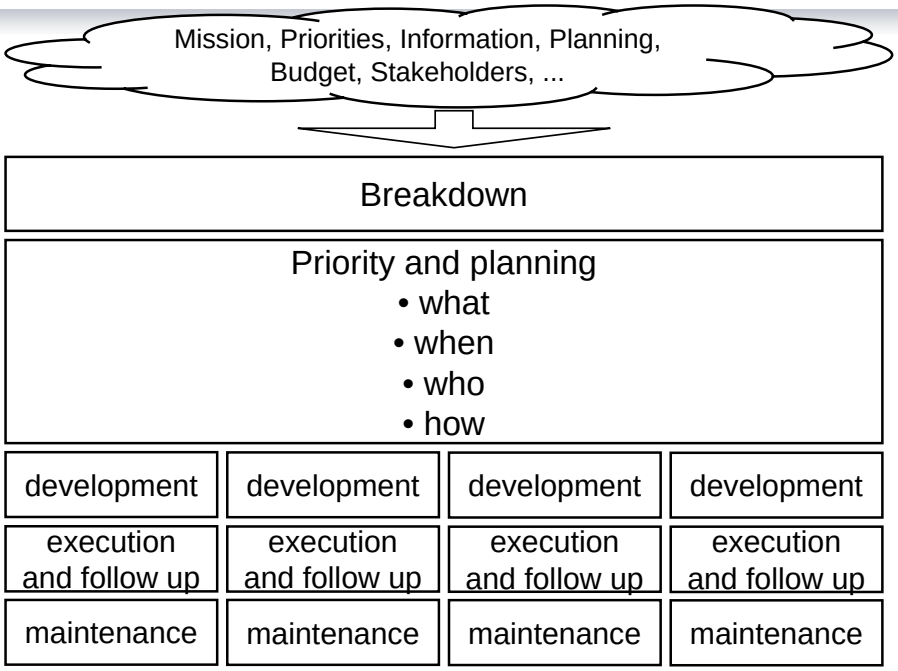
...
TR-3.51 The exit date must be after the entry date
...

test requirement	TR-3.51		
	name	entry date	exit date
enter employment	Bill Goodfellow	2002-10-02	2002-10-01
check error message	The exit date must be after the entry date.		

Action Based Testing



Breakdown: Divide and Conquer



Properties of a Good Breakdown

- Logical to all concerned
- Independent from other modules
- Well differentiated and clear in scope
- Fitting the priorities and planning of the project
- Balanced in size and amount

Breakdown "Cheat Sheet"

- Straightforward Criteria
  - Architecture of the system under test (which part are we testing)
  - Functionality and other requirements
  - Kind of test (navigation flow, quality attributes, ...)
  - Ambition level (smoke test, regression, requirement based, aggressive, …)
- Additional Criteria
  - Stakeholders
  - Complexity of the test
  - Technical aspects of execution
  - Planning and control
  - Risks involved
  - Code hand-offs

Soap Operas

Ashley hears about Jack's deposit when he thought he had to go. Victoria lectures her father about what's wrong with him and Nikki but Victor advises her that it's none of her business Olivia learns Dru has no regrets about leaving and takes great satisfaction in having Lily as her companion. Dru then asks Olivia why she is raking Malcolm over the coals. Stopping by Gina's, Nikki spots Brad and sits with him, admitting she doesn't want to be alone tonight. Victor stops by Mack's party at the Crimson Lights. Ashley takes a home pregnancy test. Worried about Billy, Raul makes call and J.T. claims he doesn't know where Billy is. Raul rushes over and finds Billy out cold in the snow. Raul worries when he can't find a pulse. . . .

Properties of Soap Operas

- About “real life”
- But condensed
- And more extreme
- Using a recurring theme, with “episodes”

Soap Operas for Testing

- Define a scope of the test to develop
- Identify with the business environment
- Identify which elements would make things difficult
- Draft test cases (typical some dozen lines)
- Write them down in modules

Soap "Count the Goodies"

In this episode, the Goodys have won $750,000 in the lottery. They decide to buy that big house on the corner of the street that they've always dreamed about. Father, Bing Goody, goes to the banking office to make the necessary arrangements. Of course, the bankruptcy that Bing had two years ago complicates the approval, but Jim, the guy at the bank, is very helpful and even sells Bing on the idea of a beautiful vacation property in Mexico. Bing has a brilliant idea. Why not ask neighbor Jones if he is interested in co-owning the vacation property? Like everything else with Mr. Jones, his credit is perfect.

The Story Continues…

One week later: After a small party with some new friends, only about $720,000 of the prize money is left, so the mortgage arrangements need to be changed. Jim, Mr. Jones, and Bing decide to meet the next morning to make the necessary adjustments. Since it was a great party, they are not at their best when they meet, so many mistakes are made. They correct some immediately, others they miss and will need to fix later. They find that an additional second mortgage on Mr. Jones's home is needed in order to still qualify for the vacation home.

What Will Happen Next?

See it all . . .

. . . in the next module!!

What This Soap Can Test

- Entering a customer with a big family
- Mortgage arrangements including a first and a second house
- Property abroad
- Both a primary residence and a vacation property
- Weighing of the income of a second owner
- Co-ownership on the second house only
- Establishing a second mortgage to finance a vacation property
- Bankruptcy two years ago
- Modification of the down payment
- Correcting errors upon entry
- Corrections after the application has been processed

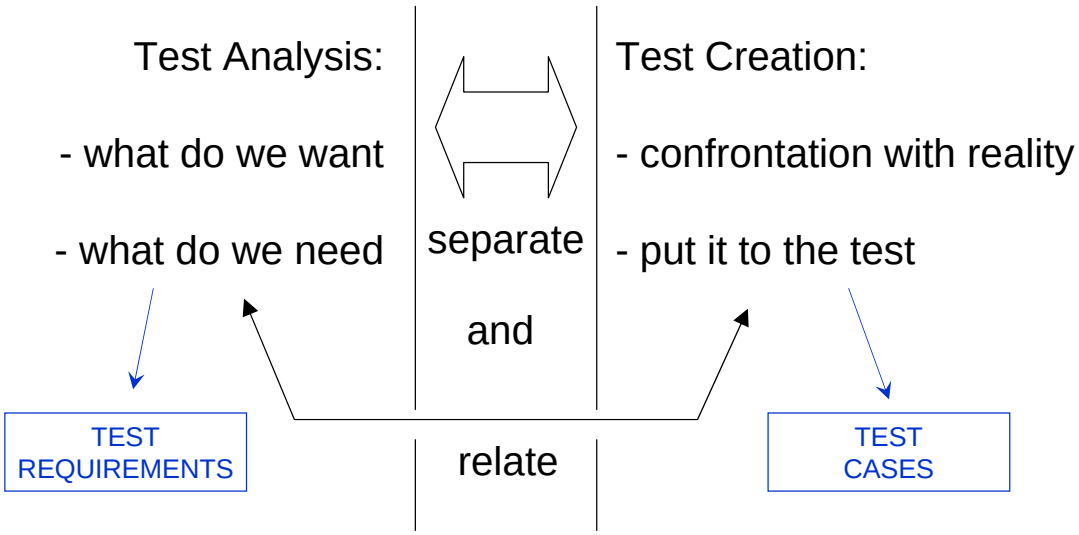
Keep it Simple

- Soap Opera Tests are not necessarily:
  - "Extreme"
  - Far fetched
  - Long and elaborate
  - Pieces of art and creativity

More Extreme: "Killer Soaps"

- More specifically aimed at finding hidden problems
- Run when everything else has passed
- One option: put a killer soap at the end of a normal module
- Ask the users and specialists for input

Test Analysis / Test Creation



Case 1

- Major IT company
- Large scale web development project
  - complete redesign of key site
- Business owners are the main stake holders
  - help define the system
  - are responsible for “User Acceptance Test”

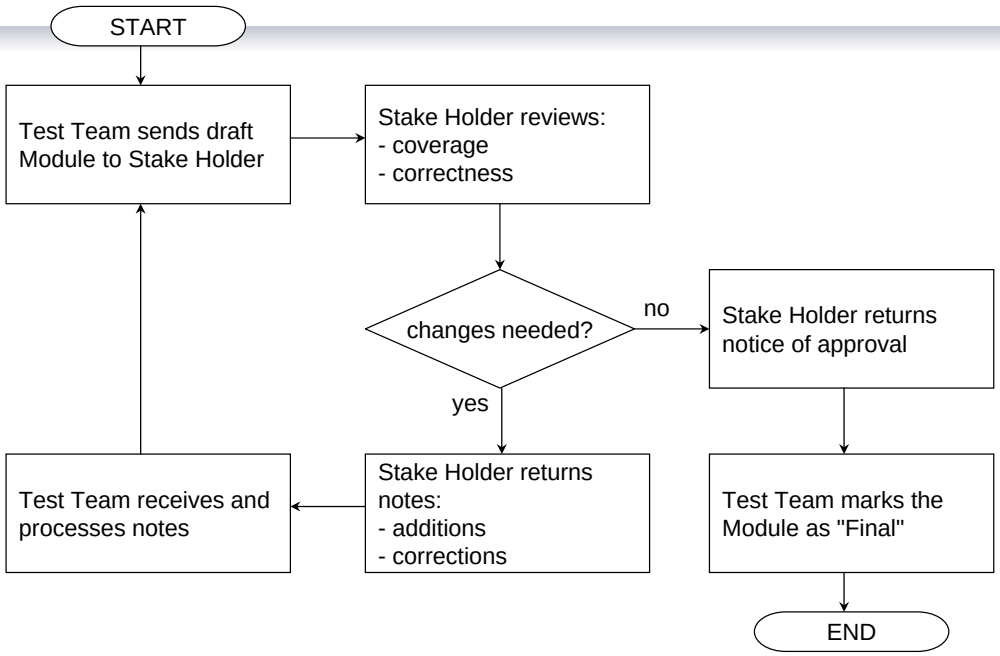
Parameters for the Testing

- Company wants to obtain automated re-usable tests
  - the site will undergo frequent changes
  - failures are not an option, so integral retest is needed after each change
- All tests must be approved by the stake holders
  - different stake holders for different areas
- Functional specs available, but much additional input from stake holders needed
- Because of the volume and available timelines use of off-shore resources

Chosen Approach

- After an overall plan of approach a specific Test Development Plan was written
  - establishing the test modules
  - assigning stake holders
  - defining time lines
- Two coordinators formed the core of the project
  - coordinating stake holder
  - coordinating lead test developer, US based
- Tests were developed and automated using Action Based Testing

Review Stake Holders



Module Development Planning

Nr	Module	Business Owner	Date to BO
1	Portal Navigation, Audience	Robyn Peterson	05 / 23
2	Portal Navigation, Search	Ted Jones	05 / 27
3	Membership, registration	Steve Shao	06 / 03
4	Portal Navigation, Category	Ted Jones	06 / 08
5	Portal Navigation, Topic and Expert	Ted Jones	06 / 13
6	Access Control	Mike Soderfeldt	06 / 17
7	Portal Navigation, Task	Ted Jones	06 / 22
8	Contact DSPP	Ted Jones	06 / 27
9	Portal search	Mike Soderfeldt	07 / 01
10	Membership, review and update	Steve Shao	07 / 05
11	Program contact assignment	Alan Lai	07 / 11
12	Company, registration	Steve Shao	07 / 14
13	Catalog, view and query	Robyn Peterson	07 / 19
14	Site map	Ted Jones	07 / 25
15	Membership, affiliation	Steve Shao	07 / 28
16	Learn about DSPP	Ted Jones	08 / 01
17	Products and services	Steve Shao, Robyn Peterson	08 / 08
18	What's new	Ted Jones	08 / 11
19	Company, life cycle	Steve Shao, Alan Lai	08 / 17
20	Specialized programs	Ted Jones, Steve Shao	08 / 22
21	Customer surveys	Ted Jones	08 / 29
22	Software downloads	Mike Soderfeldt	09 / 01
23	Newsletters	Ted Jones	09 / 06
24	Internationalization and localization	Ted Jones	09 / 13
25	Membership, life cycles	Steve Shao	09 / 19
26	Collaboration, forums	Ted Jones	09 / 23
27	Collaboration, blogs	Mike Soderfeldt	09 / 28
28	Collaboration, mailing lists	Ted Jones	10 / 03

Status of the Project

- Main project delayed for technical reasons
- UAT tests have been run, but will be run again when the system becomes available in a final state
- Methodology now also in use for program and system testing

Case 2

- Large Dutch retirement fund for metal industry
- Needed a renewal of the key systems, including Y2k
- Very high pressed time schedule

Parameters for the Testing

- Essential, both functional and legal
- Get it done, no matter what
- Automation regarded as only way out

Highlights of the Approach

- Full automation using Action Words
- Use of Soap Opera Testing
  - establish test requirements
    - often literally following the law
  - create story lines to create the test cases
- Involve the end users to create the tests
  - organized in groups
  - eventually one third of the whole company was developing tests

Results for the Project

- Project was able to finish in time
- Tests were re-run very often, fully automated
- Users were well informed on the new system