

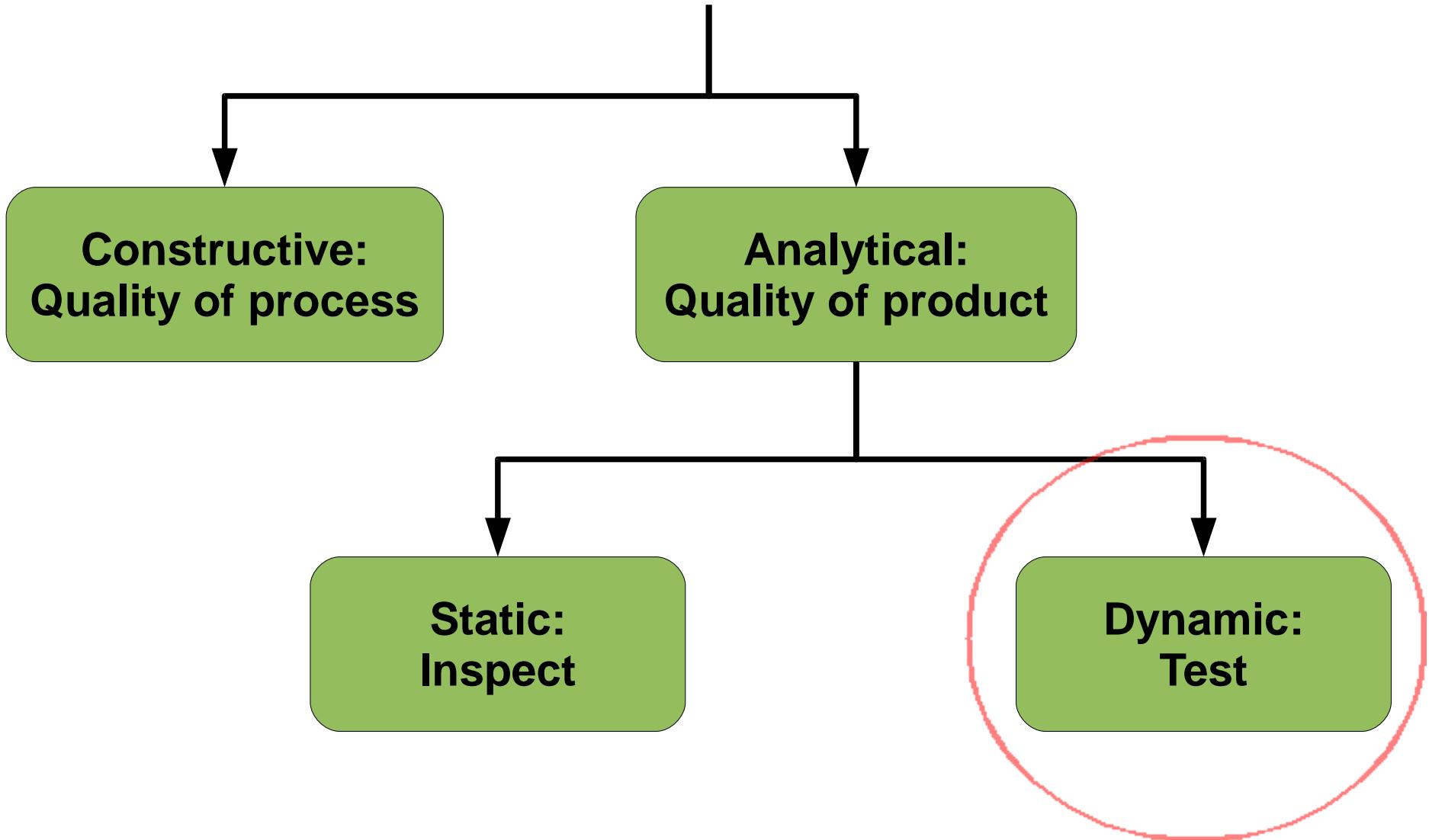


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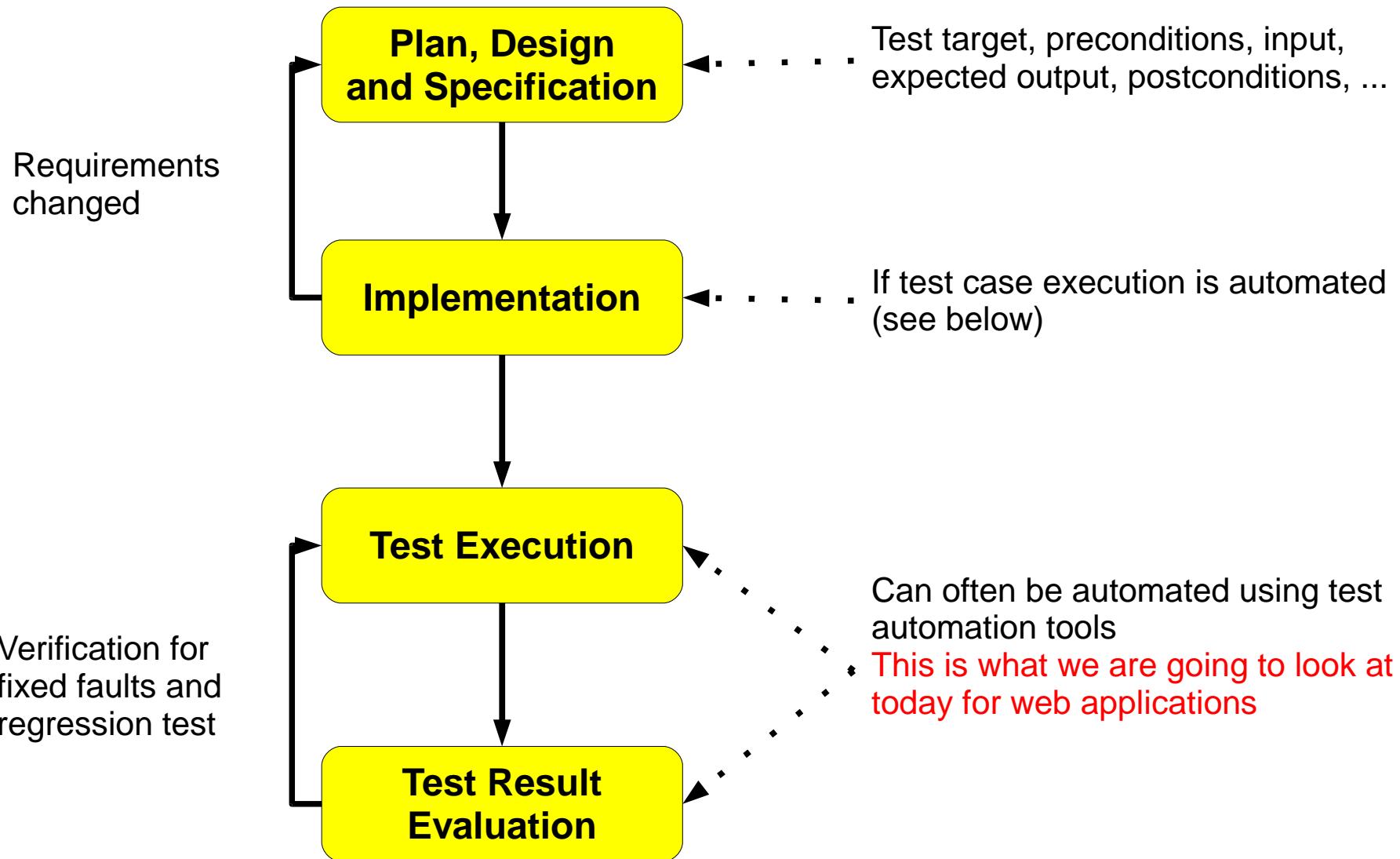
An introduction to test automation
for web applications

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Software quality assurance



Lifecycle of a testcase



Test Automation Principles

**Simulate user interaction and verify implementation behaviour
(requires observable output)**

- Steered by test case programs: *test scripts*
- Test cases are grouped into *test suites*
- Requires known “clean” pre-execution state for either all test cases or the first test case (when test cases build on each other)

Selenium: Web Application Test Automation Tool



```
package selenium;
import java.awt.BorderLayout;
import java.awt.Container;
import java.awt.event.WindowAdapter;
import java.awt.event.WindowEvent;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;
```

A screenshot of the Eclipse IDE's Java code editor. The code shown is a Java class named 'Test' with a constructor and an 'initiate()' method. The code uses Selenium API imports and creates a GUI window with a button.

Record with Selenium IDE in Firefox

Test
script

Use supported language as Java, Ruby, PHP, ... to build and modify test scripts

Replay and test with Selenium IDE in Firefox

Use Selenium Remote Control to test in Firefox, Internet Explorer and Safari



Open Source project –
<http://seleniumhq.org>

Selenium Command Types

- **Simulate user input**
Fill input fields, click buttons, ...
- **Check for presence of HTML-Elements and text fragments**
Used to verify expected application behaviour
- **Extract and store values from the user interface for later use**
Stored in variables and accessed using `${var_name}` syntax

Commands are available as API (“client driver”) for:
Java/JUnit, Java/TestNG, Python, PHP, Ruby, ...

Live Demonstration – Selenium

- 1) Recording test cases with Selenium IDE
- 2) Executing recorded test cases with Selenium IDE
- 3) Export recorded test cases to the Java programming language

Tests are done on the
JForum web forum system

The screenshot shows the 'New Topic' form in the JForum application. The 'Message body' section contains a rich text editor with various styling tools like bold, italic, underline, quote, code, list, image, and URL. Below the editor are dropdown menus for 'Text Color' (Default) and 'Font' (Normal). A tip at the bottom of the editor area says 'Tip: Styles may be quickly applied to selected text'. To the left of the editor is a sidebar with 'Emoticons' and a link to 'More smilies'. At the bottom of the form are several checkboxes under the 'Options' section: 'Disable HTML in this message' (checked), 'Disable BB Code in this message' (unchecked), 'Disable smilies in this message' (unchecked), 'Append Signature (Signatures can be modified on "My Profile" page)' (checked), and 'Send notify when a reply is post' (checked). There are also radio buttons to 'Set topic as: Normal' (selected), 'Sticky', or 'Announce'. At the very bottom are 'Preview', 'Submit', and 'Attach Files' buttons.

Forum Index -> TODO / New Features

New Topic

Subject

Message body

Emoticons

More smilies

Options

Disable HTML in this message

Disable BB Code in this message

Disable smilies in this message

Append Signature (Signatures can be modified on "My Profile" page)

Send notify when a reply is post

Set topic as: Normal Sticky Announce

Preview Submit Attach Files

List topic viewers 3 juhani 42 28/01/2005 16:13:41 andowson

newtopic Forum Index -> TODO / New Features Go to Page: 1, 2, 3, 4, 5, 6 Next

, 5, 6 Next topics as read eration Options

message

2004 23:59:57 sel Stein 2005 13:38:05 sel Stein 2005 13:24:01 sel Stein 2005 11:03:01 ankie 2005 10:25:10 sel Stein 2005 01:08:09 dowsen 2005 16:49:52 hymous 2005 10:57:13 sel Stein 2005 10:52:17 sel Stein 2005 12:43:12 sel Stein 2005 09:29:23 sel Stein 2005 14:18:14 sel Stein 2005 14:06:23 dowsen 2005 10:18:36 sel Stein

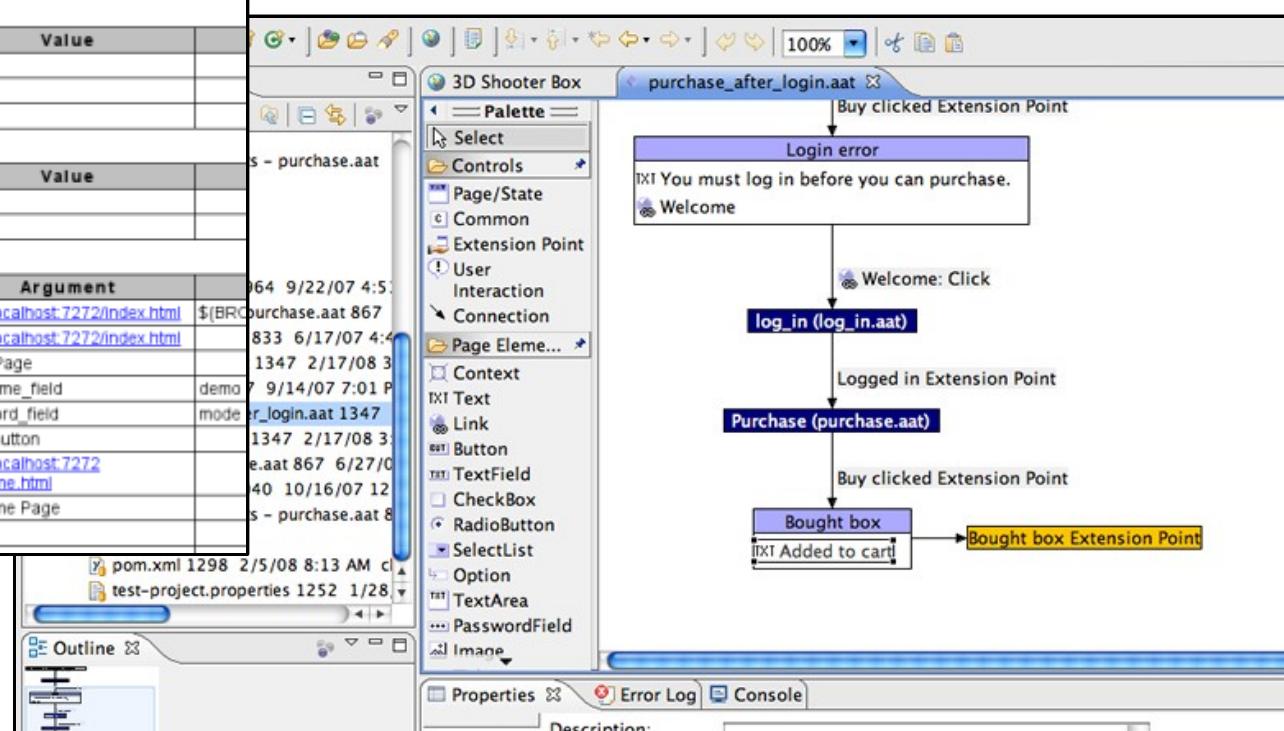
Abstraction layers for Selenium

Lower maintenance effort by encapsulation of test script code in reusable, “parameterizable” building blocks

Robot Framework + Selenium Library
(Open Source on Google Code)

Simple Login		
Setting	Value	Value
Force Tags	regression	smoke
Library	SeleniumLibrary	
Variable	Value	Value
<code>\$(BROWSER)</code>	Firefox	
Test Case	Action	Argument
Valid Login	Open Browser	http://localhost:7272/index.html
	Location Should Be	http://localhost:7272/index.html
	Title Should Be	Login Page
	Input Text	username_field
	Input Text	password_field
	Click Button	login_button
	Location Should Be	http://localhost:7272/welcome.html
	Title Should Be	Welcome Page
	Close Browser	

CubicTest Eclipse plugin (Selenium subproject)



<http://cubictest.seleniumhq.org/>
<http://robotframework.org/>

Another tool: Canoo WebTest

```
<webtest name="register">
  <invoke url="http://www.fh-stralsund.de/jforum"/>
  <clickLink href="user/insert"/>

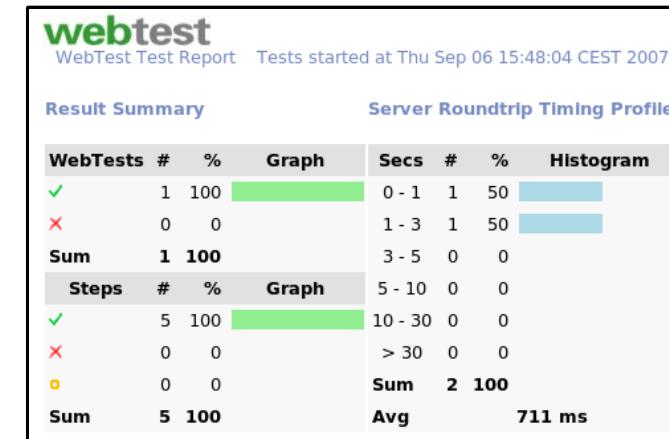
  <verifyText text="Registration agreement terms"/>
  <clickButton name="submit" />

  <verifyText text="Registration Information" />
  <setInputField name="username" value="john" />
  <setInputField name="email" value="jdoe@email.com" />
  <setInputField name="password" value="abc123" />
  <setInputField name="password_confirm" value="abc123" />
  <clickButton name="submit" />

  <verifyText text="Registration Complete" />
  <clickLink href="user/edit"/>
  <verifyText text="General Information about yourself" />
  <verifyText text="john" />
  <verifyText text="jdoe@email.com" />
</webtest>
```

Example test script
 Tool download: <http://webtest.canoo.com>

- XML-based test scripts
- “Headless” execution – no browser required
- Open Source project



Summary: Pros and Cons of test automation

Pro

- Test execution is cheap and quick, enables frequent regression testing
- Enables large test suites
- Quick feedback for developers
- Explicit documentation of test cases

Contra

- Maintenance effort
- “Path through minefield” analogy – no new errors can be found
- Dependency of test cases may block execution
- Lower fault sensitivity than human tester (“common sense”)