



Exploratory Testing Foundations

Maaret Pyhäjärvi

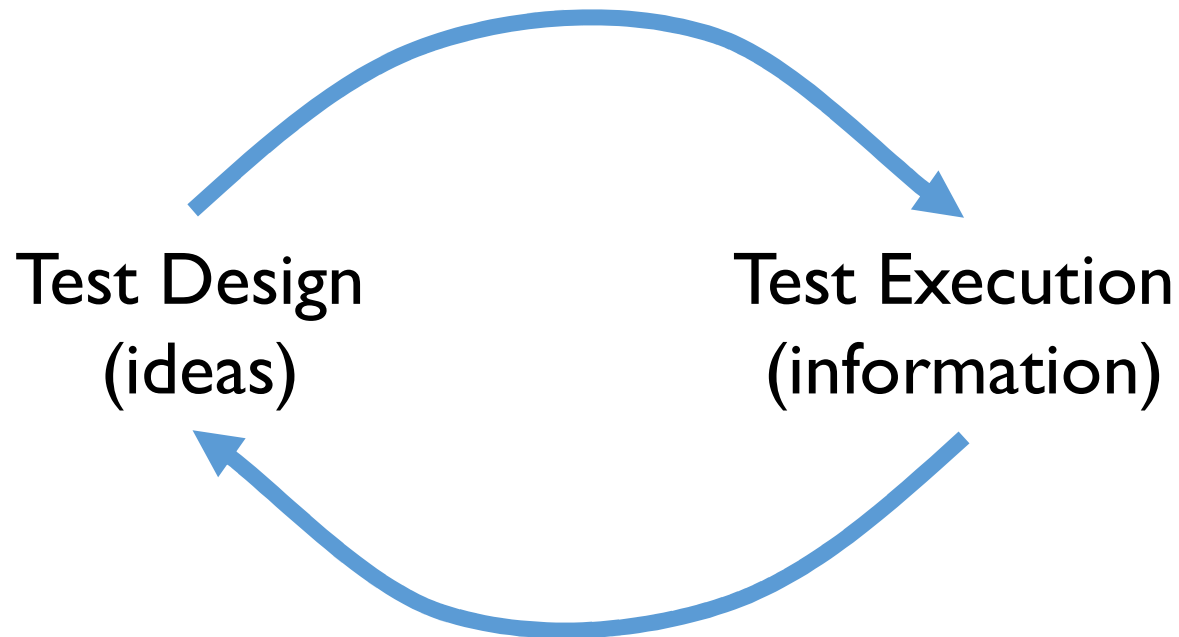


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@maaretp

Optimizing the value of testing

Learning



Exploratory Testing

the Verb





Input

Tester

Domain knowledge

Requirements and specifications

Testing knowledge

Miscellaneous knowledge



Output

Better tester

Coverage

Information incl. defects and change requests

Documentation: Strategy

Documentation: Tests

Course Outline

Chapter 1: Test target and our options for exploring

Chapter 2: Self-management basics on setting yourself constraints

Chapter 3: The moment of first impression

Chapter 4: Recognizing and learning a domain

Chapter 5: Recognizing functionality

Chapter 6: Recognizing data

Chapter 7: Recognizing application and execution environment

Chapter 8: Documenting in a mindmap

Chapter 9: Robot framework the very basics

Chapter 10: Documenting as skeleton test automation

Chapter 11: Robot framework browser library and CSS selectors on web pages

Chapter 12: Documenting as executable test automation

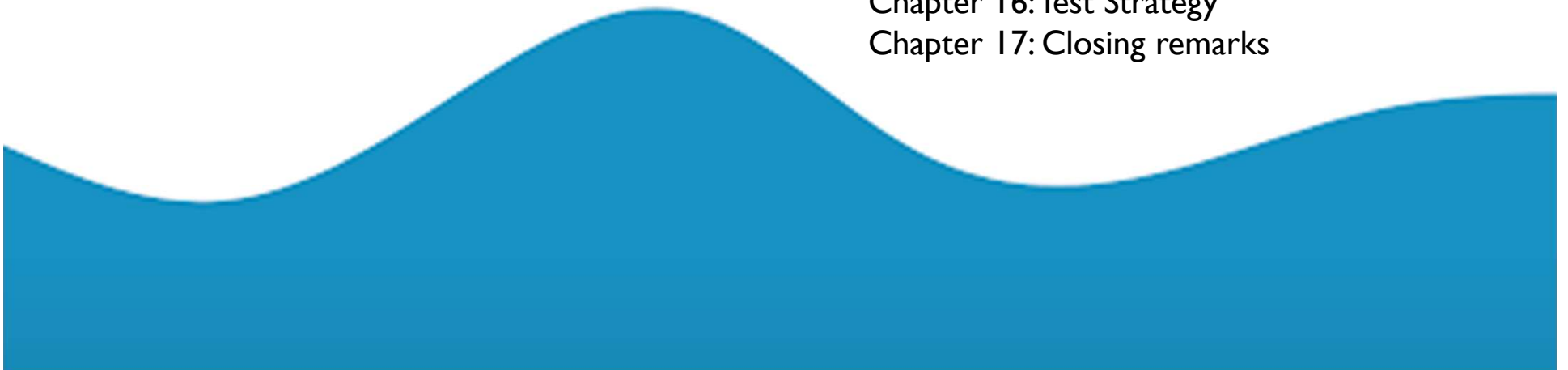
Chapter 13: Why this is not about Robot Framework

Chapter 14: Use of time

Chapter 15: Coverage

Chapter 16: Test Strategy

Chapter 17: Closing remarks



Course Outline

- Section I: Options for Exploring 1 3
- Section II: Control through Choices 2
- Section III: Documenting (with Automation)
Extending with Function, Data,
Environment and Domain 4-13
- Section IV: Use of time and coverage 14-17

Test Target and Our Options for Exploring

Chapter I





exploratorytestingacademy.com/app/



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This test target is from collections of [Alan Richardson, eviltester](#), a brilliant exploratory tester.

E-Primer an e-prime checking tool

Do you want to write without using the verb "to be"?

Do you want to master [e-prime](#)?

Use our online tool to check your writing.

- Word Count:
- Discouraged Words:
- Possible Violations:

Text:

Check For E-Prime



Stop-and-Think: Options for Exploring

What would you do first, and soon after you get started?

List all things that come to your mind about how you could test this. What would you start from? What you would not do?

Options for Exploring

Research the Domain
Use it *with a constraint*

Self-management Basics on Setting Yourself Constraints

Chapter 2



Charters

Charter template

- *target*: where you're exploring
- *resources*: what you're using/how you're exploring
- *information*: what question you want to answer

*Elizabeth Zagroba's concise template adapted
from Elizabeth Hendrickson's template*

Choose Your Own Constraint

Deliberately excluding perspectives!
Never Be Bored!

Explore with Intent

INTENT

Mission

Charter

Other
Charters

Details

LEARNINGS



Stop-and-Think: Charters, Constraints, Intent

You're approaching the moment of first impression. How do you want to frame your moment of first impression?

The Moment of First Impression

Chapter 3



Options *Expire*

Capture First Impression
Borrow someone else's First Impression
Timing of feedback changes reaction to it!

Let's Test

<https://www.exploratorytestingacademy.com/app/>

<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>



Example: Test Results, Red is Bug



Bugs are Conversation Starters

Bug is anything that might bug a user.
You start conversations about defects and
change requests.

Recognizing and Learning a Domain

Chapter 4



Conference
Reference
Inference

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- Possible Violations: 1

To **be** or not to **be is** **Hamlet's** dilemma

Text:

To be or not to be is Hamlet's dilemma

Check For E-Prime

```
function inEPrimeOutputFormat(aWord){
    return '<span class="ep_violation">' + aWord + "</span>";
}

function inPossibleEPrimeOutputFormat(aWord){
    return '<span class="ep_warning">' + aWord + "</span>";
}

function isDiscouragedWord(aWord){

    var discouragedWords = new Array();
    discouragedWords['be'] = 'be';
    discouragedWords['being'] = 'being';
    discouragedWords['been'] = 'been';
    discouragedWords['am'] = 'am';
    discouragedWords["isn't"] = "isn't";
    discouragedWords["are"] = "are";
    discouragedWords["aren't"] = "aren't";
    discouragedWords["was"] = "was";
    discouragedWords["wasn't"] = "wasn't";
    discouragedWords["were"] = "were";
    discouragedWords["weren't"] = "weren't";
    discouragedWords["is"] = "is";
    discouragedWords["ain't"] = "ain't";
    discouragedWords["i'm"] = "i'm";
    discouragedWords["amn't"] = "amn't";

    return (discouragedWords[aWord.toLowerCase()]==aWord.toLowerCase());

}
```

Let's Test

<https://www.exploratorytestingacademy.com/app/>

<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>





Learning of Domain of E-Primer

Core Idea	Writing English language avoiding verb “be” in all its forms
Why?	Someone claims it had benefits, intellectual challenge
Examples	Used in sentences Listed examples
Sample texts	The Bible!

Recognizing Functionality

Chapter 5



Naming of Function

Functions in Code
Expected Features
Visible Features

Let's Test

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Learning of Function of E-Primer

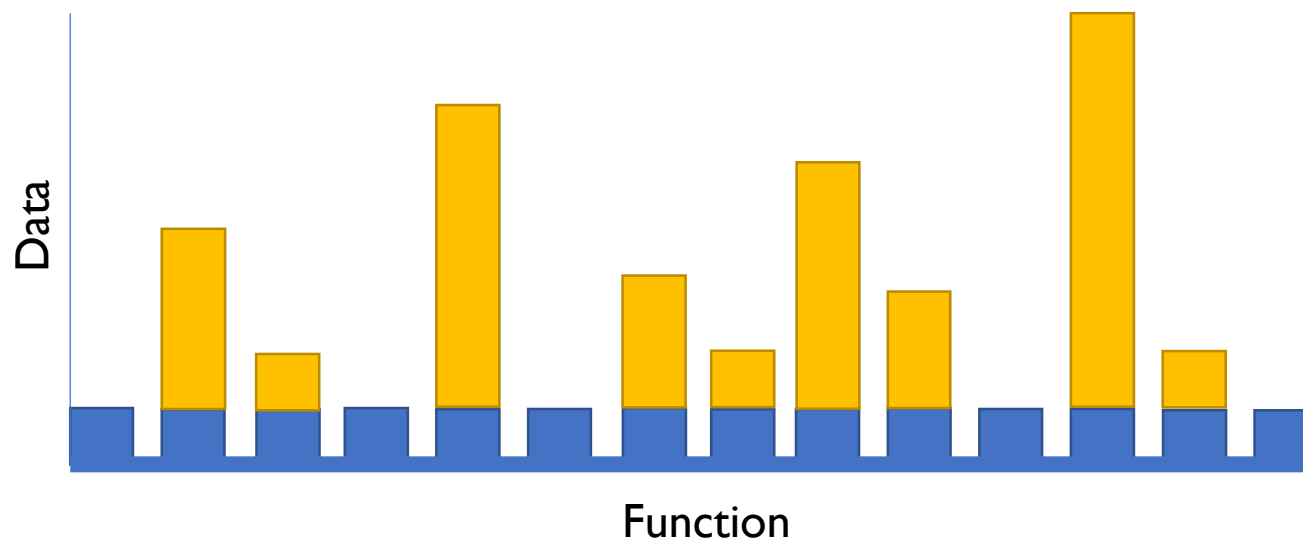
Input	Text field and button
Output	Three numbers, text area
Containers	Resizable text field, resizable browser window, page
Presentation	Fonts, text and element sizes, order of functions
Browser	Settings, zoom
Algorithm	Recognizing eprime

Recognizing Data

Chapter 6



Data or Variables



Versatile Data

Lifecycle of Data: Create, Read, Update,
Delete

Known problematic inputs: GitHub Naughty
Strings

<https://github.com/minimaxir/big-list-of-naughty-strings/blob/master/blns.txt>

Let's Test

<https://www.exploratorytestingacademy.com/app/>

<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>





Learning of Data of E-Primer

Word delimiter	Space, wordcount breaks with characters and line change
Types of apostrophes	Typesetter / typewriter
Long text	Copied / tool generated
Valid eprime	Recognizing right as right
Eprime violations	Recognizing wrong as wrong

Recognizing Application and Execution Environment

Chapter 7



What *You Coded* is a Bad Constraint



Naomi Wu 机械妖姬
@RealSexyCyborg

...

You can't say "Signal is secure, it's the OS that's not" if Signal cannot operate without an OS. They are a system—can only be used as a system, they need to be evaluated as a system, and their effectiveness as a system disclosed to customers.

3:58 AM · Jan 16, 2021 · Twitter Web App

Execution Environment

Different browsers: web and mobile
Browser functionality and add-ons
HTML standard compatibility
Accessibility standard compatibility

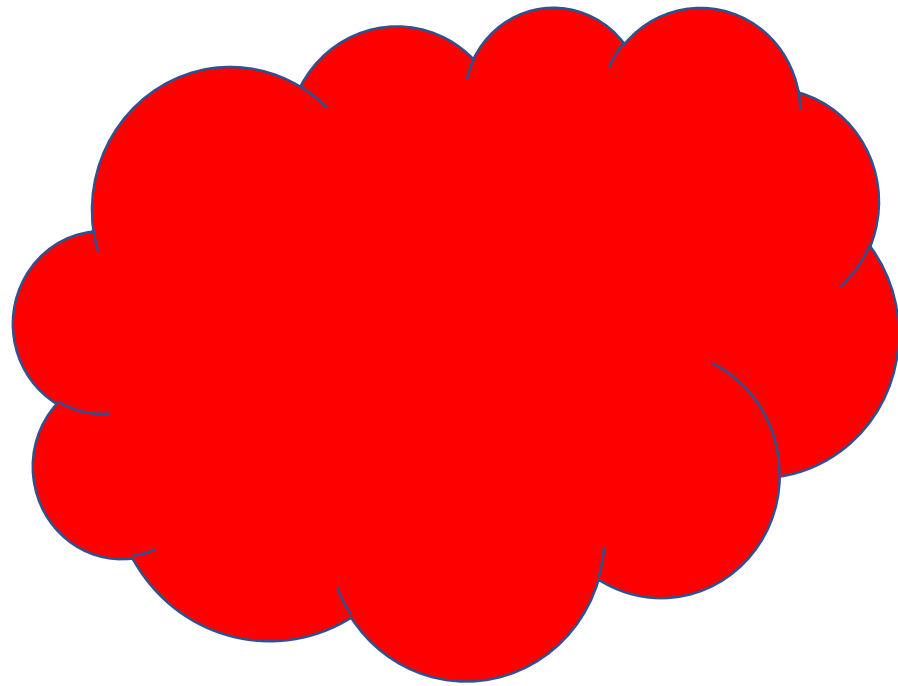
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Learning of Application and Execution Environment of E-Primer

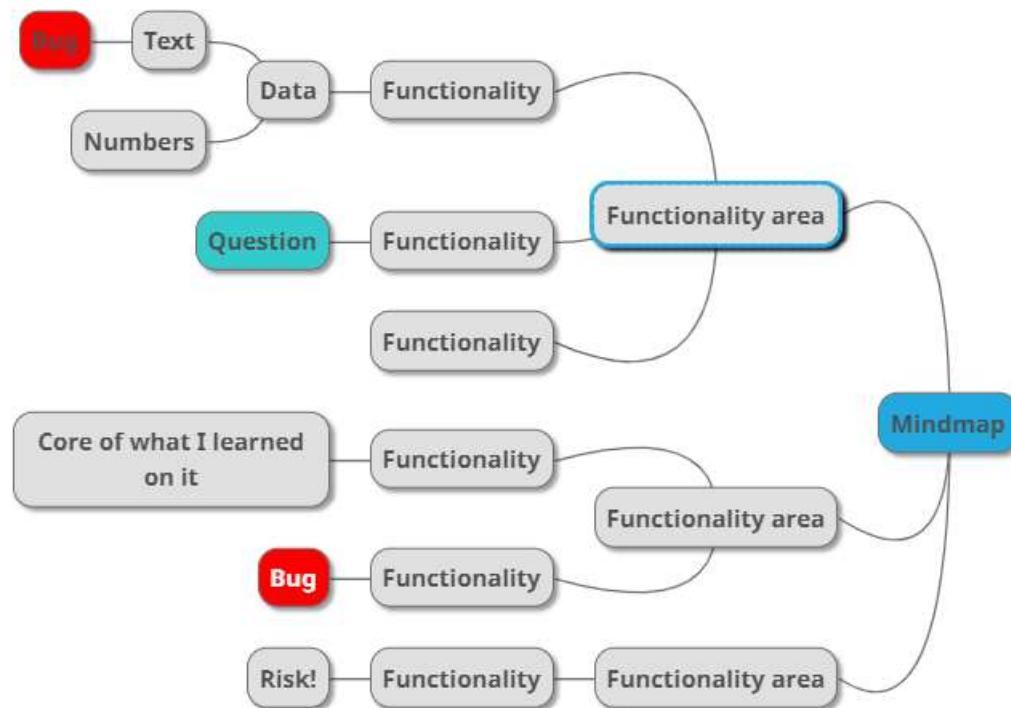


Documenting in a Mindmap

Chapter 8



Mindmap



Cem Kaner. Bug Reporting Heuristic.

Bug Reports

R eplicate
I solate
M aximimize
G eneralize
E xternalize
n eutral tone

Let's Test

<https://www.exploratorytestingacademy.com/app/>

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Mindmapping as Future Reference

Notetaking in the moment

Restructure as you learn

Documentation for the future

General purpose mindmaps

Robot Framework the Very Basics

Chapter 9



Robot Framework

Custom-made language

Built-in reporting

Ecosystem of keyword libraries

Documenting as Skeleton Test Automation

Chapter 10



Log

```
1  *** Test Cases ***
2  This is a test case name
3      Log      First thing to do
4      Log      Second thing to do
5      Log      Third thing to do
```

```
=====
Basic
=====
This is a test case name | PASS |
-----
Basic | PASS |
1 critical test, 1 passed, 0 failed
1 test total, 1 passed, 0 failed
=====
```

Let's Test

<https://www.exploratorytestingacademy.com/app/>

<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>





Skeleton Test Automation

Stepwise Test Cases as
Automation Placeholders

Like test cases but version
controlled as code

Handoff to a task that is
decomposing testing
differently

Robot Framework Browser Library and css selectors on Web Page

Chapter 11



Browser Library

Playwright inside
Speed – Reliability – Visibility
Automatic waits

```
1  *** Settings ***  
2  Library           Browser  
3
```

css selectors

css=

#id

.class

tag

[attribute='value']

[part_of_attribute_value_contains*='value']

Keywords

```
1  *** Settings ***
2  Library           Browser
3
4  *** Test Cases ***
5  Open the Page Headless
6      New Page      https://www.exploratorytestingacademy.com/app/|
```

<https://marketsquare.github.io/robotframework-browser/Browser.html>

Documenting as Executable Test Automation

Chapter 12




Let's Test

<https://www.exploratorytestingacademy.com/app/>

<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>



```
1  *** Settings ***
2  Library           Browser
3  Test Setup        Default Setup
4  Test Teardown     Default Teardown
5
6  *** Variables ***
7  ${URL}            https://www.exploratorytestingacademy.com/app/
8  ${input text}     To be or not to be is Hamlet's dilemma
9  ${word count}     9
10 ${discouraged count} 3
11
12 *** Test Cases ***
13
14 Verify Word Text
15     New Page      ${URL}
16     Fill Text     css=#inputtext  ${input text}
17     Click         css=#CheckForEPrimeButton
18     Get Text      css=#eprimeoutput ==  ${input text}
19     Get Text      css=#wordCount    ==  ${word count}
20     Get Text      css=#discouragedWordCount ==  ${discouraged count}
21
22 *** Keywords ***
23 Default Setup
24     New Browser   chromium    headless=${FALSE}
25
26 Default Teardown
27     Close Browser
```



firstTest Log

Generated
20210202 21:16:15 UTC+02:00
22 seconds ago

Test Statistics

Total Statistics	Total	Pass	Fail	Elapsed	Pass / Fail
Critical Tests	1	1	0	00:00:03	<div></div>
All Tests	1	1	0	00:00:03	<div></div>
Statistics by Tag	Total	Pass	Fail	Elapsed	Pass / Fail
No Tags					
Statistics by Suite	Total	Pass	Fail	Elapsed	Pass / Fail
firstTest	1	1	0	00:00:04	<div></div>


Test Execution Log

SUITE firstTest	00:00:03.523
Full Name:	firstTest
Source:	C:\BitbucketRepos\localBrowserCoiole\prime\firstTest.robot
Start / End / Elapsed:	20210202 21:16:11.775 / 20210202 21:16:15.298 / 00:00:03.523
Status:	1 critical test, 1 passed, 0 failed 1 test total, 1 passed, 0 failed
TEST Verify Word Text	00:00:02.642
Full Name:	firstTest.Verify Word Text
Start / End / Elapsed:	20210202 21:16:12.650 / 20210202 21:16:15.292 / 00:00:02.642
Status:	PASS (critical)
SETUP Default Setup	00:00:00.613
KEYWORD Browser.New Page \${URL}	00:00:01.703
KEYWORD Browser.Fill Text css=#inputtext, \${input text}	00:00:00.036
KEYWORD Browser.Click css=#CheckForEPrimeButton	00:00:00.049
KEYWORD Browser.Get Text css=#eprimeoutput, ==, \${input text}	00:00:00.026
KEYWORD Browser.Get Text css=#wordCount, ==, \${word count}	00:00:00.015
KEYWORD Browser.Get Text css=#discouragedWordCount, ==, \${discouraged count}	00:00:00.014
TEARDOWN Default Teardown	00:00:00.160

```
test.robot x
1  *** Settings ***
2  Library           Browser
3  Test Setup        Default Setup
4  Test Teardown      Default Teardown
5  Test Template      Verify Word Text
6
7  *** Variables ***
8  ${URL}             https://www.exploratorytestingacademy.com/app/
9
10 *** Test Cases ***
11 Test1_             nothing_             1_ 0
12 Test2_             to be or not to be_   6_ 2
13 Test3_             The cat is my only pet_ 6_ 1
14 Test4_             The cat is Garfield_  4_ 1
15 Test5_             be, being, been, am, is, isn't, are, aren't, was, wasn't, were, and weren't._ 13_ 12
16 Test6_             I'm, you're, we're, they're, he's, she's, it's, there's, here's, where's, how's, what's, who's, aint's, that's._ 15_ 15
17 Test7_             ${EMPTY}_            0_ 0
18
19 *** Keywords ***
20 Verify Word Text
21     [Arguments]    ${input text}        ${word count}        ${discouraged count}
22     New Page        ${URL}
23     Fill Text       css=#inputtext      ${input text}
24     Click           css=#CheckForEPrimeButton
25     Get Text        css=#eprimeoutput    ==    ${input text}
26     Get Text        css=#wordCount       ==    ${word count}
27     Get Text        css=#discouragedWordCount ==    ${discouraged count}
28
29 Default Setup
30     New Browser      chromium    headless=${FALSE}
31
32 Default Teardown
33     Close Browser
```

Source: C:\BitbucketRepos\local\BrowserCoiole\prime\test.robot
Start / End / Elapsed: 20210123 19:00:35.362 / 20210123 19:01:09.799 / 00:00:34.437
Status: 7 critical test, 6 passed, 1 failed
7 test total, 6 passed, 1 failed

REPORT

+ TEST	Test1	00:00:09.916
+ TEST	Test2	00:00:03.287
+ TEST	Test3	00:00:03.089
+ TEST	Test4	00:00:03.193
+ TEST	Test5	00:00:03.312
- TEST	Test6	00:00:04.722
Full Name: Test.Test6		
Start / End / Elapsed: 20210123 19:01:01.441 / 20210123 19:01:06.163 / 00:00:04.722		
Status: FAIL (critical)		
Message: Property innerText '1' (str) should be '15' (str)		
+ SETUP	Default Setup	00:00:00.961
- KEYWORD	Verify Word Text I'm, you're, we're, they're, he's, she's, it's, there's, here's, where's, how's, what's, who's, aint's, that's., 15, 15	00:00:03.276
Start / End / Elapsed: 20210123 19:01:02.417 / 20210123 19:01:05.693 / 00:00:03.276		
+ KEYWORD	Browser.New Page \${URL}	00:00:01.622
+ KEYWORD	Browser.Fill Text css=#inputtext, \${input text}	00:00:00.054
+ KEYWORD	Browser.Click css=#CheckForEPrimeButton	00:00:00.053
+ KEYWORD	Browser.Get Text css=#eprimeoutput, ==, \${input text}	00:00:00.024
+ KEYWORD	Browser.Get Text css=#wordCount, ==, \${word count}	00:00:00.023
- KEYWORD	Browser.Get Text css=#discouragedWordCount, ==, \${discouraged count}	00:00:01.495
Documentation: Returns text attribute of the element found by selector. See the 'Finding elements' section for details about the selectors.		
Tags: Assertion, Getter, PageContent		
Start / End / Elapsed: 20210123 19:01:04.198 / 20210123 19:01:05.693 / 00:00:01.495		
19:01:05.575 INFO		
		
19:01:05.693 FAIL Property innerText '1' (str) should be '15' (str)		
+ TEARDOWN	Default Teardown	00:00:00.468
+ TEST	Test7	00:00:03.620

Documenting as Executable Test Automation

Throwaway
automation?

Single line

- See it fail
- First test
- Same test but variables
- Same test but templates
- Failing test with a bug
- Spec to tests
- Guess the values that are likely to fail
- Multiple browsers
- Runs in CI

Why This is not about Robot Framework

Chapter 13



Documentation as a Constraint

A Balancing Act between Now and Future
Never be bored is not possible without
automation

Automation in Frame of Exploratory Testing



Documenting



Extending reach



Alerting to attend



Guiding to detail



Stop-and-Think: Robot Framework Browser

How would the testing you did before this have been different if you were to start with this?

Use of Time

Chapter 14



Test, Bug, Setup

Software with little bugs is faster to test
Setup is configuring, learning and
documenting
Test grows coverage

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- Word Count: 9
- Discouraged Words: 2
- Possible Violations: 1

to be or not to be - hamlet's dilemma

Text:

to be or not to be - hamlet's dilemma

Check For E-Prime

Test Cases
trap

Bug trap

Algorithm
trap



Stop-and-Think: Time and Traps

Where did your time go on testing of the application?

Coverage

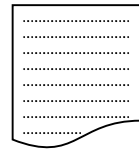
Chapter 15



Setting the Stage for Testing

WHAT
WHEN
WHO
HOW
WHY

We target
these...



Test ideas

...to find
these...

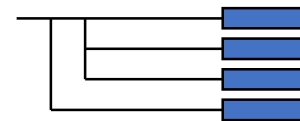


Serious

- B business
- PM project (time)
- T testing (time)
- U user

Coverage?

...to tell if there's
more and what
level we know
things.




Coverage

REQUIREMENTS
RISKS (of relevant bugs)
CODE
ENVIROMENTS

Risk Coverage

Coverage of relevant bugs
Effectiveness – results of overall strategy
facilitate experience of quality for
stakeholders



Stop-and-Think: Coverage of Today's Testing

Would the testing you thought of have missed any of the bugs we have seen?

What did we not test?

Test Strategy

Chapter 16



Ideas that Guide Test Design

Specific to Application Under Test
Risks to ways of testing for them

Let's Test

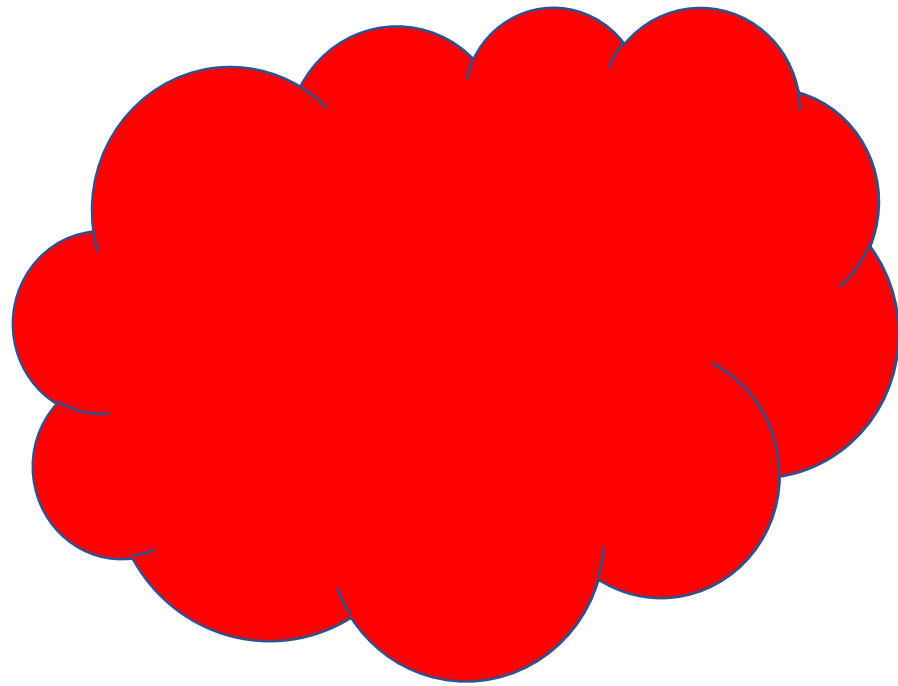
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<https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html>



Test Strategy for E-Primer

...



Closing Remarks

Chapter 17



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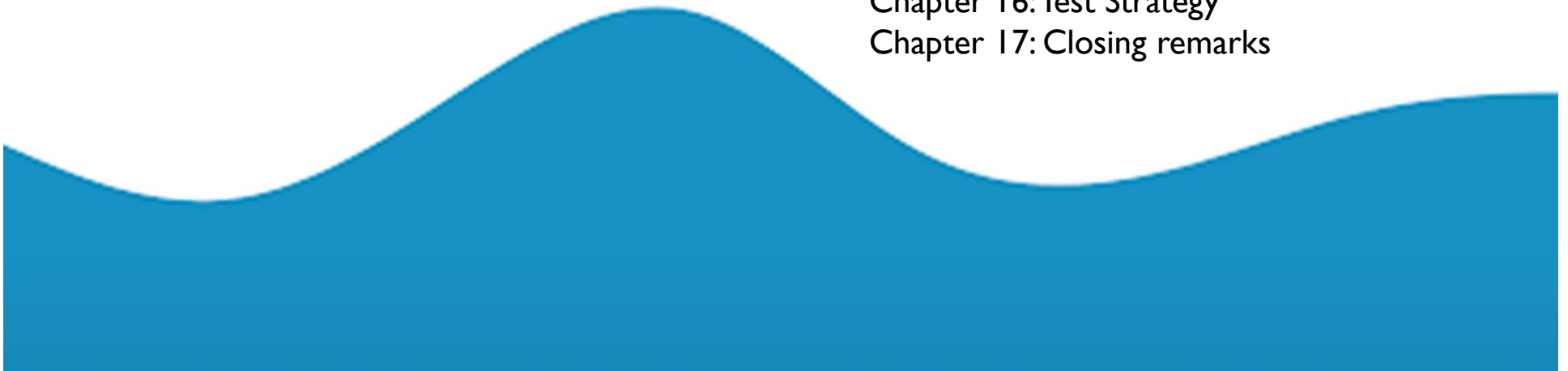
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Maaret Pyhäjärvi



EuroSTAR
TESTING EXCELLENCE
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2020



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TESTING DAYS

MIATPP

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Professional Person

2016

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