Contemporary Exploratory Testing Foundations

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Legacy

maaretp

Optimizing the value of testing

Learning

Test Design
(ideas)

Test Execution
(information)

INPUT → Doing Testing → OUTPUT
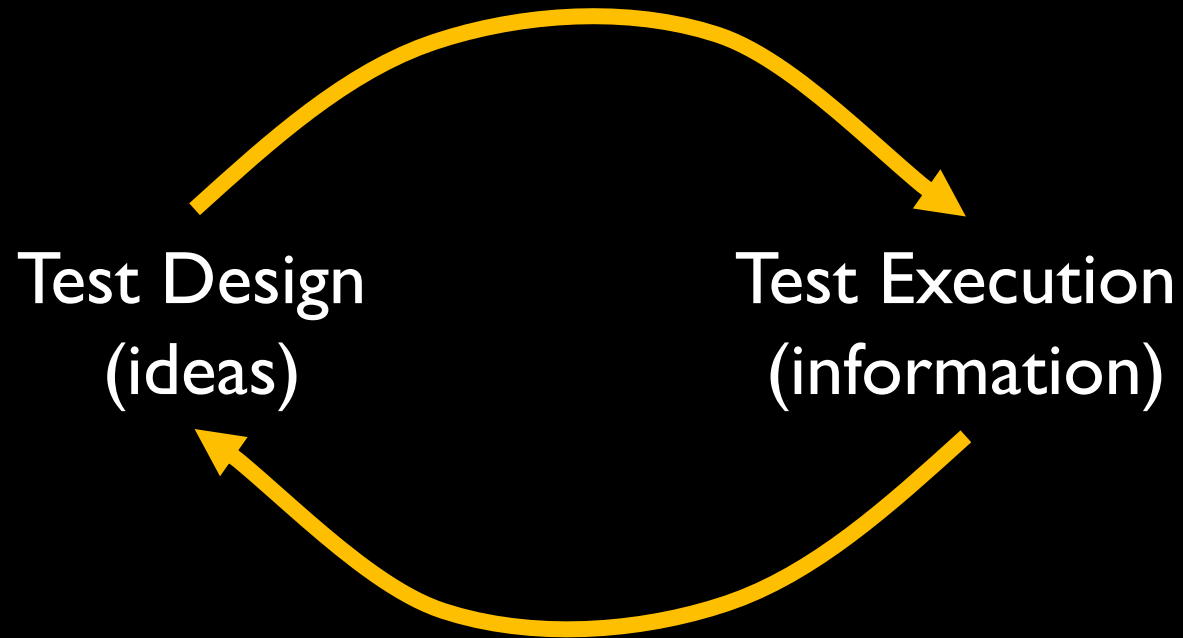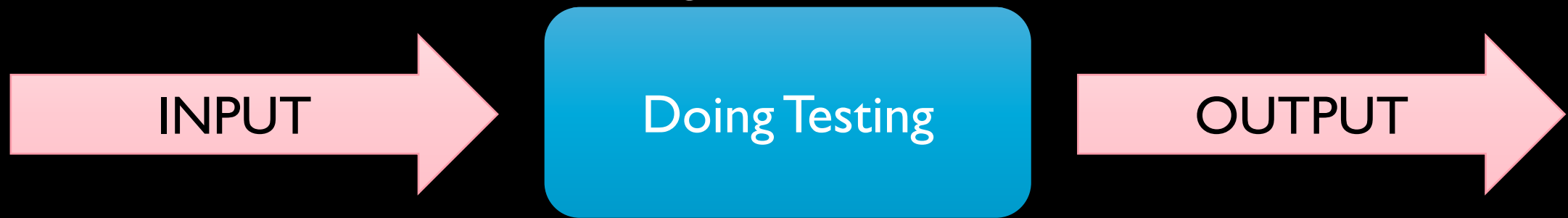
Input

Tester

Domain knowledge
Requirements and specifications
Testing knowledge
Miscellaneous knowledge

INPUT → **Doing Testing** → OUTPUT

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: pytest the very basics

Chapter 10: Documenting as skeleton test automation

Chapter 11: Playwright library and CSS selectors on web pages

Chapter 12: Documenting as executable test automation

Chapter 13: Why this is not about any specific tool

Chapter 14: Use of time

Chapter 15: Coverage

Chapter 16: Test Strategy

Chapter 17: Full results and reproducing from customer feedback

Chapter 18: Closing remarks

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Course Outline

Section 1:   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

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Test Target and Our Options for Exploring

Chapter 1

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✓ Modification	✗ Liability	ⓘ State changes
✓ Distribution	✗ Warranty	
✓ Patent use		
✓ Private use		

This test target is from collections of <u>Alan Richardson, eviltester</u>, 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 <u>e-prime</u>?

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 test target *with a constraint*

Self-management Basics on Setting Yourself Constraints

Chapter 2

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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
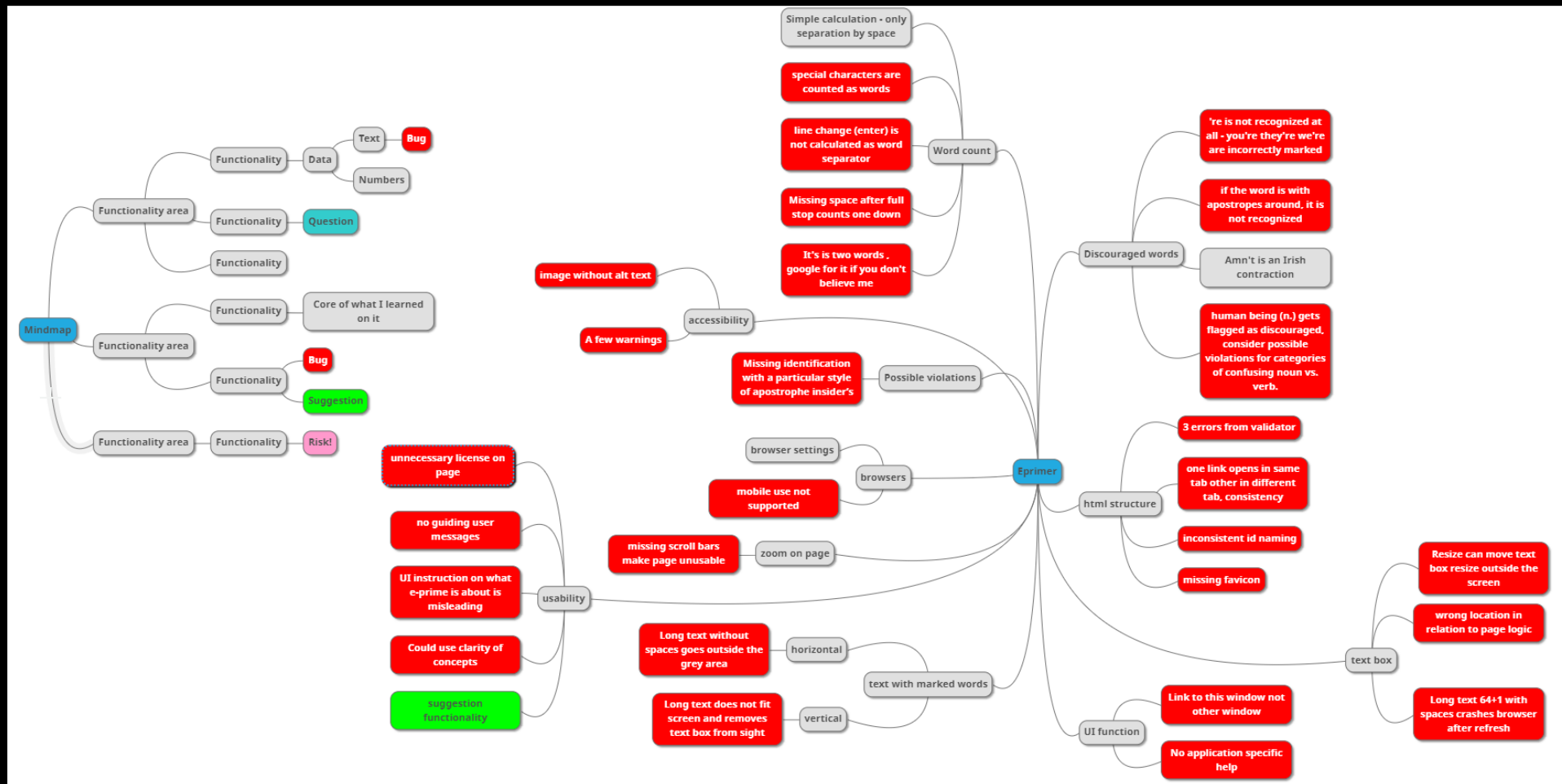
Bugs are *Conversation* Starters

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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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: 9
- Discouraged Words: 3
- 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

```javascript
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

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

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
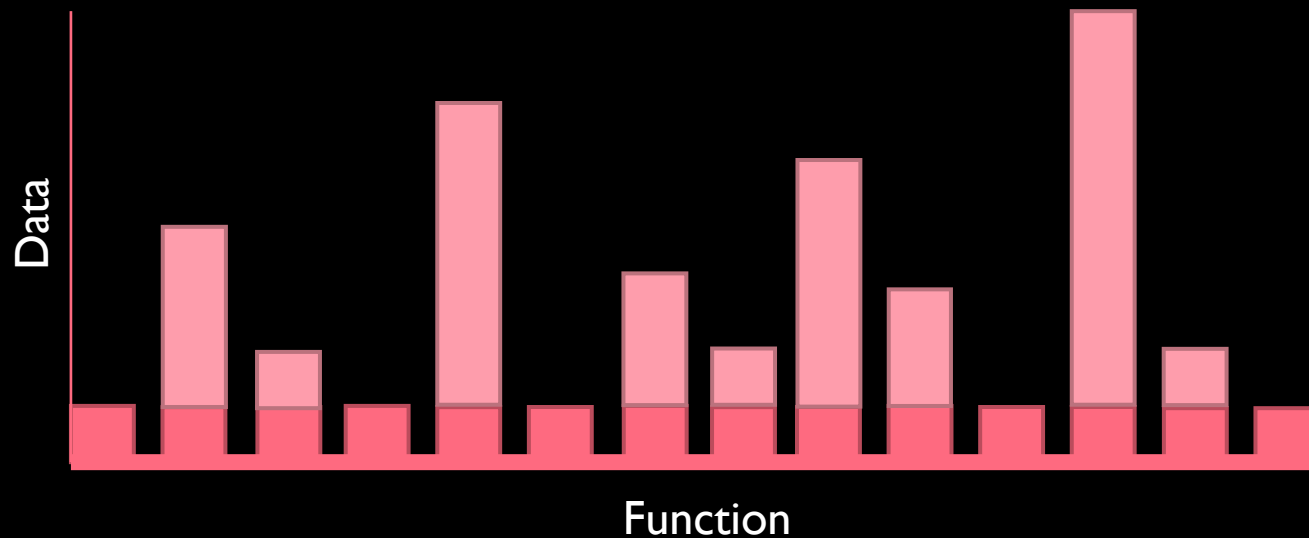
Versatile Data

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

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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

Let's Test

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

Learning of Application and Execution Environment of E-Primer

Browser	Chrome, Brave, …
Screen size	Web, Mobile
Browser Settings	Zoom, Security, …
Add-ons	BugMagnet
Validators	HTML, Accessibility, …

Documenting in a Mindmap

Chapter 8

Mindmap
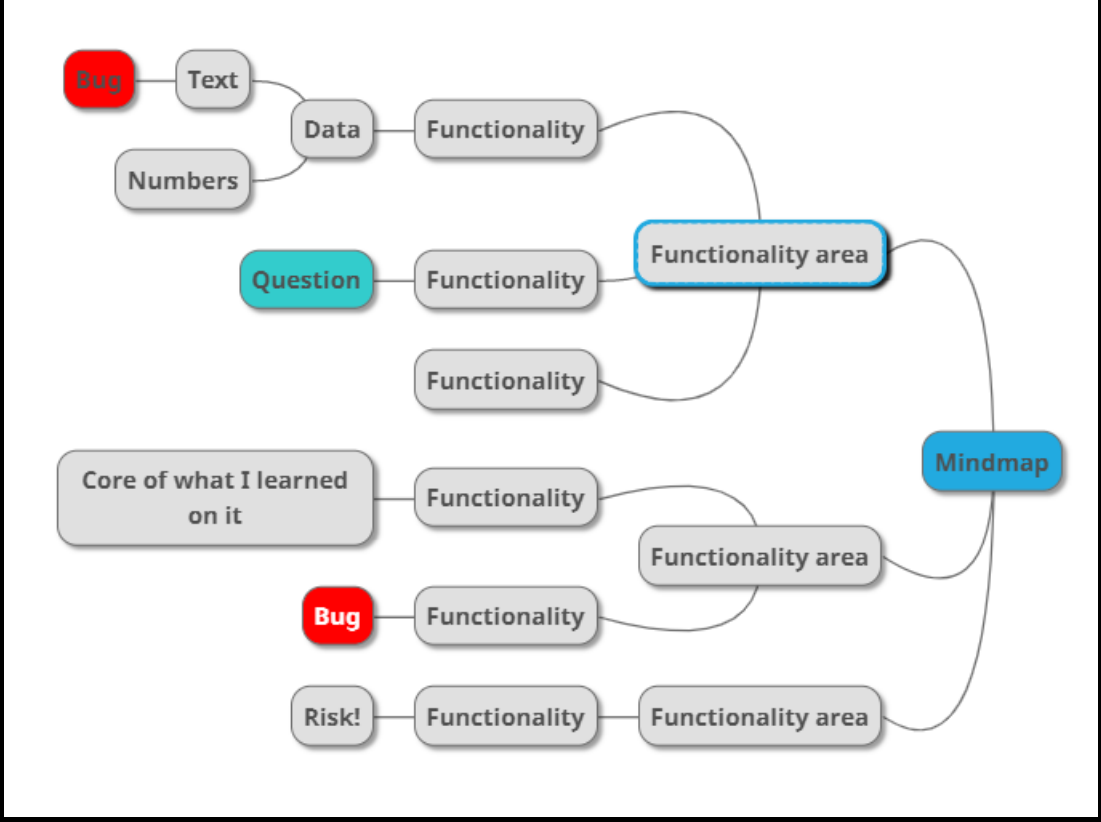
Cem Kaner. Bug Reporting Heuristic.

Bug Reports

R eplicate
I solate
M azimize
G eneralize
E xternalize
N eutral tone

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Let's Test

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

Mindmapping as Future Reference

Notetaking in the moment

Restructure as you learn

Documentation for the future

General purpose mindmaps

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pytest
the Very Basics

Chapter 9

pytest

Popular test runner for python language
Used both for unit tests and orchestrated tests
Integrates with libraries in python ecosystem

Documenting as Skeleton Test Automation

Chapter 10

Document in Context of Code

```python
def this_is_a_test():
    #first thing to do
    #second thing to do
    #third thing to do
    pass
```

```
================================= test session starts =================================
platform win32 -- Python 3.10.2, pytest-7.0.0, pluggy-1.0.0
rootdir: C:\avimet\avimet-bdd, configfile: pytest.ini
plugins: anyio-3.5.0, approvaltests-0.2.3, base-url-1.4.2, bdd-5.0.0, playwright-0.2.2
collected 1 item


test.py .                                                                        [100%]


================================== 1 passed in 0.02s ==================================
PS C:\avimet\avimet-bdd\tests>
```

```
Scenario: Eprime analysis                                    * Runnable with pytest-bdd
    Given the eprime page is displayed
    When user analyses sentence to be or not to be
    Then user learns sentence has 2 be-verbs, 0 possible be-verbs and total 6 words
```

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

Playwright Library and css Selectors on Web Page

Chapter 11

Playwright Library

Browser driver by Microsoft
Speed – Reliability –Visibility
Automatic waits

```
from playwright.sync_api import Page
```

Library / Methods

```python
1  import pytest
2  from playwright.sync_api import Page
3
4  def test_example(page: Page):
5      page.goto("https://www.exploratorytestingacademy.com/app/")
6      page.screenshot(path="example.png")
```

https://playwright.dev/python/docs/intro

css selectors

css=
#id
.class
tag
[attribute='value']
[part_of_attribute_value_contains*='value']

Documenting as Executable Test Automation

Chapter 12

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Let's Test

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

https://www.linkedin.com/in/maaret/   @maaretp@mas.to

```python
first_test.py ✕

 1    from playwright.sync_api import Page
 2
 3
 4 ▶  def test_example(page: Page):
 5        page.goto("https://www.exploratorytestingacademy.com/app/")
 6    💡  page.fill("#inputtext", "To be or not to be - Hamlet's dilemma")
 7        page.click("#CheckForEPrimeButton")
 8        # it should really be 8, but it's not
 9        assert page.inner_text("#wordCount") == "9"
10        assert page.inner_text("#discouragedWordCount") == "2"
11        assert page.inner_text("#possibleViolationCount") == "1"
12
```

▶ ✓ ⊘ ↓ᵃᶻ ↓≡ ≡ ≡ ↑ ↓ 🕑 ↙ ↗ ⚙   ✓ Tests passed: 1 of 1 test – 3 sec 622 ms

⌄ ✓ Test Results   3 sec 622 ms   C:\pythonProject\eprime-bdd\venv\Scri

                                                     Testing started at 21:56 ...

                                                     C:\Users\mapyh\AppData\Local\JetBrains

                                                        from distutils import version

                                                     Launching pytest with arguments first_

                                                     ================================ test ses

                                                     collecting ... collected 1 item

    ┌─────────────────────┐
    │ Tests passed: 1   │   first_test.pv::test_example[chromium]
    └─────────────────────┘

▶ Run   ≡ TODO   ❶ Problems   >_ Terminal   ≋ Python Packages   🐍 Python Console   ▶ Services

Tests passed: 1 (a minute ago)

```python
import pytest
from playwright.sync_api import Page

url = "https://www.exploratorytestingacademy.com/app/"

def this_is_file(text):...

@pytest.mark.parametrize('input_text, expect_wordcount, expect_discouraged, expect_violation',
[
    ("To be or not to be - Hamlet's dilemma", 8, 2, 1),
    ("nothing", 1, 0, 0),
    ("to be or not to be", 6, 2, 0),
    ("", 0, 0, 0),
    ("be, being, been, am, is, isn't, are, aren't, was, wasn't, were, and weren't.", 17, 12, 0),
    ("\n", 0, 0, 0),
    ("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.", 30, 4, 11),
    ("first\nsecond", 2, 0, 0),
    ("ain't, amn't", 4, 2, 0),
    ("Hanna's Esa's Meera's Süess-O'Reggio's or Okechukwu's", 6, 0, 5),
    ("'be'", 1, 1, 0),
    ("human being", 2, 0, 0),
    ("typewriter's apostrophe", 2, 0, 1),
    ("typesetter's apostrophe", 2, 0, 1),
    (1000 * "x", 1, 0, 0),
    (this_is_file('sample'), 508, 2, 0),
    (this_is_file('bible'), 31172, 21, 1),
    ('cat sat\n', 2, 0, 0)
],
ids=['demo', 'not eprime', 'hamlet', 'empty', 'be in forms', 'newline', 'contractions', 'newline with words', 'slang',
'possessive', 'quoted be', 'not verb', 'typewriters apostrophe', 'typesetters apostrophe', 'long word', 'file', 'bible', 'ending newline']
)

def test_parametrized_test(page: Page, input_text, expect_wordcount, expect_discouraged, expect_violation):
    page.goto(url)
    page.fill("#inputtext", input_text)
    page.click("#CheckForEPrimeButton")
    assert page.inner_text("#wordCount") == str(expect_wordcount)
    assert page.inner_text("#discouragedWordCount") == str(expect_discouraged)
    assert page.inner_text("#possibleViolationCount") == str(expect_violation)
```

18 tests,
3 browsers

⊗ Tests failed: 10, passed: 8 of 18 tests – 8 sec 470 ms

∨ ⊗ Test Results		8 sec 470 ms
∨ ⊗ eprime_tests		8 sec 470 ms
∨ ⊗ test_parametrized_test		8 sec 470 ms
⊗ (chromium-demo)		1 sec 126 ms
✔ (chromium-not eprime)		391 ms
✔ (chromium-hamlet)		496 ms
✔ (chromium-empty)		406 ms
⊗ (chromium-be in forms)		417 ms
⊗ (chromium-newline)		495 ms
⊗ (chromium-contractions)		347 ms
⊗ (chromium-newline with words)		306 ms
⊗ (chromium-slang)		576 ms
⊗ (chromium-possessive)		337 ms
⊗ (chromium-quoted be)		393 ms
⊗ (chromium-not verb)		394 ms
✔ (chromium-typewriters apostrophe)		434 ms
⊗ (chromium-typesetters apostrophe)		348 ms
✔ (chromium-long word)		528 ms
✔ (chromium-file)		318 ms
✔ (chromium-bible)		618 ms
✔ (chromium-ending newline)		540 ms

```
C:\pythonProject\eprime-bdd\venv\Scripts\
Testing started at 22:29 ...
C:\Users\mapyh\AppData\Local\JetBrains\Py
    from distutils import version
Launching pytest with arguments eprime_te

============================== test sessi
collecting ... collected 18 items

eprime_tests.py::test_parametrized_test[c
eprime_tests.py:10 (test_parametrized_tes
9 != 8

Expected :8
Actual   :9
<Click to see difference>


page = <Page url='https://www.exploratory
input_text = "To be or not to be - Hamlet
expect_discouraged = 2, expect_violation

    @pytest.mark.parametrize('input_text,
    [
        ("To be or not to be - Hamlet's c
        ("nothing", 1, 0, 0),
```

10 bugs

Requires pytest-bdd + refactoring to step-methods

```gherkin
eprime.feature

Feature: Eprime text analysis
    As a user,
    I want to verify my text for violations of eprime,
    So I learn to write proper English

    Scenario Outline: Eprime samples are correctly analyzed
        Given the eprime page is displayed
        When user analyses sentence <sentence>
        Then user learns sentence has <count_certain> be-verbs, <count_possible> possible be-verbs and total <count_total> words

        Examples:
        | sentence                              | count_certain | count_possible | count_total |
        | to be or not to be - Hamlet's dilemma | 2             | 1              | 8           |
        | cat is hat                            | 1             | 0              | 3           |
        | nothing                               | 0             | 0              | 1           |
        | be, being, been, am, is, isn't        | 6             | 0              | 7           |
        | are, aren't, was, wasn't, were, weren't | 6           | 0              | 9           |
        | I'm, you're, we're, they're, he's, she's | 6          | 0              | 12          |
        | it's, there's, here's, where's, how's | 5             | 0              | 10          |
        | what's, who's, aint's, that's         | 4             | 0              | 8           |
```

Documenting as Executable Test 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

Throwaway automation?

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Why This is not about Any Specific Tool

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

in https://www.linkedin.com/in/maaret/   m @maaretp@mas.to

Moving Focus

Attended

Learning

Learning

Learning
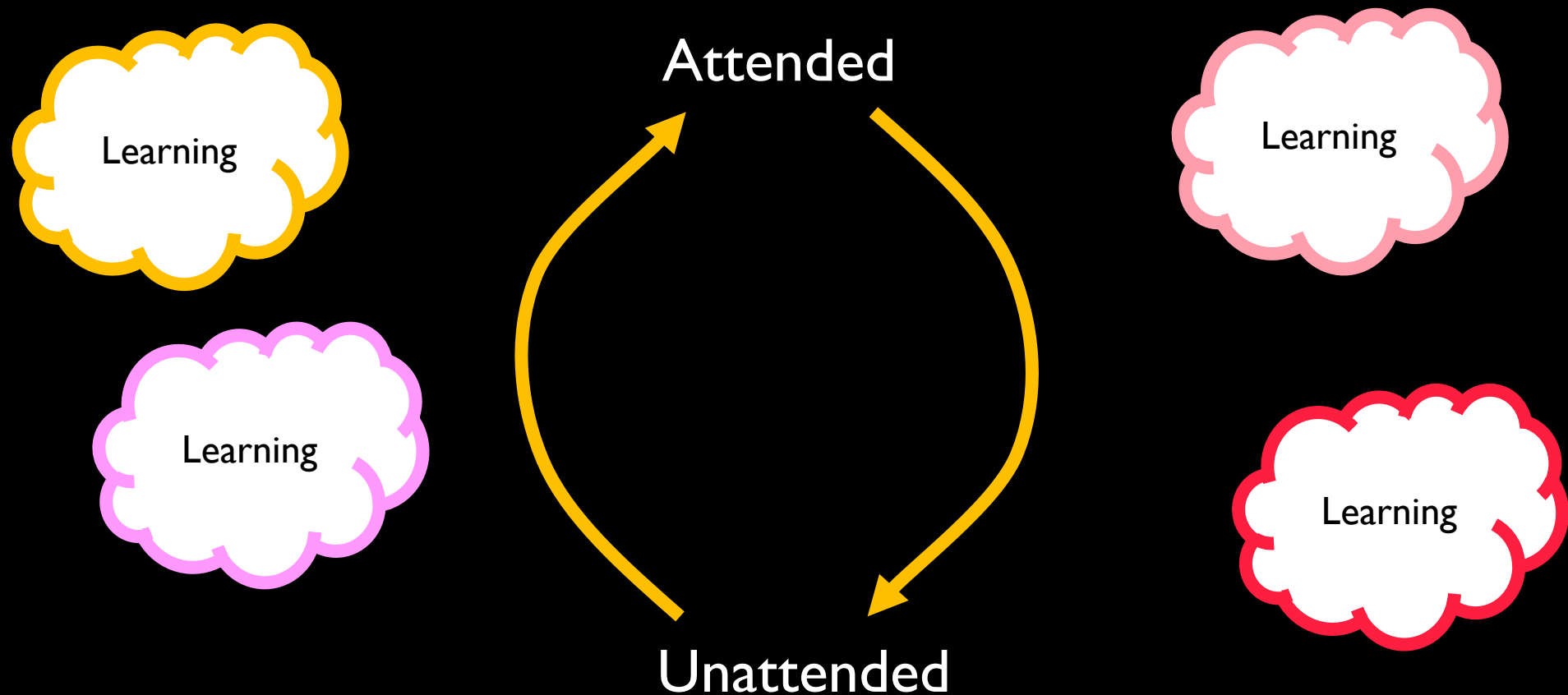
Learning

Unattended

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Stop-and-Think:
Test Automation as Documentation

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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✓ Distribution	✕ Warranty	
✓ Patent use		
✓ Private use		

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Use our online tool to check your writing.

- 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

Data trap

Stop-and-Think:
Time and Traps

Where did your time go on testing of the application?

Coverage

Chapter 15
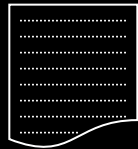
Risk Coverage

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

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

Test Strategy for E-Primer

What is the product?

- E-Primer is an English text validator that checks text against specific rules around avoiding the verb 'to be'. It identifies rule breaking in two categories: one that can be checked by a rule, and another that needs human assessment (for now).

What are the key potential risks?

- It suggest the wrong corrections and misses corrections in realistic text samples

- It miscounts words in a way that leads us to underappreciate the scale of processing.

- It looks wrong on some browsers and data samples

- It requires too much effort to learn in relation to the value of proofreading it provides

How could we test the product so as to evaluate the *actual* risks associated with it?

- Understand the rules of e-prime through research

- Collect data samples (short and long ones) that represent both e-prime text and text that violates rules of e-prime and run them through the program.

- Verify common forms of 'to be' are systematically recognized across the samples

- Document specification as automation that shows the rules of e-prime and enables running subset of all tests across browsers.

- Try fooling word count to count less words or more words by specific data samples

- Run the web page through a set of html-validators

- Visually verify the page with realistic e-prime text samples

- Read the code of the application for inspiration focusing on names of functions rather than understanding implementation

- Summarize learning obstacles for user and value of the application as comparison sheet

Full Results and Reproducing from Customer Feedback

Chapter 17

Invisible ink

Customers will tell you of some of the things you missed
Observing customers (incl. telemetry) will tell you of
some of the things you missed
Limited reporting capability

BUGS:

- ⚪ Css validator gives errors
- ⚪ Special character as start of line forces an extra line change in grey display box
- ⚪ Firefox text field does not clear with ctrl+R
- ⚪ html validator identifies 3 errors
- ⚪ You're / we're / They're contractions not recognised as violations of e-prime
- ⚪ Two words separated by line feed are counted as one
- ⚪ Human being is noun but recognised as violation
- ⚪ Space is considered only separator for words and special characters are counted as words
- ⚪ Long text moves button outside user's access as vertical scroll is disabled
- ⚪ id naming is inconsistent, some are camel case, others not
- ⚪ Long texts without spaces go outside the grey area reserved for displaying the texts
- ⚪ Red/blue on grey has bad contrast
- ⚪ Zoom or resize of browser renders page unusable due to missing scroll bars
- ⚪ Contractions for word count (I'm) count as two words as per general searchable rules of how word counting works
- ⚪ The possible violation's category takes possessives and leaves for human assessment and would probably be expected to be something to create programmatic rules on
- ⚪ Possible violations does not handle typesetter's apostrophe, only typewriter's apostrophe in calculation
- ⚪ Two part words (like people's last names) in possessive form are not recognised as possible violations
- ⚪ Images missing alt text necessary for accessibility
- ⚪ Accessibility warnings on contrast
- ⚪ Mobile use not supported, styles very non-responsive
- ⚪ UI instructions for user are unclear
- ⚪ if word is in single quotes, it is not properly recognised as e-prime.
- ⚪ text box location in UI is not where user would expect it to be as per the logic of how web pages are usually operating
- ⚪ Site is missing favicon and security.txt - both common conventions for web applications
- ⚪ Resizing the input text field can move it outside view so that it cannot be resized back
- ⚪ Choosing which links are to overload this app and which open new browser window are inconsistent

word + space + enter creates extra vertical space in grey area

'is are' both are not recognised

zoom with and horizontal bar has issues, seen on edge and chrome, on win and Mac with touchpad

Wave accessibility tool does a forced refresh on close   **TOOL?**

On Chrome when settings panel scroll does not work. It works on Firefox.   **TOOL?**

Enter in end of line moves last word to different line on grey box

Firefox does not come back from mobile use simulation without forced refresh with this site   **TOOL?**

34 bugs

Let's Test

https://www.exploratorytestingacademy.com/app/
https://eviltester.github.io/TestingApp/apps/eprimer/eprimer.html

Finding (more of some) relevant Conversation Starters

You will never find all bugs.

Target finding only things that matter. Learn what matters.

Seeing and not reporting is better than not seeing problems.

https://www.linkedin.com/in/maaret/   @maaretp@mas.to

Closing Remarks

Chapter 18

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: pytest the very basics

Chapter 10: Documenting as skeleton test automation

Chapter 11: Playwright library and CSS selectors on web pages

Chapter 12: Documenting as executable test automation

Chapter 13: Why this is not about any specific tool

Chapter 14: Use of time

Chapter 15: Coverage

Chapter 16: Test strategy

Chapter 17: Full results and reproducing from customer feedback

Chapter 17: Closing remarks

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