FUNCTIONAL TESTING

TEST

PBA SOFTWAREUDVIKLING/
BSC SOFTWARE DEVELOPMENT

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TODAY'S TOPICS

- **Test types & levels**
  - Be able to compare the different test levels and their objectives
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  - Be able to map terminology between traditional testing and agile

- **Test automation**
  - Be able to use the Test Pyramid as guideline to think about different layers of testing. and how much testing to do on each layer.

- **Service layer testing: REST service**
  - Be able to use REST Assured to test REST service

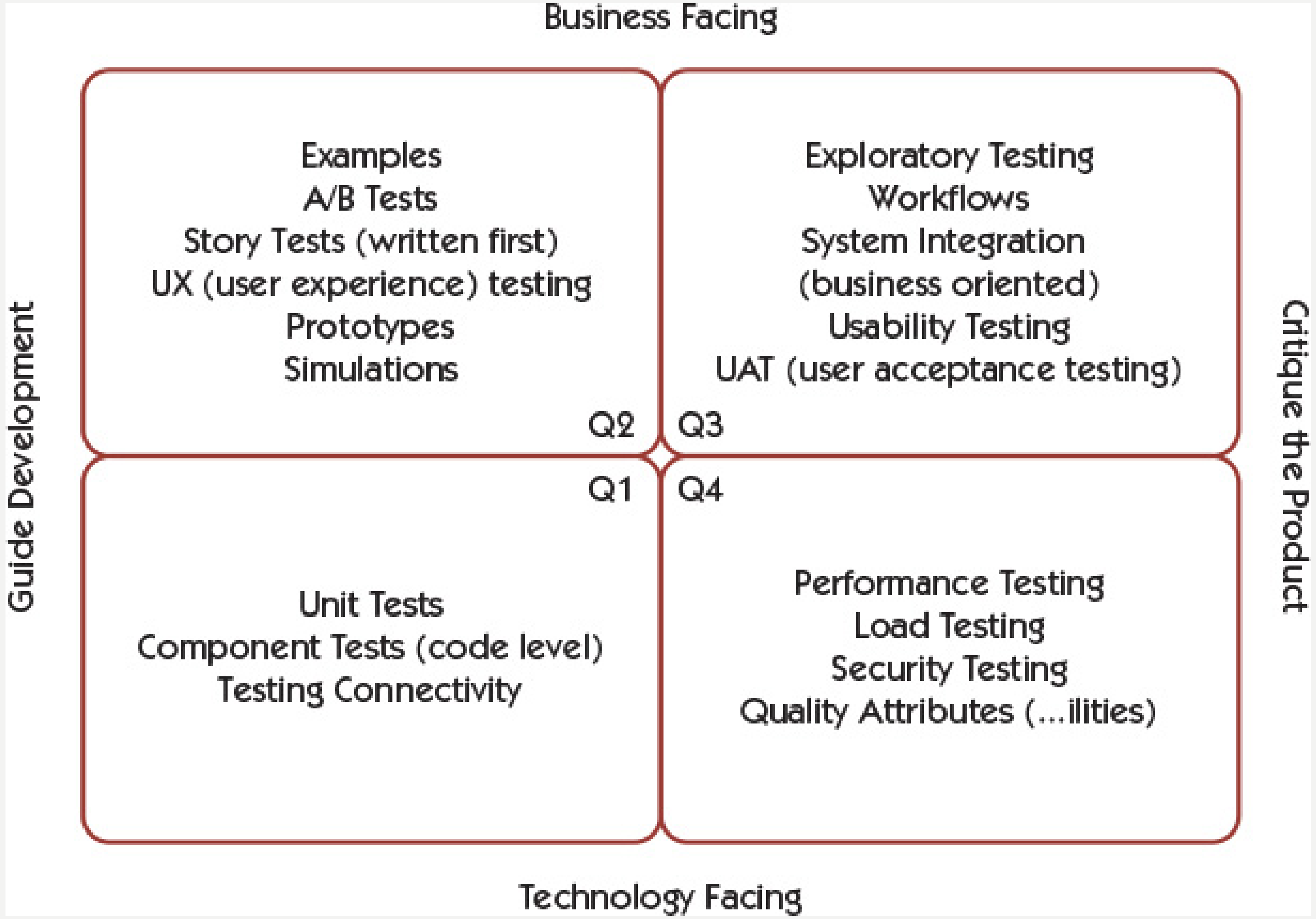
- **Presentation layer testing: Automated system testing of Web pages**
  - Be able to automate test of web pages with Selenium Webdriver

TEST LEVELS AND TEST TYPES

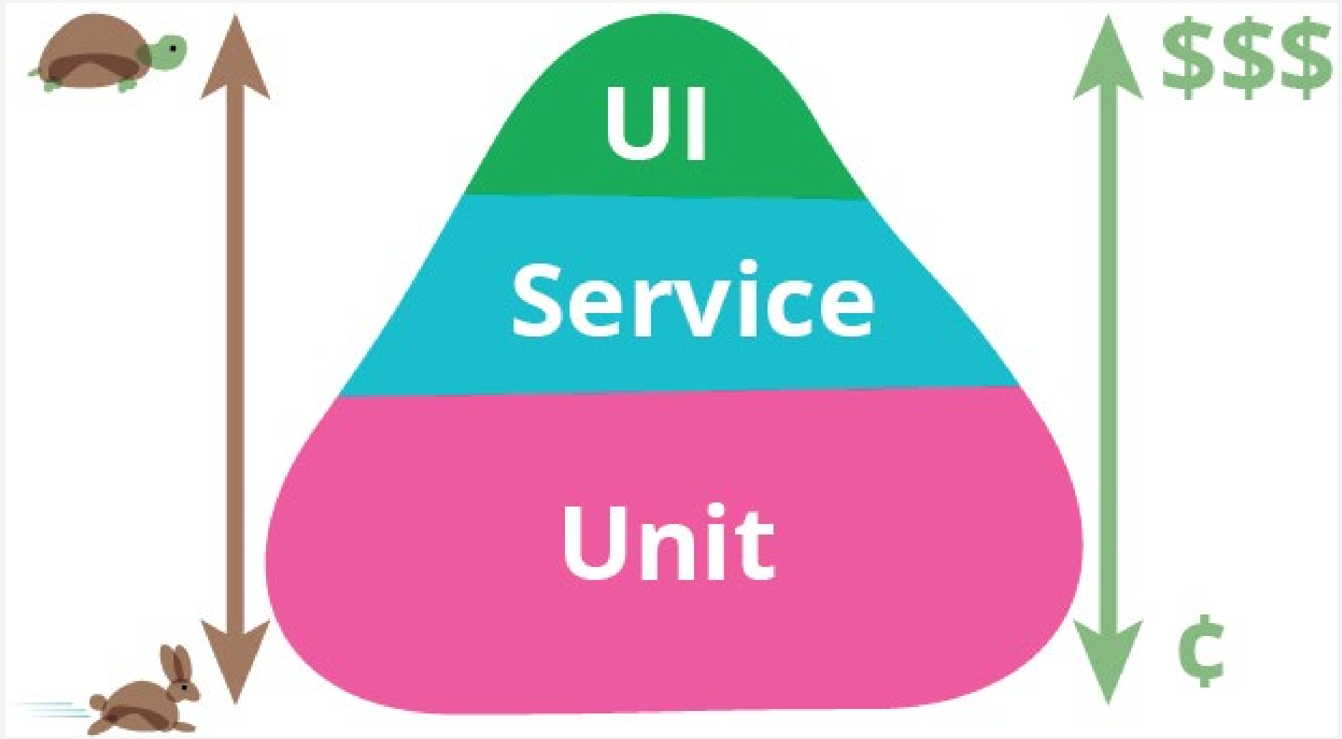
- **Test levels**
  - Unit tests
    - Classes and methods
  - Integration tests
    - Subsystems, databases, interfaces, API
  - System testing *(acceptance testing)*
    - Applications
  - Acceptance testing *(user acceptance testing)*
    - System, Configuration, Recovery systems, Converted Data

- **Test types**
  - Functional tests (black-box)
    - Use cases /stories
    - Functional unit tests(!)
  - Non-functional tests
    - "ilities"
  - White-box
    - Code coverage, structural coverage
  - Change-related tests
    - Confirmation testing (bug fixing)
    - Regression testing (unintended side-effects)

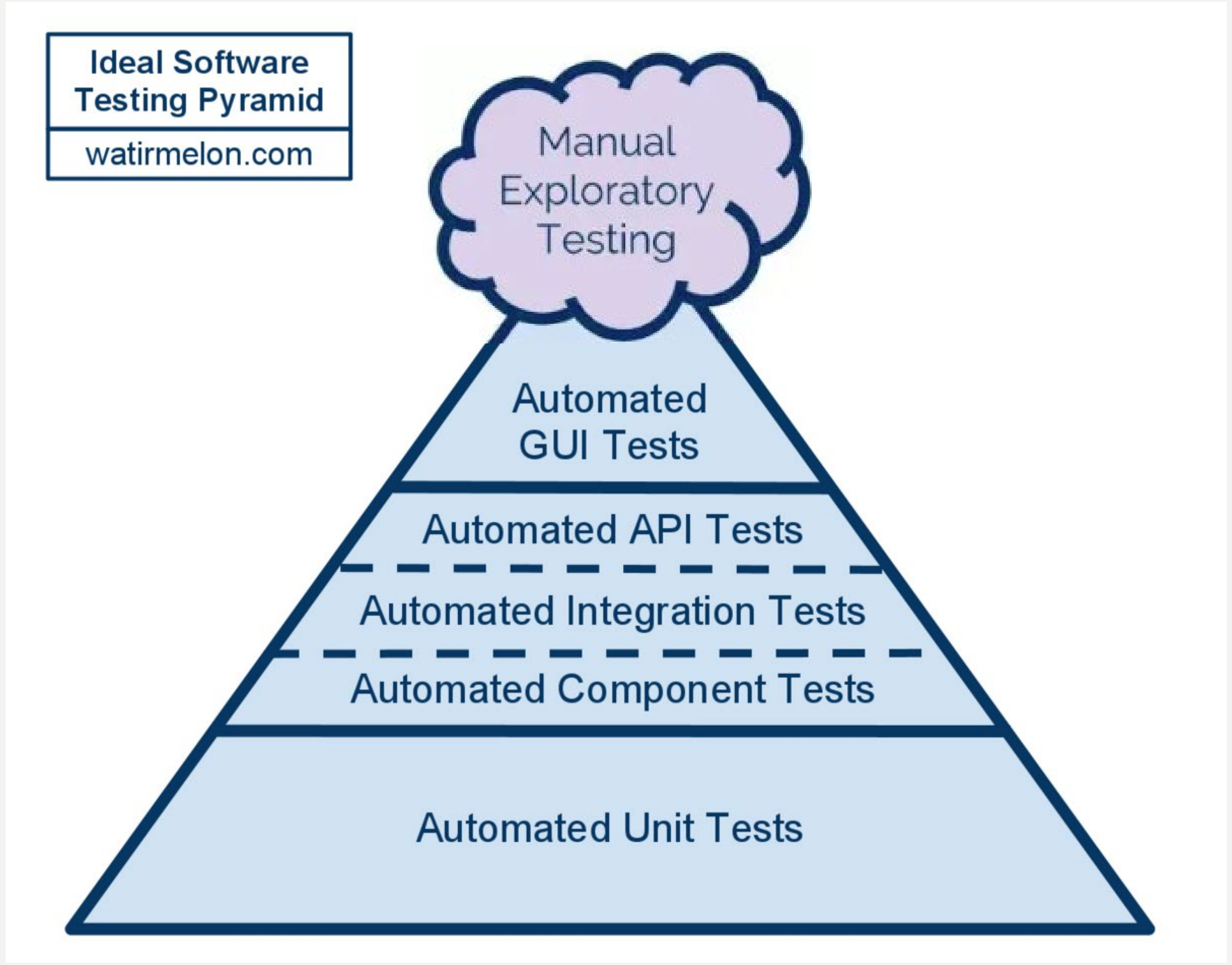
AGILE TESTING QUADRANTS



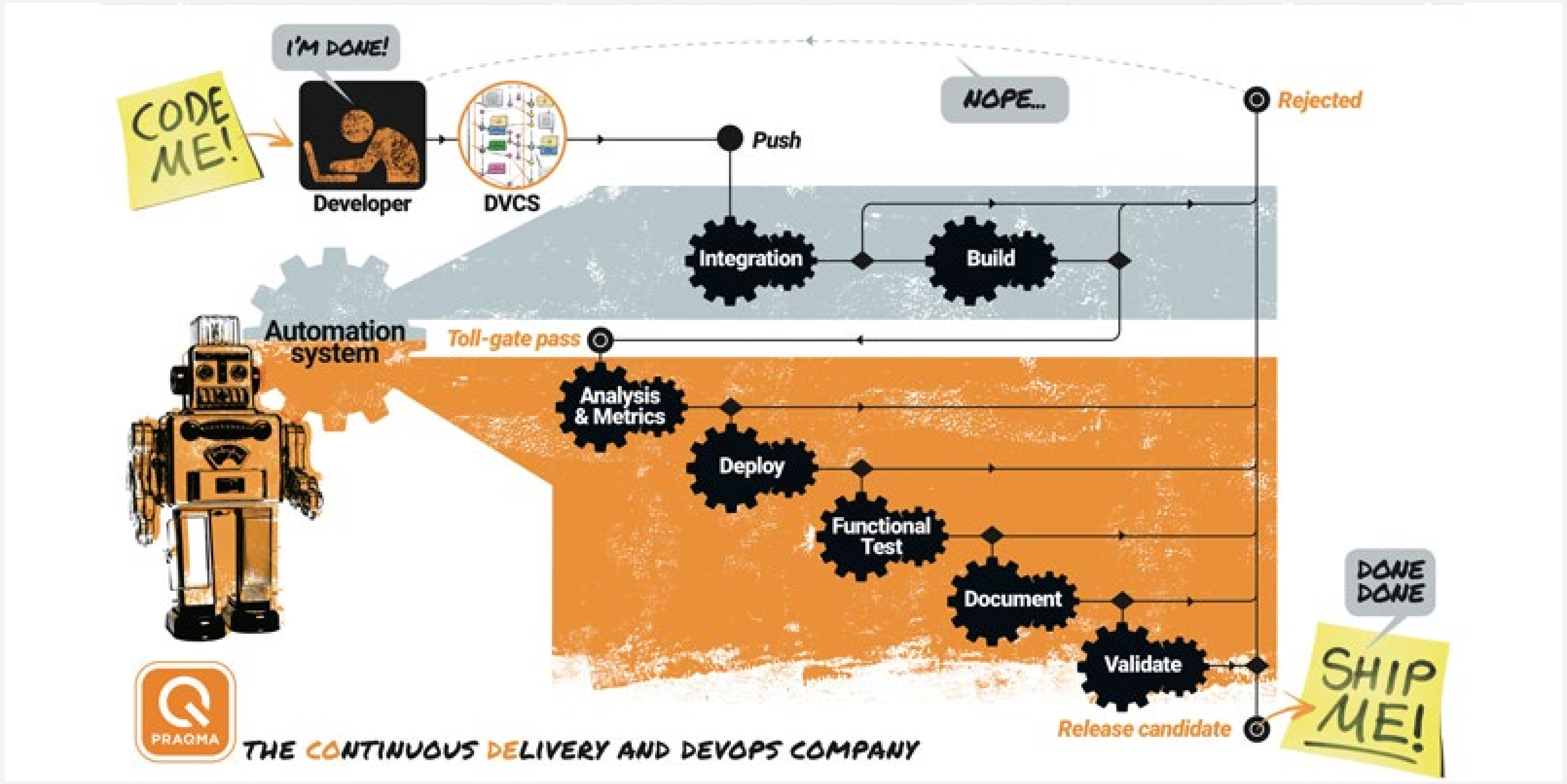
TEST PYRAMID



TEST PYRAMID


Ideal Software Testing Pyramid
watirmelon.com
Manual Exploratory Testing
Automated GUI Tests
Automated API Tests
Automated Integration Tests
Automated Component Tests
Automated Unit Tests

RELEASE PIPELINE



FUNCTIONAL UNIT TEST

```
@Test
public void testChuckNorris() {
   when().
      get("https://api.chucknorris.io/jokes/random").then().
            statusCode(200);
}
```

TEST REST SERVICE

- REST Assured Java DSL for easy testing of REST services: http://rest-assured.io/

EXERCISE 1 - JOKEFETCHER

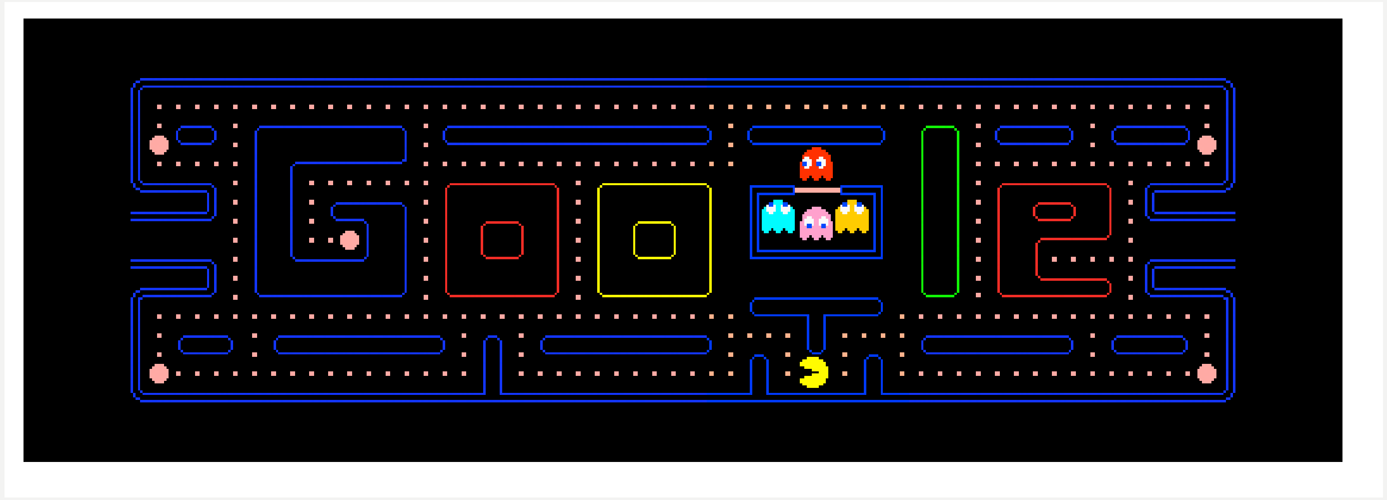
- Create a new method in `JokeFetcher` class that uses another Joke Rest API
- Write relevant unit tests
- Write relevant integration tests

- Constraints/issues
  - Unit tests that deal with dates, must use Java 8 Date/Time API
  - Hamcrest matchers should be considered for better readability
  - Implement a strategy for test of private methods
  - Implement a strategy for test to handle time difference of tests at the two test levels

AUTOMATED SYSTEM TESTING

- Selenium automates browsers. That's it! What you do with that power is entirely up to you. https://www.seleniumhq.org/

- Example: Pacman automated



PRESENTATION LAYER TESTING

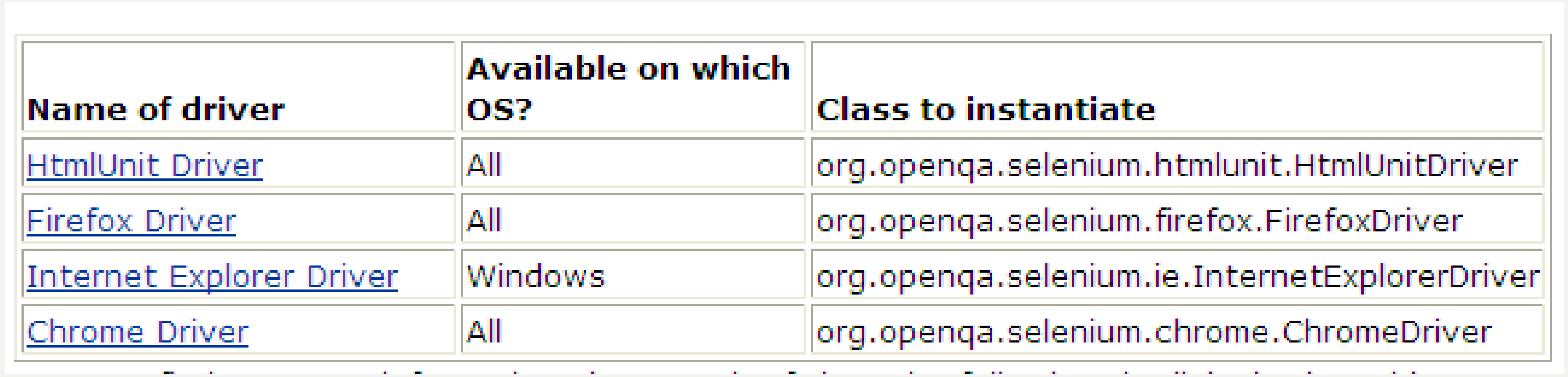
- We can test
  - the content of web pages to any level of detail (even spelling)
  - the application structure or navigation (following links to their expected destination, for example),
  - the ability to verify user stories with acceptance tests*
  - the site works with required browsers and operating systems.

SETTING UP A SELENIUM-WEBDRIVER PROJECT

- The easiest way to set up a Selenium 2.0 Java project is to use Maven

```
<dependency>
    <groupId>org.seleniumhq.selenium</groupId>
    <artifactId>selenium-java</artifactId>
    <version>3.141.59</version>
</dependency>
<dependency>
    <groupId>org.seleniumhq.selenium</groupId>
    <artifactId>htmlunit-driver</artifactId>
    <version>2.29.0</version>
</dependency>
```

SELENIUM BROWSER SUPPORT



Name of driver	Available on which OS?	Class to instantiate
HtmlUnit Driver	All	org.openqa.selenium.htmlunit.HtmlUnitDriver
Firefox Driver	All	org.openqa.selenium.firefox.FirefoxDriver
Internet Explorer Driver	Windows	org.openqa.selenium.ie.InternetExplorerDriver
Chrome Driver	All	org.openqa.selenium.chrome.ChromeDriver

- HtmlUnit Driver is fast, but not graphical

```
WebDriver driver = new HtmlUnitDriver();
```

- Other drivers render content to a screen (can be used to check information such as the position of an element on a page)

- Firefox
- Chrome

```
WebDriver driver = new FirefoxDriver();
```

```
WebDriver driver = new ChromeDriver();
```

  – you'll need a chromedriver binary,

GETTING STARTED WITH SELENIUM

- Goto "Introducing the Selenium-WebDriver API by Example" at https://www.seleniumhq.org/docs/03_webdriver.jsp
- Create a Maven project and copy the sample code from the grey box (Selenium2Example) into your project. You may choose Chrome or IE instead, if you want.

- Run code and see what happens

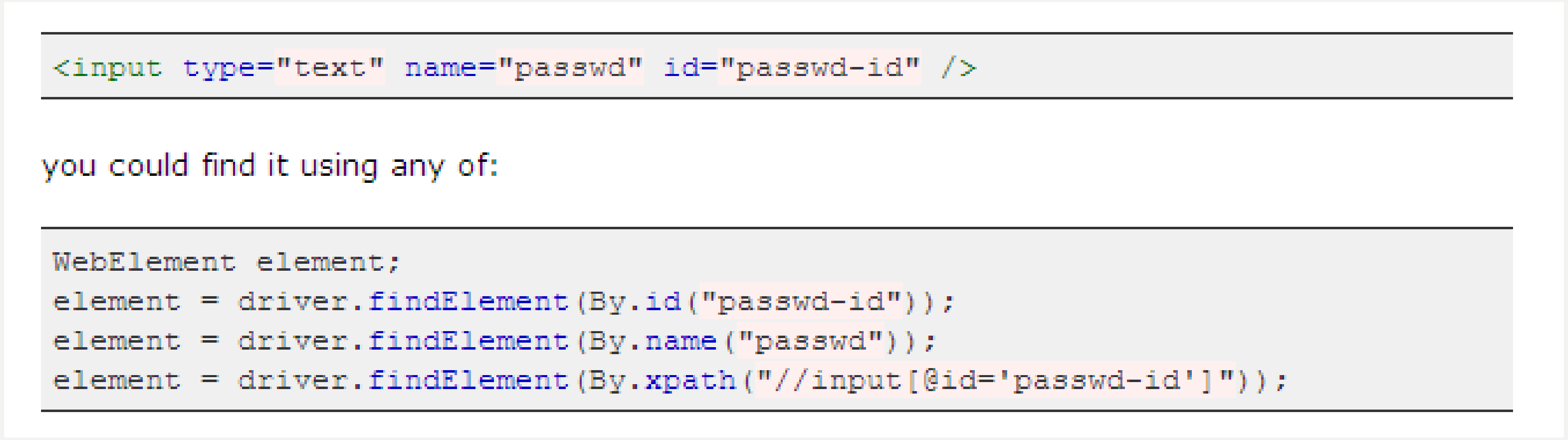
SELENIUM AND JUNIT

- Manually inspecting `System.out.println()` in an output window doesn't seem efficient
- Change the Google cheese search into a JUnit test

INTERACTING WITH THE PAGE

- Locating UI element (called `WebElement`):

Having this HTML code:



```
<input type="text" name="passwd" id="passwd-id" />
```

you could find it using any of:

```
WebElement element;
element = driver.findElement(By.id("passwd-id"));
element = driver.findElement(By.name("passwd"));
element = driver.findElement(By.xpath("//input[@id='passwd-id']"));
```

PAGE INTERACTION EXAMPLE

- Let's see a local jsp example (BuyCarTest.java

STUDY POINT EXERCISE

- Create a Web user interface to Marios Pizzabar and relevant automated system tests.
- Push your solution to github, including an image with test results in the root and follow the review hand-in process.