WELCOME TO THE WORKSHOP

Best Practices for Automated Testing

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AGENDA

After completing this workshop, you will be able to:

Code top quality tests

Run tests in parallel

Create proper page objects

Master synchronization

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Your Trainer

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Nikolay Advolodkin

- Solutions Architect at Sauce Labs
- Contributing author to Continuous Testing for DevOps Professionals
- Test automation instructor and owner at www.ultimateqa.com
- Voted one of top 33 automation engineer three years in a row by TechBeacon.com
- Automation instructor at TestAutomationU
- Animal lover

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Rules of Engagement

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Don’t worry about mistakes

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Participation is Encouraged

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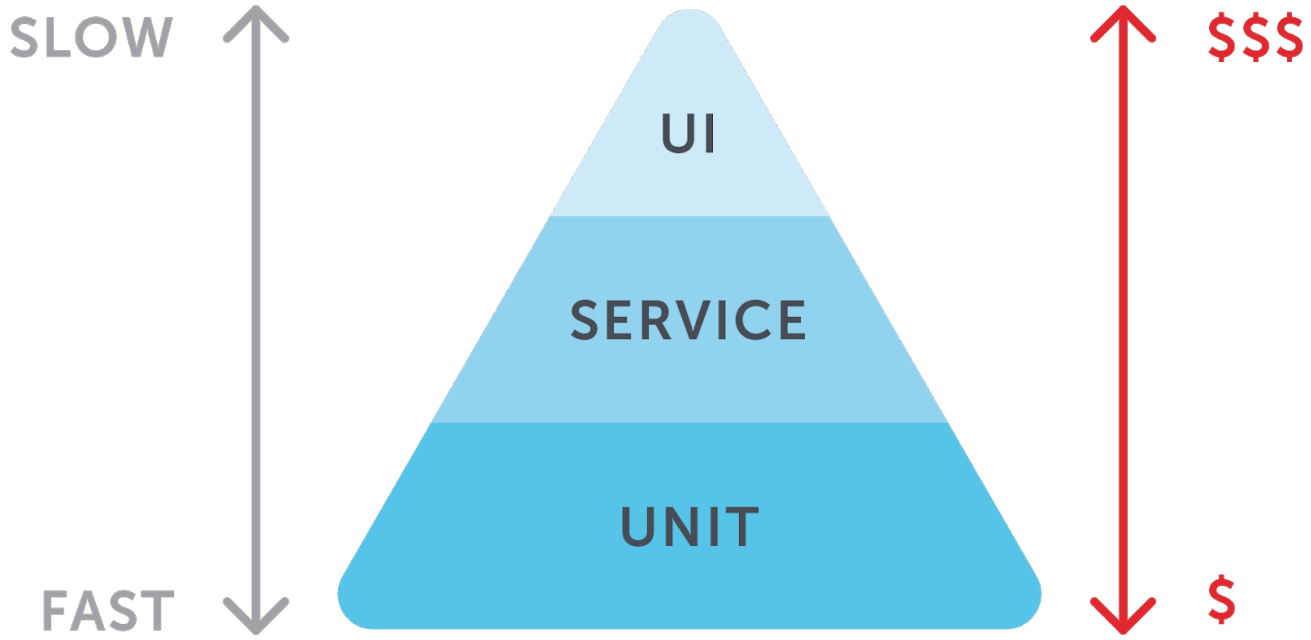
Automation Pyramid



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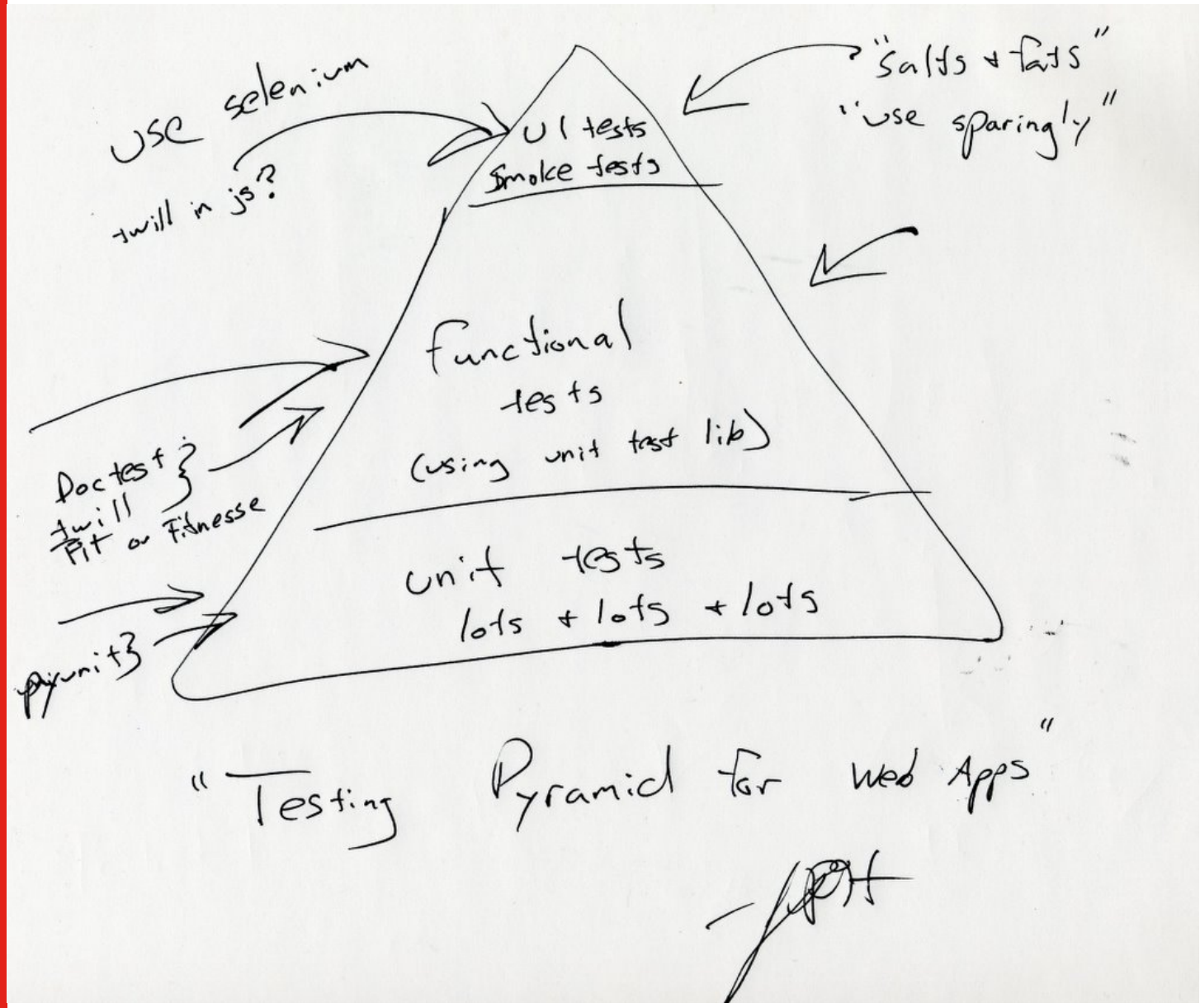
Automation Pyramid

Jason Huggins



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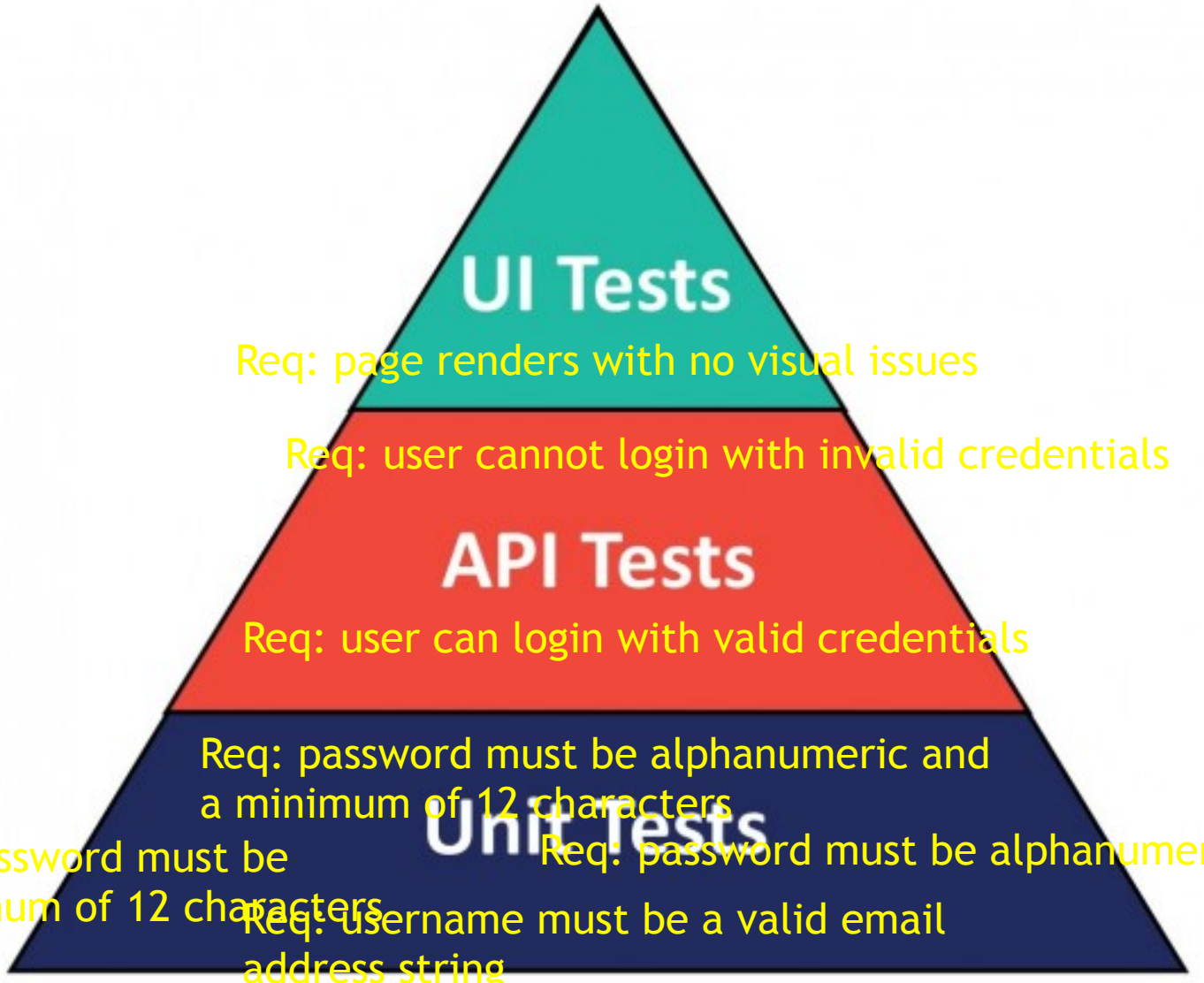
Login Feature



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Best Practices for Test Case Design

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Have an Object Oriented Approach

1. Identify code that fits into at least 3 different sections
    a. Set-up
    b. Test(s)
    c. Teardown

2. Separate the different parts into **functions** with the appropriate **annotations**

3. Analyze script for any **repetitive identifications or actions** and store values/actions in **variables**

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"Duplication is the primary enemy of a well-designed system."
- Bob Martin

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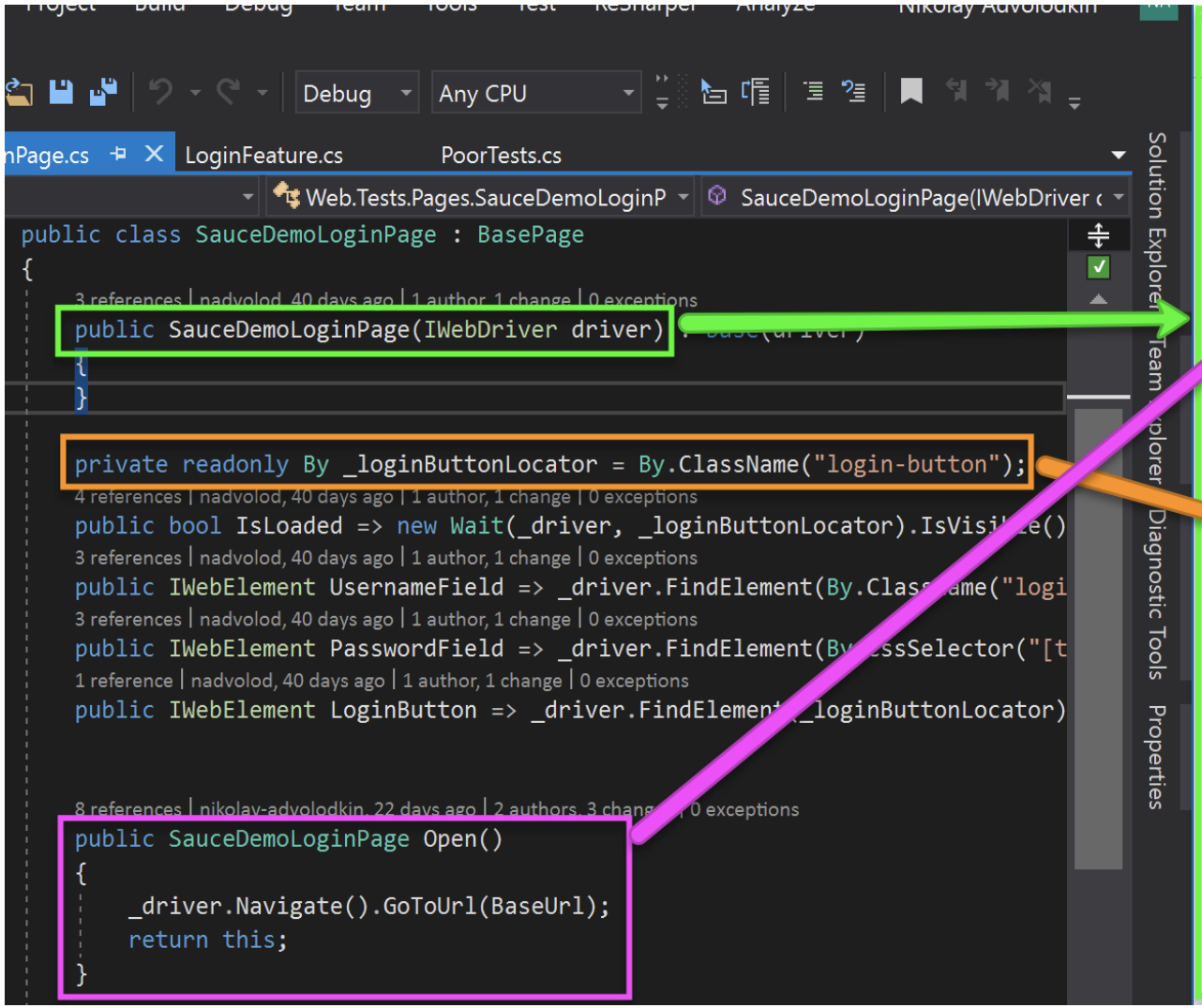
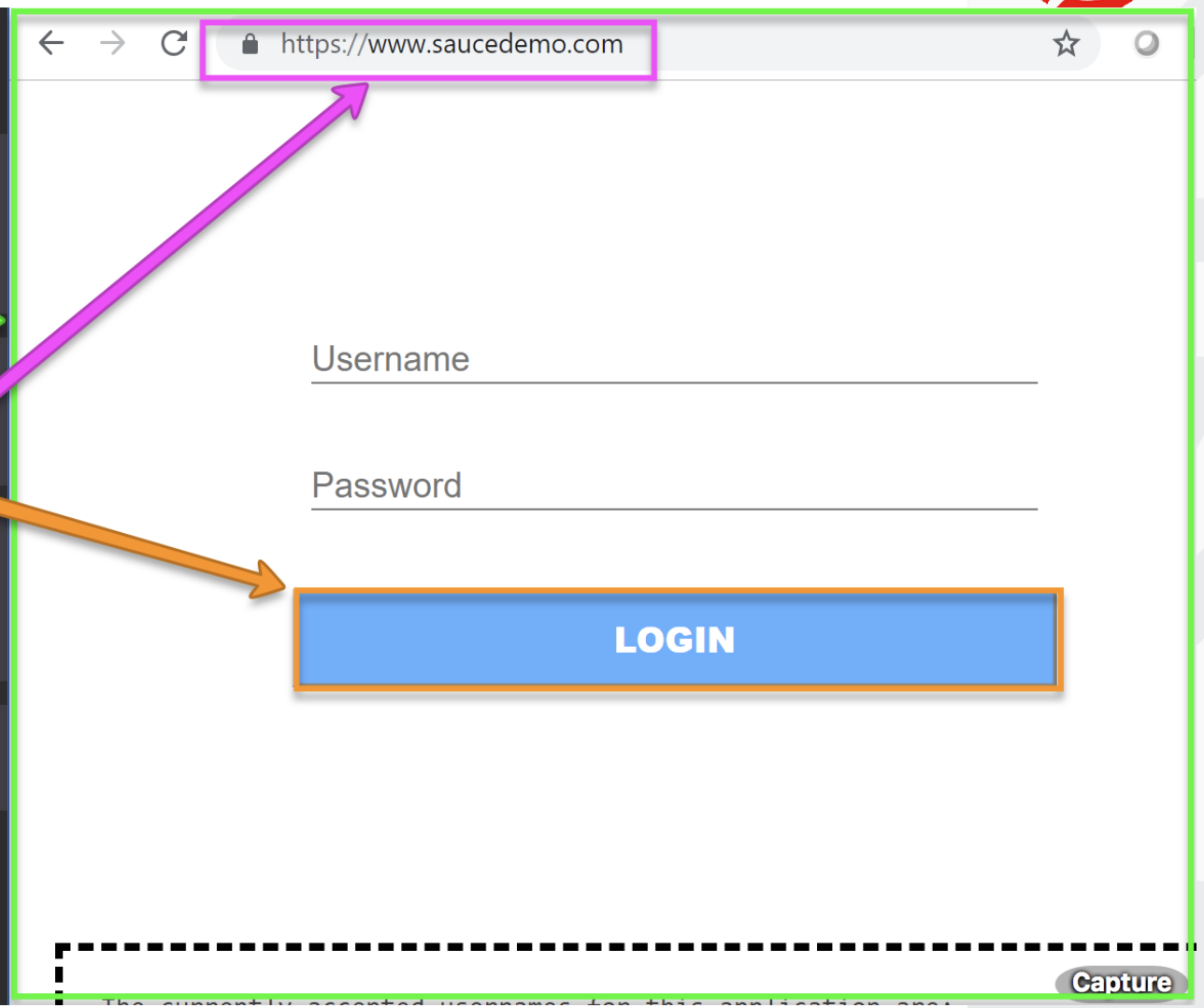
Page Objects

Page Object





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Use Page Object Pattern

- Improves Maintainability
  - Update in one place
  - Know where to update
  - Reduces duplication
- Improves Readability
- Improves Organization

Page Object Anti-Patterns

- Overpopulating `BasePage`
  - A place for common components of **all** pages
  - 200 lines of code max
- Over-populating a Page Object
- Public Methods/properties not representing user actions
  - `OpenExcelFile()`
  - `ConnectToSql()`
  - `ConvertStringToArray()`
  - `ClickButton()`
  - `WaitForButtonToBeDisplayed()`

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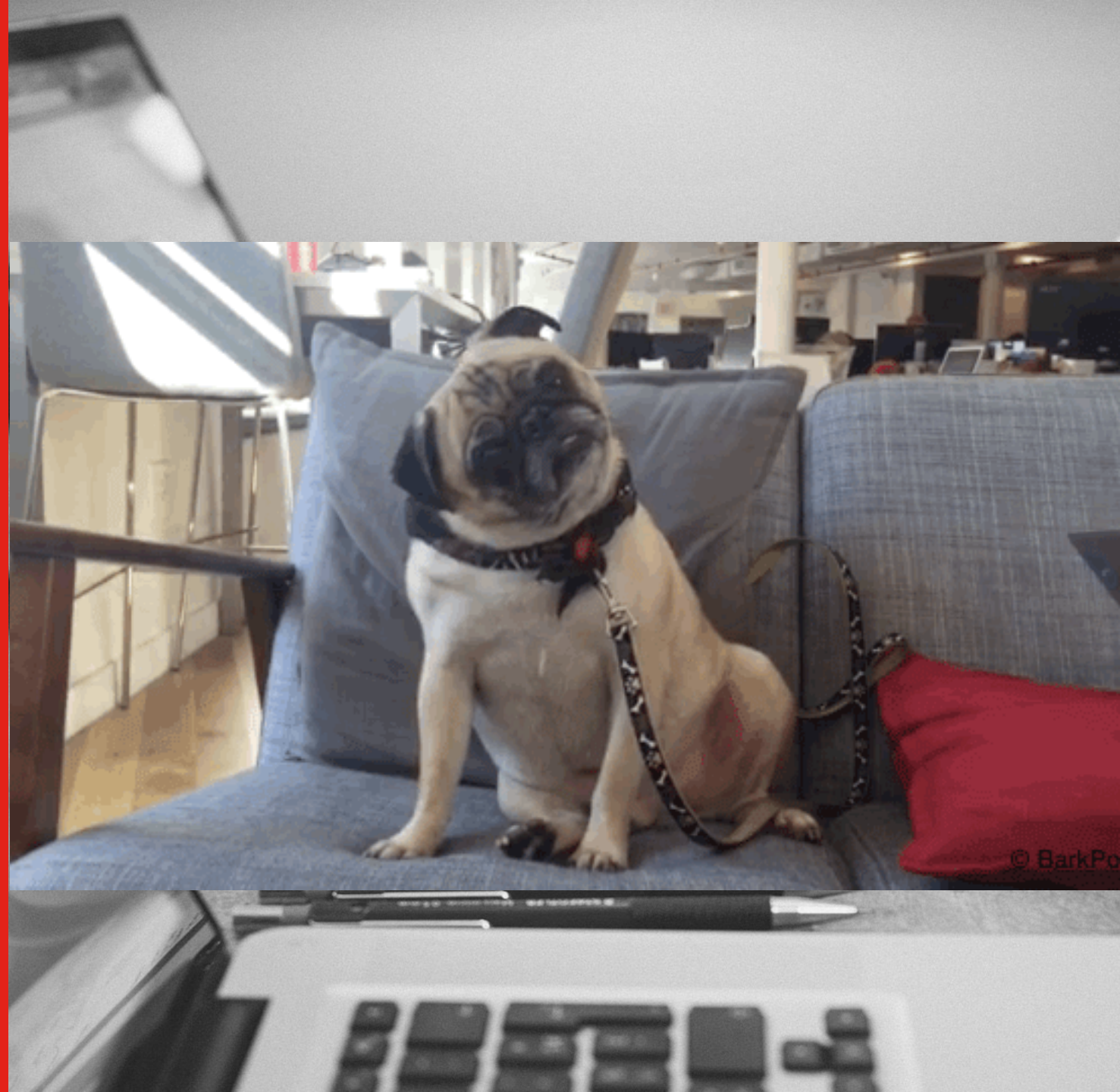
Questions?



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Coding Time

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What's Wrong With This Test?

```
@Test
public void fullCustomerJourney(Method method) throws MalformedURLException {

    // Input your SauceLabs Credentials
    String sauceUsername = System.getenv( name: "SAUCE_USERNAME");
    String sauceAccessKey = System.getenv( name: "SAUCE_ACCESS_KEY");

    MutableCapabilities capabilities = new MutableCapabilities();

    //sets browser to Safari
    capabilities.setCapability( capabilityName: "browserName", value: "Safari");

    //sets operating system to macOS version 10.13
    capabilities.setCapability( capabilityName: "platform", value: "macOS 10.13");

    //sets the browser version to 11.1
    capabilities.setCapability( capabilityName: "version", value: "11.1");

    //sets your test case name so that it shows up in Sauce Labs
    capabilities.setCapability( capabilityName: "name", method.getName());

    capabilities.setCapability( capabilityName: "username", sauceUsername);
    capabilities.setCapability( capabilityName: "accessKey", sauceAccessKey);

    //instantiates a remote WebDriver object with your desired capabilities
    driver = new RemoteWebDriver(new URL( spec: "https://ondemand.saucelabs.com/wd/hub"), capabilities);

    //navigate to the url of the Sauce Labs Sample app
    driver.navigate().to( s: "https://www.saucedemo.com");
    // navigate to desired page
    driver.get("https://www.saucedemo.com");
```


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Atomic Tests
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Test One Thing

Achieving atomicity might
be the most powerful
way to cure all test automation
problems

Non-Atomic Test

```
20  public void EndToEndTest()
21  {
22      SauceReporter.SetBuildName("AntiPatternTests3");
23      var loginPage = new SauceDemoLoginPage(Driver);
24      //test loading of login page
25      loginPage.Open().IsLoaded.Should().BeTrue("the login page should load successfully.");
26      loginPage.UsernameField.Displayed.Should().BeTrue("the page is loaded, so the username field should exist");
27      loginPage.PasswordField.Displayed.Should().BeTrue("the page is loaded, so the password field should exist");
28
29      //test login with valid user
30      var productsPage = loginPage.Login("standard_user", "secret_sauce");
31      productsPage.IsLoaded.Should().BeTrue("we successfully logged in and the home page should load.");
32      productsPage.Logout();
33      loginPage.IsLoaded.Should().BeTrue("we successfully logged out, so the login page should be visible");
```

Atomic Test

```
20  public void EndToEndTest()
21  {
22      SauceReporter.SetBuildName("AntiPatternTests3");
23      var loginPage = new SauceDemoLoginPage(Driver);
24      //test loading of login page
25      loginPage.Open().IsLoaded.Should().BeTrue("the login page should load successfully.");
```

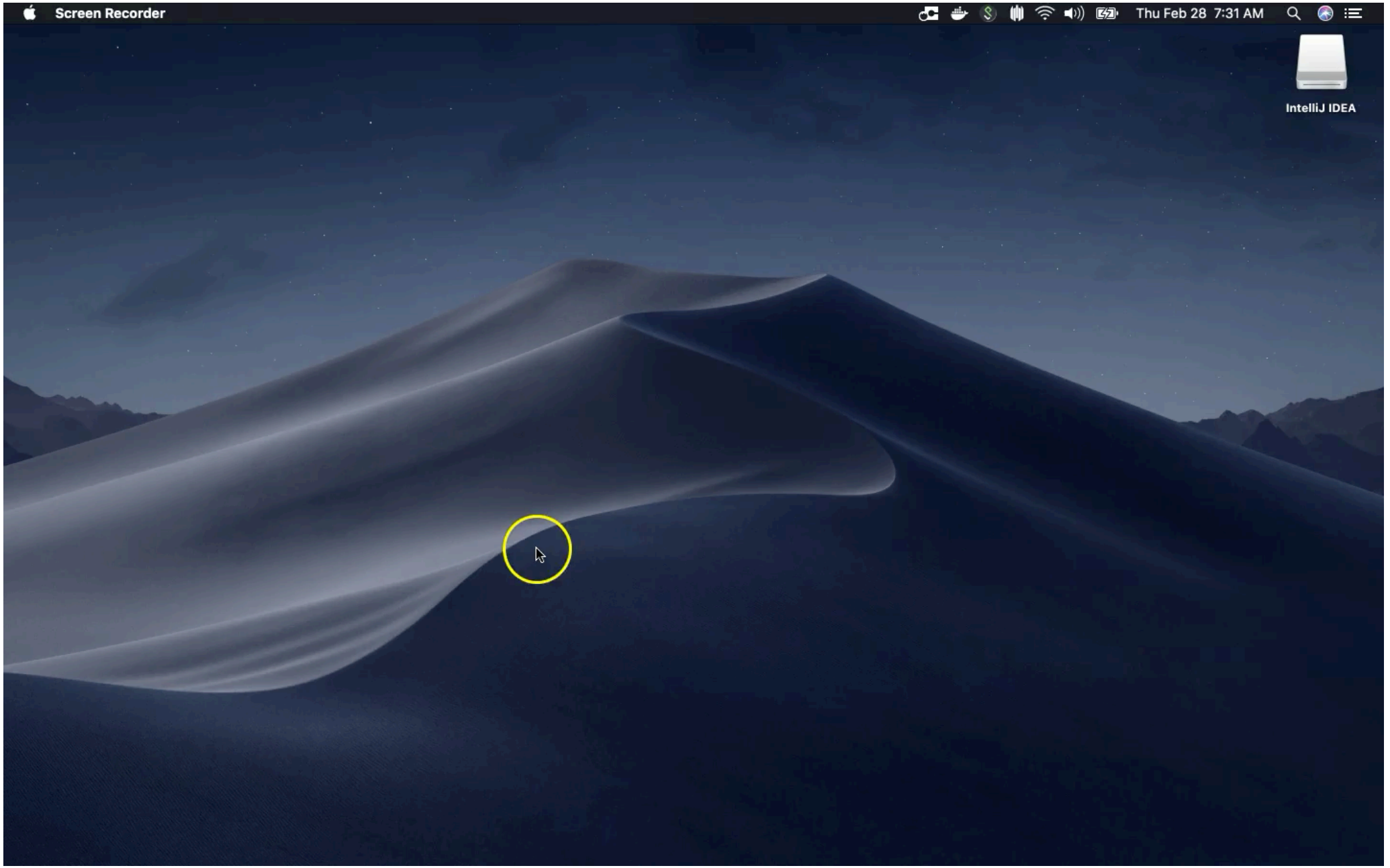


```
[Test]
0 references | nikolay-advolodkin, 25 days ago | 1 author, 3 changes | 0 exceptions
public void LoginPageShouldLoad()
{
    _loginPage.Open().IsLoaded.Should().BeTrue("the login page should load successfully.");
}
```

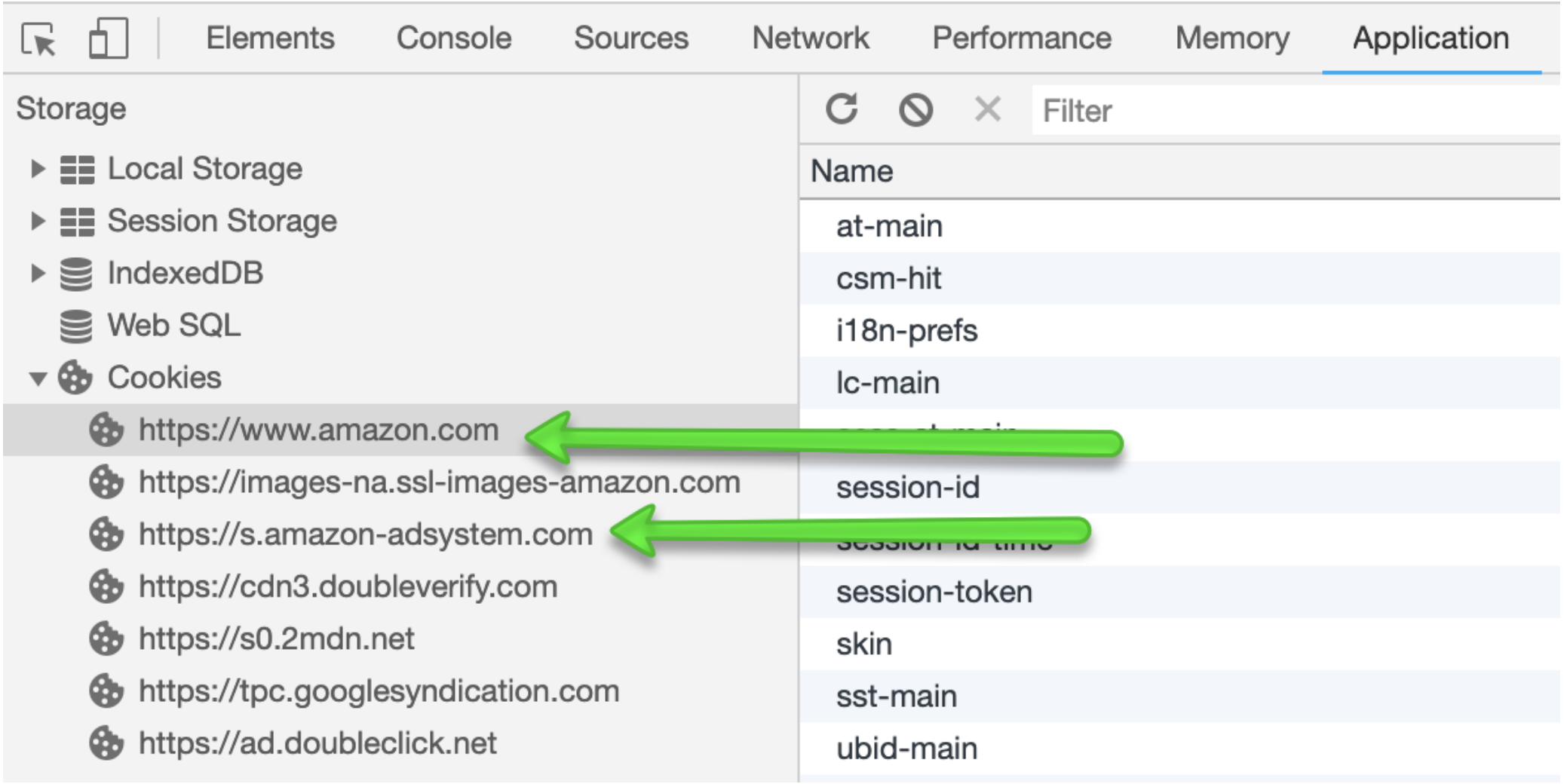
End-to-End Tests?


Seams and testability

Using a Web API



Login with a Browser Cookie



DB Data Manipulation

It Won’t Be Easy

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Questions?

Let’s Create An Atomic Test…

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How to achieve parallel test execution?
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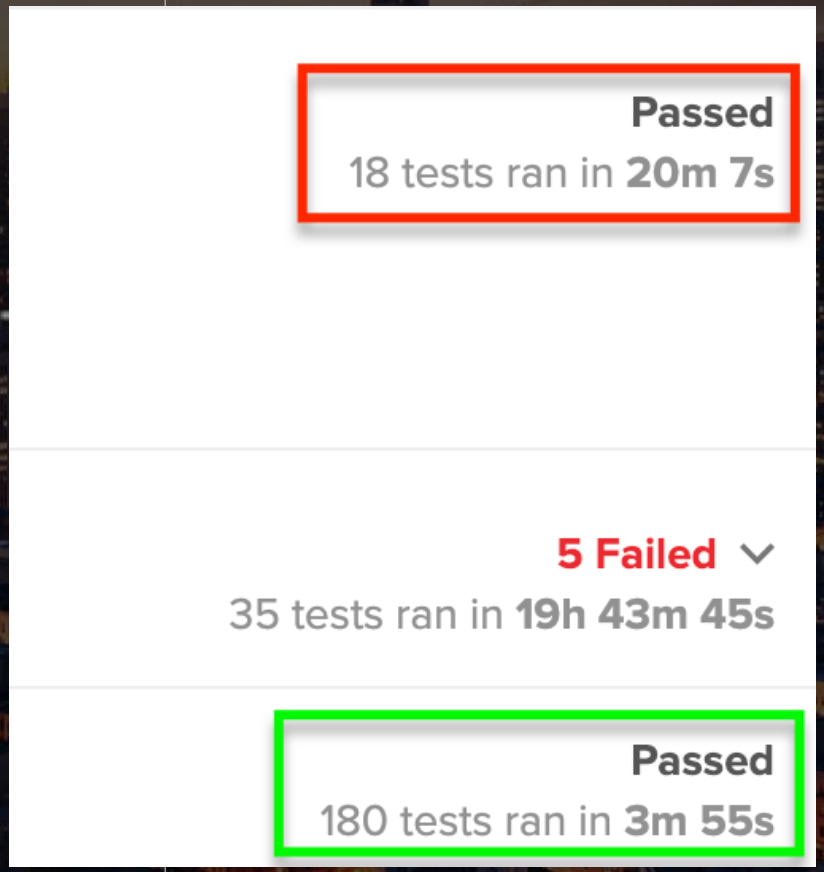
400% Reduction in Suite execution speed



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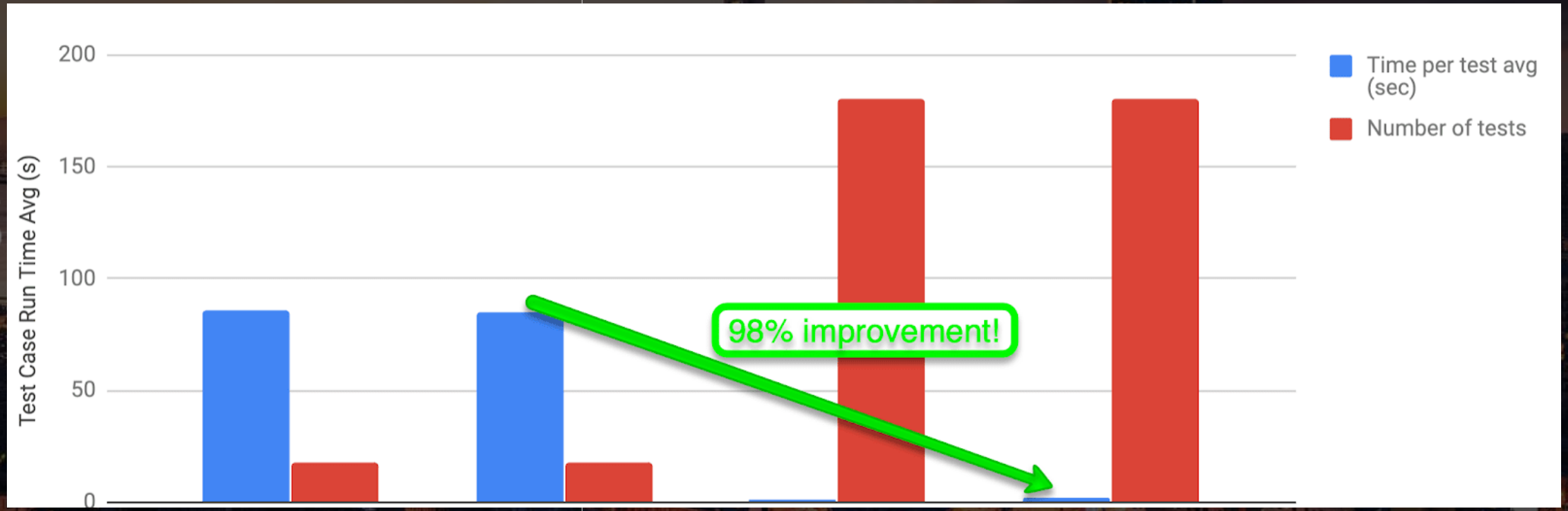
98% improvement in Test run time



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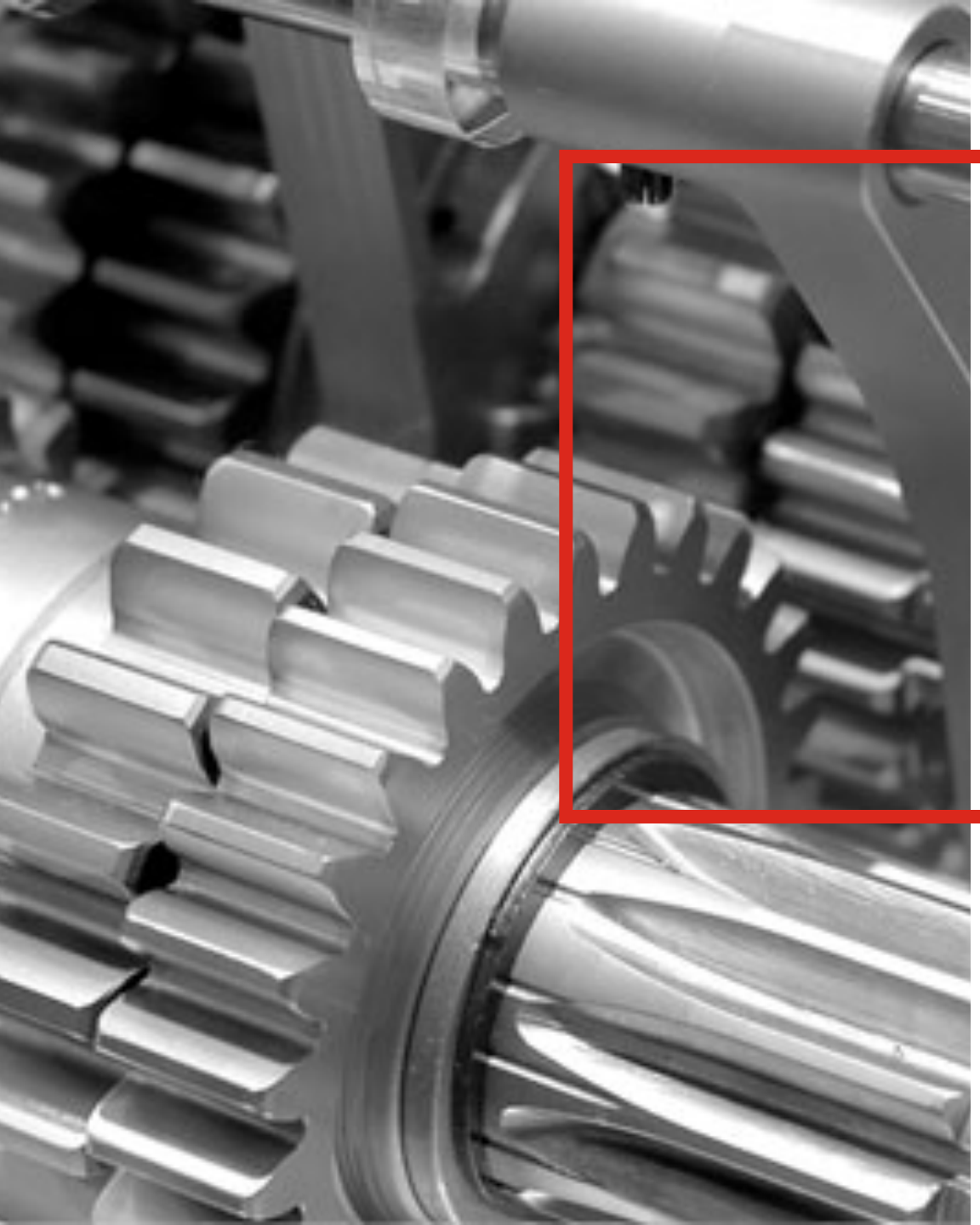
7,000 tests
in 7 min


100K tests
Per day



Mandatory Requirements for Parallelization

1. Tests must be ***atomic***
2. Tests must be ***autonomous***
3. Test data must be managed correctly
4. Avoid ***static*** keyword

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Autonomous Tests
Self contained and isolated

3. Proper Test Data Management

Danger

Hard Coded Test Data

- Hard code data for use

- Concerns
  - Is Data in same state at end as at beginning?
  - What if test didn't pass?
  - Do you have to refresh data between uses?
  - Do you have to add new data for each new test?
  - Are you sure multiple tests with the same data is ok?

Just-In-Time Test Data Management

4. Don’t be static about *static*

Avoid *static* keyword

```
public class DriverInit { (using remote webdriver, browser name will be read from XML)
  public static WebDriver driver;
  public DriverInit() {
    switch (browser) {
    case "IE" : driver = ....
    case "Firefox" : driver = ....
    }
  }
}
```

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Bonus Tips!!


Keep Tests
Quick


Start Early

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Coding Time

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Synchronization Strategies
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Use Waits to Account for Automation Speed

- Automation moves faster than human reactions and internet transmissions
- Use Waits to make sure elements are present before you try to test them

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~2,000% improvement in automation stability

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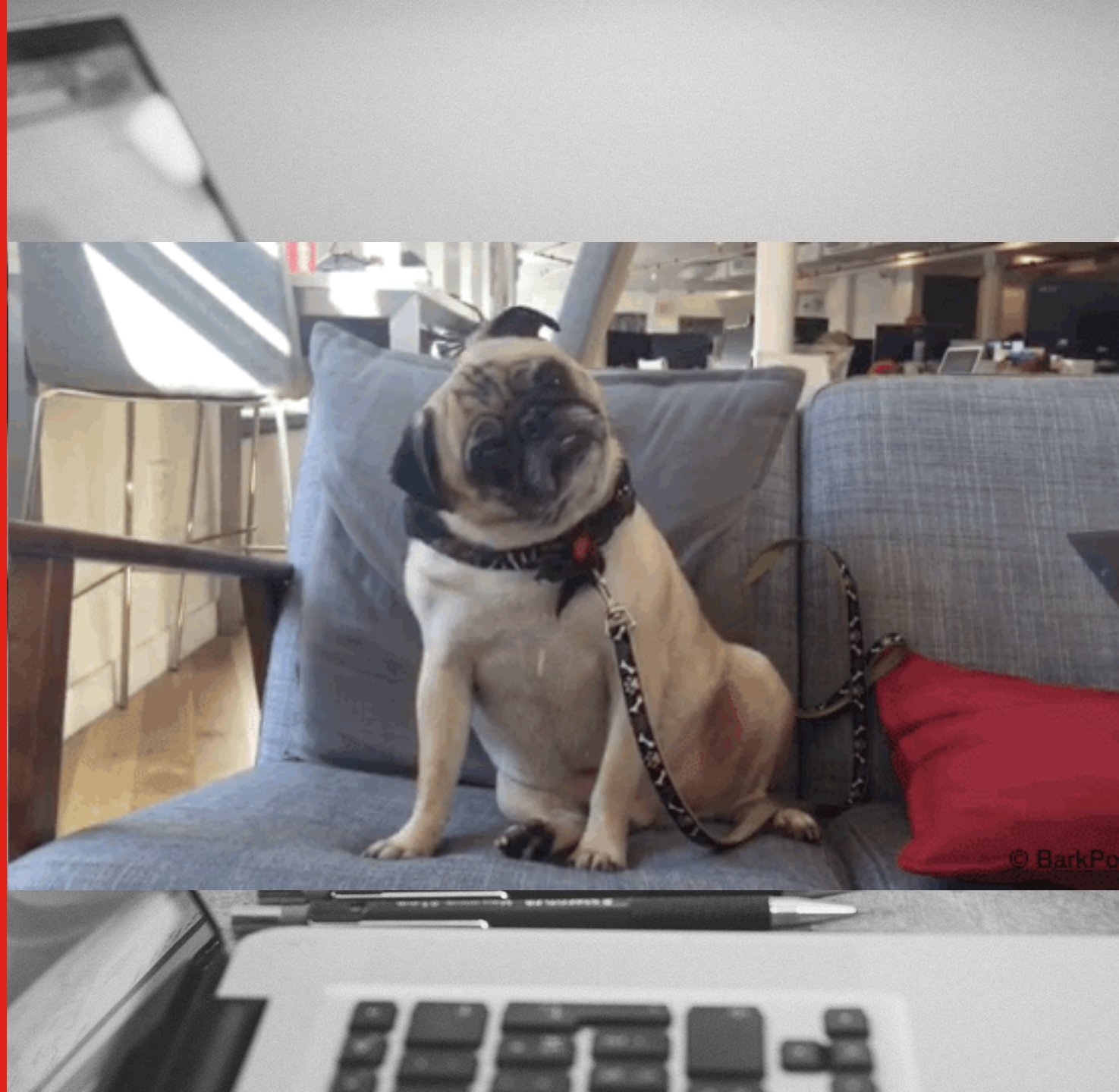
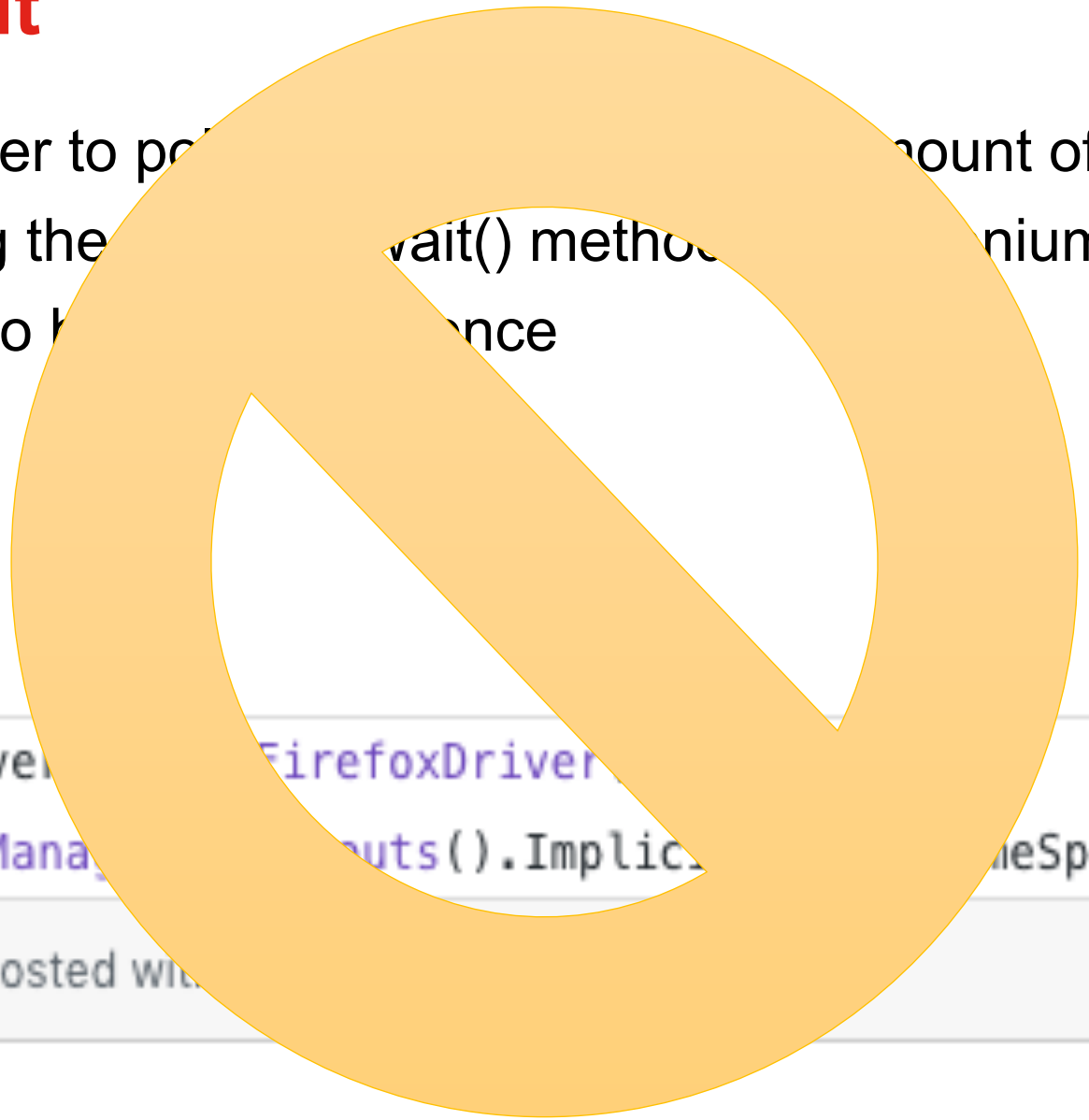
What are the types of waits in Selenium?



Implicit Wait

- Tell WebDriver to po ount of time. This is literally using the ait() metho nium Webdriver offers
- Only needs to h nce
- Less flexible

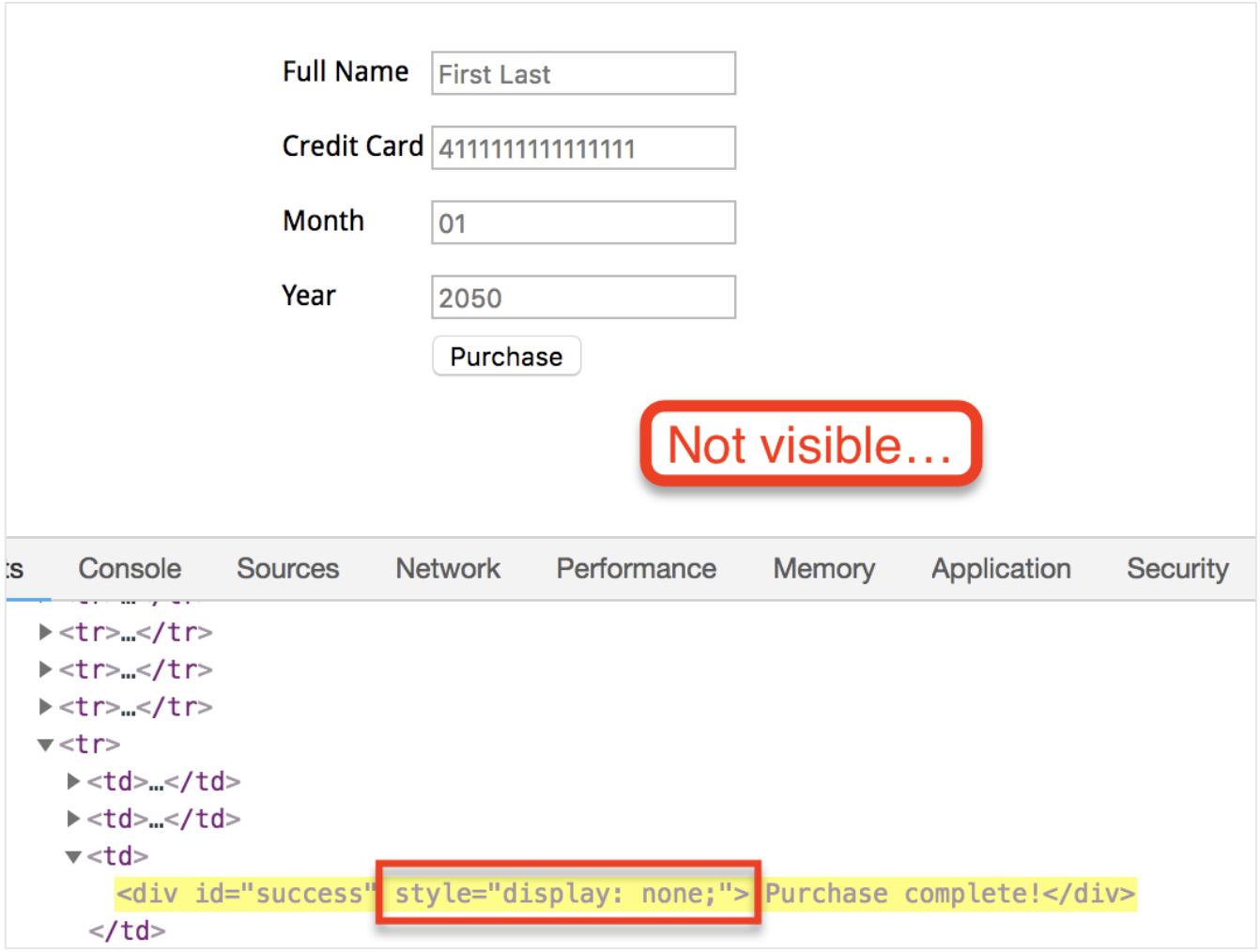


Implicit Wait

```
1    var _drive  FirefoxDriver
2    _driver.Mana  uts().Implic  eSpan.FromSeconds(5);
```

ImplicitWait.cs hosted wi

Finds Elements in DOM



Explicit Wait

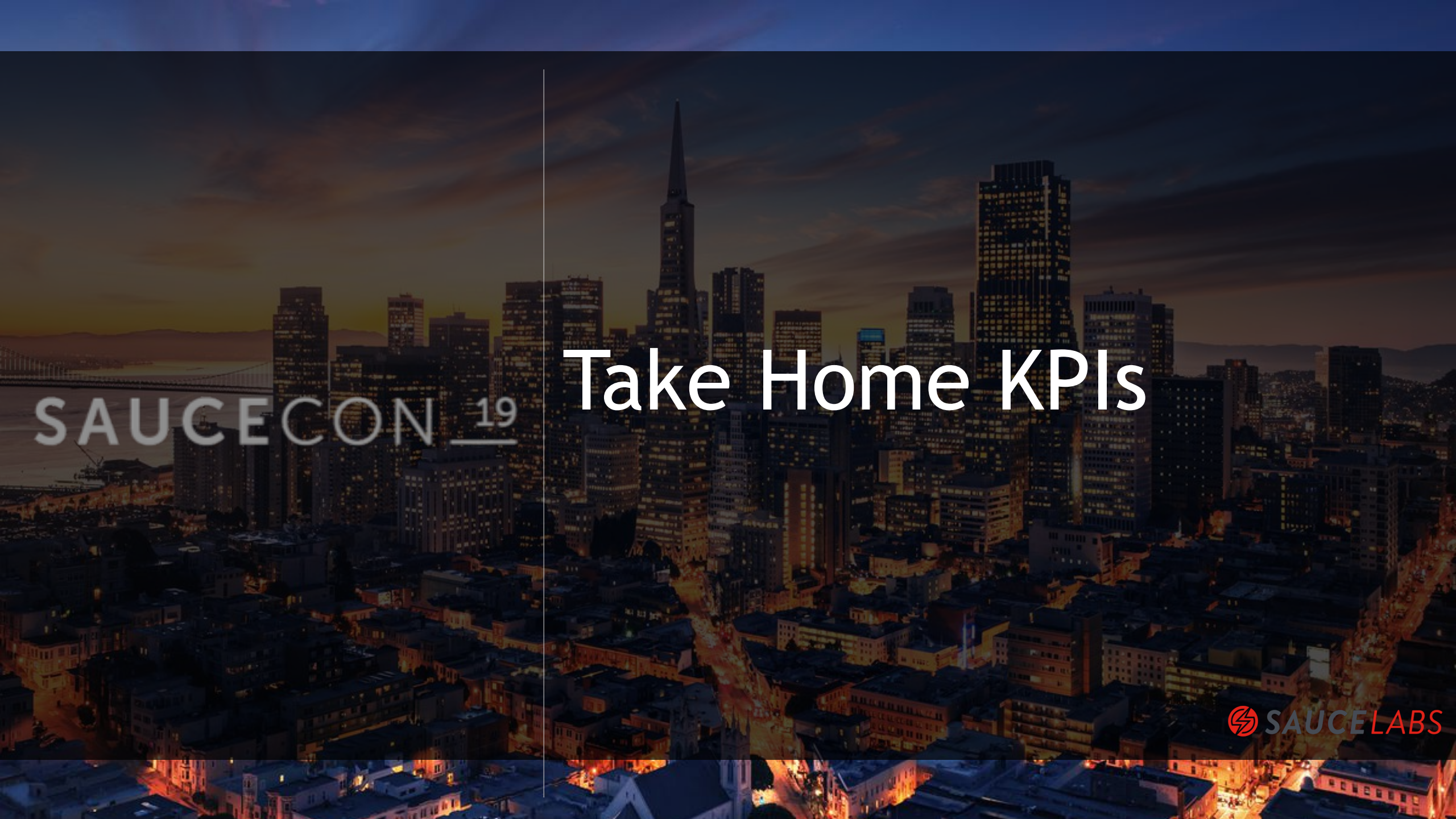
This is the code that you write to wait for some condition to occur before proceeding.

Recommended way to wait in your tests

```
//EXAMPLE 1 - This is the most convenient method provided to us by the Webdriver API
//ExpectedConditions class provides us many different options for locating an element
var wait = new WebDriverWait(_driver,TimeSpan.FromSeconds(10));
wait.Until(ExpectedConditions.ElementIsVisible(By.Id("elementId")));

//EXAMPLE 2 - This is a wait that dynamically checks for the presence of an element for a maximum amount of time, a bit burdensome
//because we had to write it
IWebDriver driver = new FirefoxDriver();
driver.Url = "http://somedomain/url_that_delays_loading";
WebDriverWait wait = new WebDriverWait(driver, TimeSpan.FromSeconds(10));
IWebElement myDynamicElement = wait.Until<IWebElement>((d) =>
    {
        return d.FindElement(By.Id("someDynamicElement"));
    });

//EXAMPLE 2 - This is the worst kind of wait and should almost never be used
Thread.Sleep(10000)
```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Take Home KPIs
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Key Performance Indicators of Automation

1. 100% automation reliability
2. 1 min/test max on your local resources
3. 10 min max for entire automation suite
4. Tests execute every pull request

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Thanks!

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Nikolay Advolodkin

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- Contributing author to Continuous Testing for DevOps Professionals
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