GUI Test Automation

Selenium Framework and Page Object Models

Frameworks

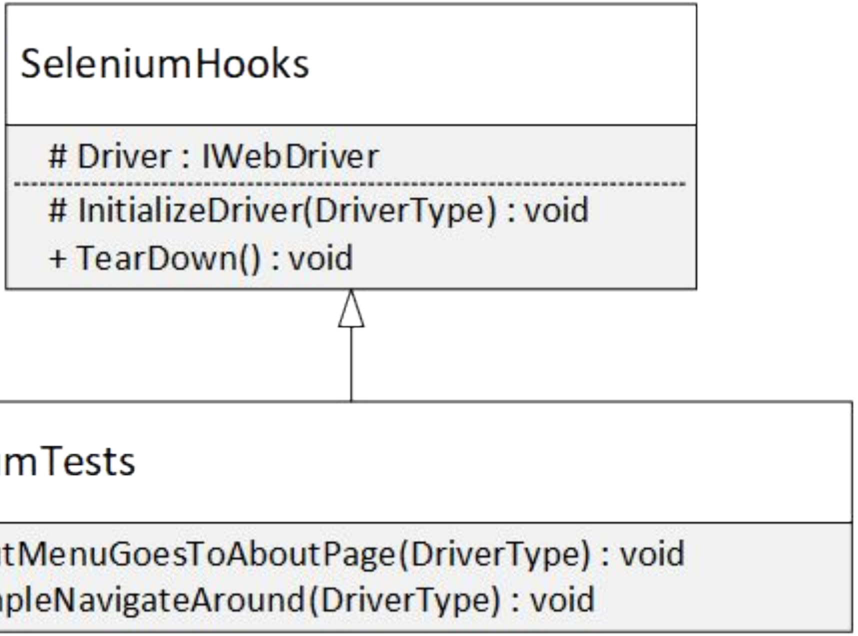
- CodedUI
  - Microsoft product only available with Visual Studio Enterprise
  - IE, Chrome, Firefox
  - https://docs.microsoft.com/en-us/visualstudio/test/supported-configurations-and-platforms-for-coded-ui-tests-and-action-recordings?view=vs-2017
- Cypress.io
  - Open-source product leveraging JavaScript, Chrome plugin
  - Canary, Chrome, Chromium, Electron
  - https://docs.cypress.io/guides/core-concepts/launching-browsers.html
- Selenium
  - WebDriver: Language-specific bindings to drive a browser
  - Chrome, Edge, IE, Firefox, Safari, Opera
  - https://www.seleniumhq.org/about/platforms.jsp

Contents

Selenium Demo

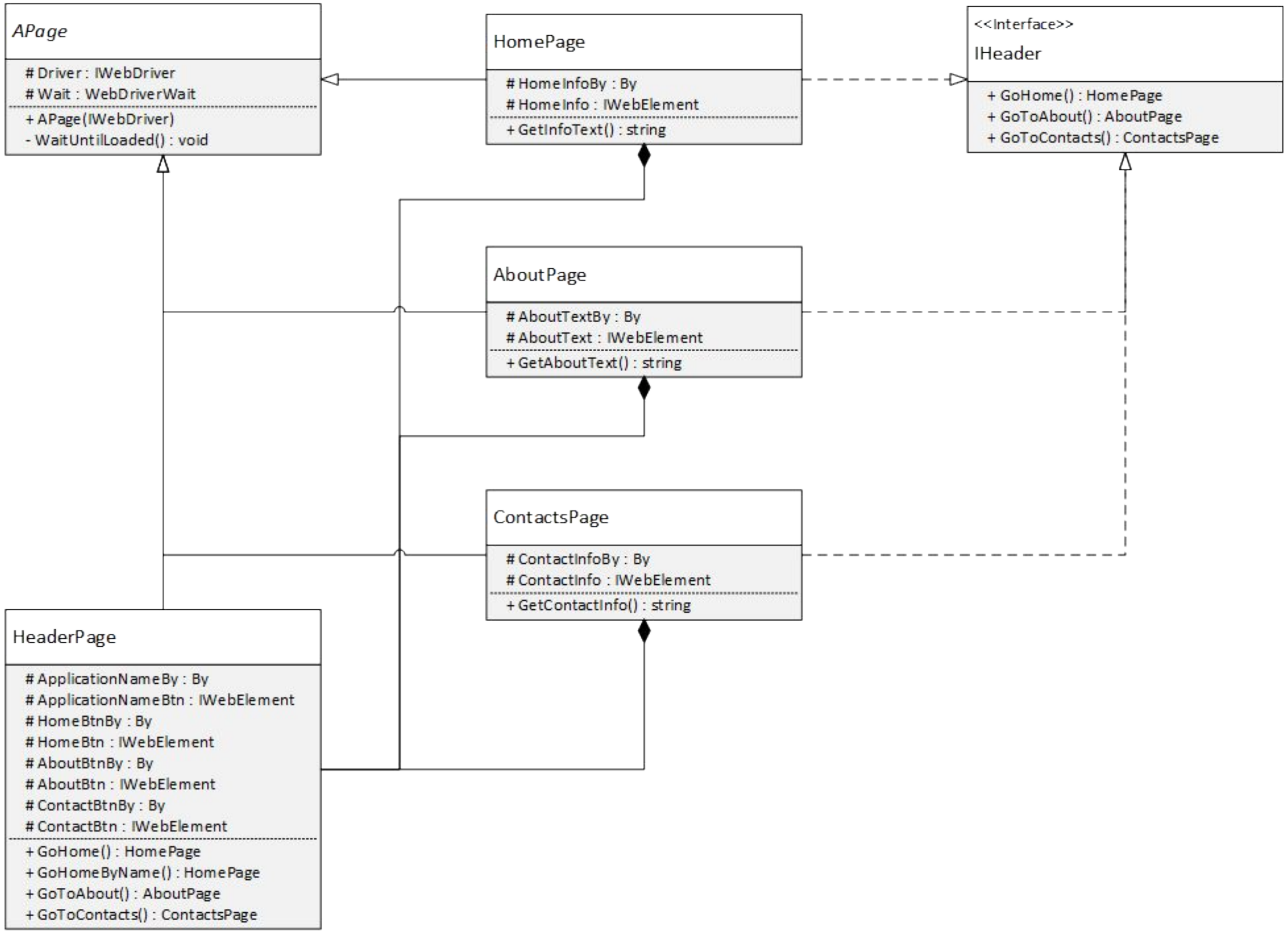
- Small C# .NET MVC app
  - Test: About menu item goes to About page
  - Test: Navigate through site, land on home page
  - Expected results based on displayed text, but can be more rigorous
- Assertions are the responsibility of the test method, not the object under test

Selenium Tests


SeleniumHooks
# Driver : IWebDriver
# InitializeDriver(DriverType) : void
+ TearDown() : void
SeleniumTests
+ AboutMenuGoesToAboutPage(DriverType) : void
+ ExampleNavigateAround(DriverType) : void

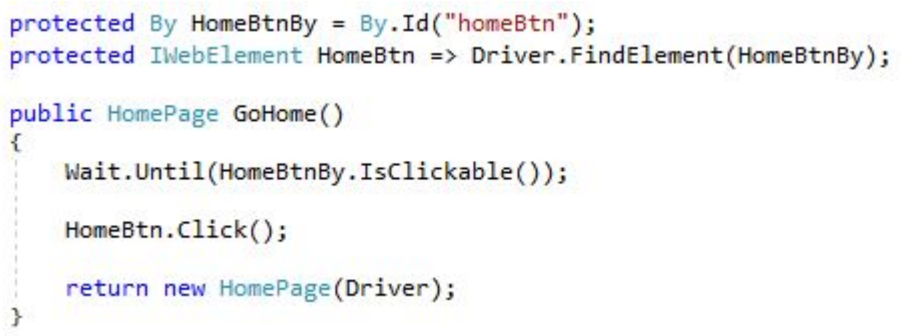
Page Object Model

- “A page object wraps an HTML page, or fragment, with an application-specific API, allowing you to manipulate page elements without digging around in the HTML.” - Martin Fowler
  - https://martinfowler.com/bliki/PageObject.html
- “If you have WebDriver APIs in your test methods, You're Doing It Wrong.” - Simon Stewart
  - https://martinfowler.com/bliki/PageObject.html


APage
# Driver : IWebDriver
# Wait : WebDriverWait
+ APage(IWebDriver)
- WaitUntilLoaded() : void
HomePage
# HomeInfoBy : By
# HomeInfo : IWebElement
+ GetInfoText() : string
<<Interface>>
IHeader
+ GoHome() : HomePage
+ GoToAbout() : AboutPage
+ GoToContacts() : ContactsPage
AboutPage
# AboutTextBy : By
# AboutText : IWebElement
+ GetAboutText() : string
ContactsPage
# ContactInfoBy : By
# ContactInfo : IWebElement
+ GetContactInfo() : string
HeaderPage
# ApplicationNameBy : By
# ApplicationNameBtn : IWebElement
# HomeBtnBy : By
# HomeBtn : IWebElement
# AboutBtnBy : By
# AboutBtn : IWebElement
# ContactBtnBy : By
# ContactBtn : IWebElement
+ GoHome() : HomePage
+ GoHomeByName() : HomePage
+ GoToAbout() : AboutPage
+ GoToContacts() : ContactsPage

Page Element Interaction

- IWebDriver: browser interaction
- By: how to find an element
- IWebElement: the element on the page
- Wait: wait for something to be true
- Return a new page (or “this”)
- Expression-bodied property searches
- Only those things that a human can interact with
  - Click - .Click()
  - Input - .SendKeys()
  - Read - .Text

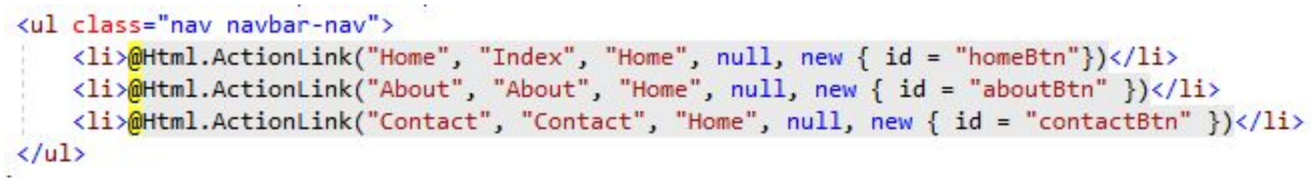


```
protected By HomeBtnBy = By.Id("homeBtn");
protected IWebElement HomeBtn => Driver.FindElement(HomeBtnBy);

public HomePage GoHome()
{
    Wait.Until(HomeBtnBy.IsClickable());

    HomeBtn.Click();

    return new HomePage(Driver);
}
```



```
<ul class="nav navbar-nav">
    <li>@Html.ActionLink("Home", "Index", "Home", null, new { id = "homeBtn"})</li>
    <li>@Html.ActionLink("About", "About", "Home", null, new { id = "aboutBtn" })</li>
    <li>@Html.ActionLink("Contact", "Contact", "Home", null, new { id = "contactBtn" })</li>
</ul>
```

Page Element Interaction

- By
  - Class Name
  - CSS Selector
  - ID
  - LinkText
  - Name
  - Partial Link Text
  - Tag Name
  - XPath

- IWebElement
  - TagName
  - Text
  - Enabled
  - Selected
  - Location
  - Size
  - Displayed
  - Clear() (input, textarea)
  - Click()
  - GetAttribute(attributeName)
  - GetCssValue(propertyName)
  - GetProperty(propertyName)
  - SendKeys(text)
  - Submit()

Developer Considerations

- Give HTML elements IDs where applicable
  - Easy to find
  - More maintainable
- Watch for changes to
  - IDs
  - Class names
  - Position in DOM (e.g. XPath Bys)
- Wait for elements before interacting with them
  - Clickable, displayed, enabled, etc.
- Interaction == human interaction
  - Don’t try to interact with off-screen (“hidden”) text inputs that a human couldn’t get to

What are your questions?