5. Waits

These days, most of the web apps are using AJAX techniques. When a page is loaded by the browser, the elements within that page may load at different time intervals. This makes locating elements difficult: if an element is not yet present in the DOM, a locate function will raise an *ElementNotVisibleException* exception. Using waits, we can solve this issue. Waiting provides some slack between actions performed - mostly locating an element or any other operation with the element.

Selenium Webdriver provides two types of waits - implicit & explicit. An explicit wait makes WebDriver wait for a certain condition to occur before proceeding further with execution. An implicit wait makes WebDriver poll the DOM for a certain amount of time when trying to locate an element.

5.1. Explicit Waits

An explicit wait is a code you define to wait for a certain condition to occur before proceeding further in the code. The extreme case of this is time.sleep(), which sets the condition to an exact time period to wait. There are some convenience methods provided that help you write code that will wait only as long as required. WebDriverWait in combination with ExpectedCondition is one way this can be accomplished.

```
from selenium import webdriver
from selenium.webdriver.common.by import By
from selenium.webdriver.support.ui import WebDriverWait
from selenium.webdriver.support import expected_conditions as EC

driver = webdriver.Firefox()
driver.get("http://somedomain/url_that_delays_loading")
try:
    element = WebDriverWait(driver, 10).until(
        EC.presence_of_element_located((By.ID, "myDynamicElement"))
    )
finally:
    driver.quit()
```

In the code above, Selenium will wait for a maximum of 10 seconds for an element matching the given criteria to be found. If no element is found in that time, a TimeoutException is thrown. By default, WebDriverWait calls the ExpectedCondition every 500 milliseconds until it returns success. ExpectedCondition will return *true* (Boolean) in case of success or *not null* if it fails to locate an element.

Expected Conditions

There are some common conditions that are frequently of use when automating web browsers. Listed below are the names of each. Selenium Python binding provides some convenience methods so you don't have to code an expected_condition class yourself or create your own utility package for them.

- title_is
- title_contains
- presence_of_element_located
- visibility_of_element_located
- visibility_of
- presence_of_all_elements_located
- text_to_be_present_in_element
- text_to_be_present_in_element_value
- frame_to_be_available_and_switch_to_it
- invisibility_of_element_located

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- element_to_be_clickable
- staleness_of
- element_to_be_selected
- element_located_to_be_selected
- element_selection_state_to_be
- element_located_selection_state_to_be
- alert_is_present

```
from selenium.webdriver.support import expected_conditions as EC

wait = WebDriverWait(driver, 10)
element = wait.until(EC.element_to_be_clickable((By.ID, 'someid')))
```

The expected_conditions module contains a set of predefined conditions to use with WebDriverWait.

Custom Wait Conditions

You can also create custom wait conditions when none of the previous convenience methods fit your requirements. A custom wait condition can be created using a class with *__call__* method which returns *False* when the condition doesn't match.

```
class element_has_css_class(object):
  """An expectation for checking that an element has a particular css class.

  locator - used to find the element
  returns the WebElement once it has the particular css class
  """
  def __init__(self, locator, css_class):
    self.locator = locator
    self.css_class = css_class

  def __call__(self, driver):
    element = driver.find_element(*self.locator)   # Finding the referenced element
    if self.css_class in element.get_attribute("class"):
        return element
    else:
        return False

# Wait until an element with id='myNewInput' has class 'myCSSClass'
wait = WebDriverWait(driver, 10)
element = wait.until(element_has_css_class((By.ID, 'myNewInput'), "myCSSClass"))
```

Note:

polling2 Library

You may also consider using polling2 library which you need to install separately.

5.2. Implicit Waits

An implicit wait tells WebDriver to poll the DOM for a certain amount of time when trying to find any element (or elements) not immediately available. The default setting is 0 (zero). Once set, the implicit wait is set for the life of the WebDriver object.

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```
from selenium import webdriver

driver = webdriver.Firefox()
```

```
driver.implicitly_wait(10) # seconds
driver.get("http://somedomain/url_that_delays_loading")
myDynamicElement = driver.find_element_by_id("myDynamicElement")
```

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