**AUTOMATION WEB APPLICATION USING TESTNG**

**ANNOTATIONS:**

**Page:**

package com.demo.seleniumspring.annotation;

import org.springframework.context.annotation.Lazy;

import org.springframework.context.annotation.Scope;

import org.springframework.stereotype.Component;

import java.lang.annotation.\*;

@Lazy

@Component

@Scope("prototype") // to create new instances of bean instead of sharing; helps during parallel runs

@Documented

@Retention(RetentionPolicy.RUNTIME)

@Target(ElementType.TYPE)

public @interface Page {

}

**Page Fragment:**

package com.demo.seleniumspring.annotation;

import org.springframework.context.annotation.Lazy;

import org.springframework.context.annotation.Scope;

import org.springframework.stereotype.Component;

import java.lang.annotation.\*;

@Lazy

@Component

@Scope("prototype") // to create new instances of bean instead of sharing; helps during parallel runs

@Documented

@Retention(RetentionPolicy.RUNTIME)

@Target(ElementType.TYPE)

public @interface PageFragment {

}

**CONFIG:**

**Browser Scope:**

package com.demo.seleniumspring.config;

import org.openqa.selenium.remote.RemoteWebDriver;

import org.openqa.selenium.remote.SessionId;

import org.springframework.beans.factory.ObjectFactory;

import org.springframework.context.support.SimpleThreadScope;

import java.util.Objects;

// custom scope to prevent multiple browsers from launching

// see video: https://bah.udemy.com/course/cucumber-with-spring-boot/learn/lecture/20184630#overview

public class BrowserScope extends SimpleThreadScope {

@Override

public Object get(String name, ObjectFactory<?> objectFactory) {

return super.get(name, objectFactory);

// Object o = super.get(name, objectFactory);

//

// SessionId sessionId = ((RemoteWebDriver)o).getSessionId();

// if (Objects.isNull(sessionId)){

// super.remove(name);

// super.get(name,objectFactory);

// }

// return o;

}

@Override

public void registerDestructionCallback(String name, Runnable callback) {

}

}

**Browser Scope Config:**

package com.demo.seleniumspring.config;

import org.springframework.beans.factory.config.BeanFactoryPostProcessor;

import org.springframework.context.annotation.Bean;

import org.springframework.context.annotation.Configuration;

// this is how spring boot reads custom scope

@Configuration

public class BrowserScopeConfig {

@Bean

public static BeanFactoryPostProcessor beanFactoryPostProcessor(){

return new BrowserScopePostProcessor();

}

}

**Browser Scope Post Processer:**

package com.demo.seleniumspring.config;

import org.springframework.beans.BeansException;

import org.springframework.beans.factory.config.BeanFactoryPostProcessor;

import org.springframework.beans.factory.config.ConfigurableListableBeanFactory;

// registers new scope created: BrowserScope.java

public class BrowserScopePostProcessor implements BeanFactoryPostProcessor {

@Override

public void postProcessBeanFactory(ConfigurableListableBeanFactory beanFactory) throws BeansException {

beanFactory.registerScope("browserscope", new BrowserScope());

}

}

**Remote Web Driver Config:**

package com.demo.seleniumspring.config;

import io.github.bonigarcia.wdm.WebDriverManager;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.chrome.ChromeDriver;

import org.openqa.selenium.chrome.ChromeOptions;

import org.openqa.selenium.remote.DesiredCapabilities;

import org.openqa.selenium.remote.RemoteWebDriver;

import org.openqa.selenium.support.ui.WebDriverWait;

import org.springframework.beans.factory.annotation.Value;

import org.springframework.boot.autoconfigure.condition.ConditionalOnMissingBean;

import org.springframework.boot.autoconfigure.condition.ConditionalOnProperty;

import org.springframework.context.annotation.Bean;

import org.springframework.context.annotation.Configuration;

import org.springframework.context.annotation.Lazy;

import org.springframework.context.annotation.Profile;

import java.net.URL;

// for selenium grid run; this will be the remote profile

@Lazy

@Configuration

@Profile("remote") // only activate this class if remote profile

public class RemoteWebDriverConfig {

@Value("${selenium.grid.url}")

private URL url;

@Bean

@ConditionalOnProperty(name = "browser", havingValue = "firefox")

public WebDriver remoteFirefoxDriver(){

return new RemoteWebDriver(this.url, DesiredCapabilities.firefox());

}

@Bean

@ConditionalOnMissingBean // to catch invalid browser values

public WebDriver remoteChromeDriver(){

return new RemoteWebDriver(this.url, DesiredCapabilities.chrome());

}

}

**Web Driver Config:**

package com.demo.seleniumspring.config;

import io.github.bonigarcia.wdm.WebDriverManager;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.chrome.ChromeDriver;

import org.openqa.selenium.chrome.ChromeOptions;

import org.openqa.selenium.edge.EdgeDriver;

import org.openqa.selenium.support.ui.WebDriverWait;

import org.springframework.beans.factory.annotation.Value;

import org.springframework.boot.autoconfigure.condition.ConditionalOnMissingBean;

import org.springframework.boot.autoconfigure.condition.ConditionalOnProperty;

import org.springframework.context.annotation.\*;

@Configuration

@Profile("!remote") // to avoid loading for remote runs

public class WebDriverConfig {

@Bean

@ConditionalOnProperty(name = "browser", havingValue = "edge")

public WebDriver edgeDriver() {

// this is the bean class for edge driver

if (System.getenv("CLOUD\_RUN\_FLAG") == null) {

WebDriverManager.edgedriver().setup();

}

return new EdgeDriver();

}

@Bean

// @Primary // this will be the default browser

@ConditionalOnMissingBean // to catch invalid browser values

@Scope("browserscope") // use custom scope

public WebDriver chromeDriver() {

// this is the bean class for chrome driver

if (System.getenv("CLOUD\_RUN\_FLAG") == null) {

WebDriverManager.chromedriver().setup();

return new ChromeDriver();

} else {

WebDriverManager.chromedriver().setup();

ChromeOptions options = new ChromeOptions();

options.addArguments("--no-sandbox");

options.addArguments("--headless");

return new ChromeDriver(options = options);

}

}

}

**Web Driver Wait Config:**

package com.demo.seleniumspring.config;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.support.ui.WebDriverWait;

import org.springframework.beans.factory.annotation.Value;

import org.springframework.context.annotation.Bean;

import org.springframework.context.annotation.Configuration;

import org.springframework.context.annotation.Lazy;

@Lazy

@Configuration

public class WebDriverWaitConfig {

@Value("${default.timeout:30}")

private int timeout;

@Bean

public WebDriverWait webDriverWait(WebDriver driver) {

return new WebDriverWait(driver, this.timeout);

}

}

**PAGE:**

**Google Page:**

package com.demo.seleniumspring.page.google;

import com.demo.seleniumspring.annotation.Page;

import com.demo.seleniumspring.page.Base;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.beans.factory.annotation.Value;

import org.springframework.context.annotation.Lazy;

import org.springframework.context.annotation.Scope;

import org.springframework.stereotype.Component;

// this is the main page class that uses search componet and search results componet

@Page // using custom annotation created; src/main/java/com/demo/seleniumspring/annotation/Page.java

public class GooglePage extends Base {

@Autowired

private SearchComponent searchComponent;

@Autowired

private SearchResult searchResult;

@Value("${application.url}")

private String url;

//launch website

public void goToGooglePage(){

this.driver.get(url);

}

public SearchComponent getSearchComponent() {

return searchComponent;

}

public SearchResult getSearchResult() {

return searchResult;

}

@Override

public boolean isAt() {

return this.searchComponent.isAt();

}

public void close(){

this.driver.quit();

}

}

**Search Component:**

package com.demo.seleniumspring.page.google;

import com.demo.seleniumspring.annotation.PageFragment;

import com.demo.seleniumspring.page.Base;

import org.openqa.selenium.Keys;

import org.openqa.selenium.WebElement;

import org.openqa.selenium.support.FindBy;

import org.springframework.context.annotation.Lazy;

import org.springframework.context.annotation.Scope;

import org.springframework.stereotype.Component;

import java.util.List;

@PageFragment// using custom annotation created; src/main/java/com/demo/seleniumspring/annotation/PageFragment.java

public class SearchComponent extends Base {

@FindBy(name = "q")

private WebElement searchBox;

@FindBy(name="btnK")

private List<WebElement> searchBtns;

public void search(final String keyword) {

this.searchBox.sendKeys(keyword);

this.searchBox.sendKeys(Keys.TAB);

// CLICK first search button

this.searchBtns

.stream()

.filter(e -> e.isDisplayed() && e.isEnabled())

.findFirst()

.ifPresent(WebElement::click);

}

@Override

public boolean isAt() {

return this.wait.until(driver1 -> this.searchBox.isDisplayed());

}

}

**Search Result:**

package com.demo.seleniumspring.page.google;

import com.demo.seleniumspring.annotation.PageFragment;

import com.demo.seleniumspring.page.Base;

import org.openqa.selenium.WebElement;

import org.openqa.selenium.support.FindBy;

import java.util.List;

@PageFragment// using custom annotation created; src/main/java/com/demo/seleniumspring/annotation/PageFragment.java

public class SearchResult extends Base {

@FindBy(css = "div.g")

private List<WebElement> results;

public int getCount() {

return this.results.size();

}

@Override

public boolean isAt() {

return this.wait.until((d) -> !this.results.isEmpty());

}

}

**Base:**

package com.demo.seleniumspring.page;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.support.PageFactory;

import org.openqa.selenium.support.ui.WebDriverWait;

import org.springframework.beans.factory.annotation.Autowired;

import javax.annotation.PostConstruct;

public abstract class Base {

@Autowired

protected WebDriver driver;

@Autowired

protected WebDriverWait wait;

@PostConstruct

private void init(){

PageFactory.initElements(this.driver, this);

}

public abstract boolean isAt();

}

**UTIL:**

**ScreenShot Util:**

package com.demo.seleniumspring.util;

import org.apache.commons.lang3.ObjectUtils;

import org.openqa.selenium.OutputType;

import org.openqa.selenium.TakesScreenshot;

import org.openqa.selenium.WebDriver;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.beans.factory.annotation.Value;

import org.springframework.context.annotation.Lazy;

import org.springframework.stereotype.Component;

import org.springframework.util.FileCopyUtils;

import java.io.File;

import java.io.IOException;

import java.nio.file.Path;

@Lazy

@Component

public class ScreenShotUtil {

@Autowired

private TakesScreenshot driver;

// location of screenshot file

@Value("${screenshot.path}")

private Path path;

public void takeScreenShot(final String imgName) throws IOException {

// takes screenshot as saves to path in app properties file using given imgName ex. test.png

if (System.getenv("CLOUD\_RUN\_FLAG") == null) {

try {

File sourceFile = this.driver.getScreenshotAs(OutputType.FILE);

FileCopyUtils.copy(sourceFile, this.path.resolve(imgName).toFile());

System.out.println("Saving screenshot to " + path);

} catch (Exception e) {

System.out.println("Something went wrong with screenshot capture" + e);

}

}

}

}

**SELENIUM SPRING APPLICATION:**

package com.demo.seleniumspring;

import org.springframework.boot.SpringApplication;

import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication

public class SeleniumSpringApplication {

public static void main(String[] args) {

SpringApplication.run(SeleniumSpringApplication.class, args);

}

}

**TEST:**

**GoogleSearch01 Test:**

package com.demo.seleniumspring.googletests;

import com.demo.seleniumspring.SpringBaseTestNGTest;

import com.demo.seleniumspring.page.google.GooglePage;

import com.demo.seleniumspring.util.ScreenShotUtil;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.context.annotation.Lazy;

import org.testng.Assert;

import org.testng.annotations.Test;

import java.io.IOException;

public class GoogleSearch1Test extends SpringBaseTestNGTest {

@Autowired

private GooglePage googlePage;

@Lazy // only create the object when needed

@Autowired

private ScreenShotUtil screenShotUtil;

@Test

public void GoogleTest() throws IOException, InterruptedException {

this.googlePage.goToGooglePage();

Assert.assertTrue(this.googlePage.isAt());

this.googlePage.getSearchComponent().search("spring boot");

Assert.assertTrue(this.googlePage.getSearchResult().isAt());

Assert.assertTrue(this.googlePage.getSearchResult().getCount() > 2);

System.out.println("Number of Results: " + this.googlePage.getSearchResult().getCount());

// wait 3 seconds

// Thread.sleep(3000);

//take screenshot

//this.screenShotUtil.takeScreenShot("Test.png");

//this.googlePage.close();

}

}

**GoogleSearch02 Test:**

package com.demo.seleniumspring.googletests;

import com.demo.seleniumspring.SpringBaseTestNGTest;

import com.demo.seleniumspring.page.google.GooglePage;

import com.demo.seleniumspring.util.ScreenShotUtil;

import org.springframework.beans.factory.annotation.Autowired;

import org.springframework.context.annotation.Lazy;

import org.testng.Assert;

import org.testng.annotations.Test;

import java.io.IOException;

public class GoogleSearch2Test extends SpringBaseTestNGTest {

@Autowired

private GooglePage googlePage;

@Lazy // only create the object when needed

@Autowired

private ScreenShotUtil screenShotUtil;

@Test

public void GoogleTest() throws IOException, InterruptedException {

this.googlePage.goToGooglePage();

Assert.assertTrue(this.googlePage.isAt());

this.googlePage.getSearchComponent().search("Selenium");

Assert.assertTrue(this.googlePage.getSearchResult().isAt());

Assert.assertTrue(this.googlePage.getSearchResult().getCount() > 2);

System.out.println("Number of Results: " + this.googlePage.getSearchResult().getCount());

// wait 3 seconds

// Thread.sleep(3000);

//take screenshot

//this.screenShotUtil.takeScreenShot("Test.png");

//this.googlePage.close();

}

}

**Selenium Application Test:**

package com.demo.seleniumspring;

import org.junit.jupiter.api.Test;

import org.springframework.boot.test.context.SpringBootTest;

@SpringBootTest

class SeleniumSpringApplicationTests {

@Test

void contextLoads() {

}

}

**Spring Base Test Ng Test:**

package com.demo.seleniumspring;

import org.springframework.boot.test.context.SpringBootTest;

import org.springframework.test.context.testng.AbstractTestNGSpringContextTests;

@SpringBootTest

public class SpringBaseTestNGTest extends AbstractTestNGSpringContextTests {

}