==================== Selenium 12/12/2023===============================================

* What is Selenium? 🡺 API (middle man between automation code & browser 🡺 actually selenium driver the browser)
* Selenium follows which protocol or how selenium connect with any browser
  1. Selenium 1/2/3 = JSON wire protocol (Restful web service **using** JSON over HTTP)
  2. Selenium 4(4.15.0)= WebDriver protocol
* What kind of application selenium can handle?
  1. Web based application = open with browser 🡸 Selenium Yes
  2. Client based application = no need browser 🡸 Selenium No (UFT/QTP , Team complete)
  3. No GUI application 🡸 API
  4. Mobile application 🡸 Selenium with help of Appium
* Selenium components
  1. Selenium IDE :
     1. Advantage:
        1. No need coding knowledge, it use selenium own language known as selecse
        2. We can record manual steps in application and run later on 🡺 record & run
     2. Disadvantage:
        1. Not stable automation (Not working in the long run / break automation)
  2. Selenium Grid
     1. Parallel test execution & cut down run time
     2. Cross browser testing
     3. Cross platform testing

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| Parallel test execution | Cross browser testing | Cross platform testing |
| All Test group/each test start at the same time | Code same , but run different browser | Code same, but run in different operating system like windows, mac, linux |
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* 1. Selenium WebDriver 🡸 Automation to handle web based application
  2. Version
     1. Selenium 1 = IDE , RC, Grid,WebDriver
     2. Selenium 2/3/4 = IDE,Grid, WebDriver
* What is WebDriver?
  1. This is the main component of selenium who can handle web based applications
  2. Actually Web driver is an interface
* How to open a browser?
  1. Webdriver driver = new WebDriver(); 🡸 wrong (interface instantiation not possible)
  2. WebDriver driver = new ChromeDriver(); 🡸 correct code
     1. Here Chromedriver is a class and it help WebDriver to create object
     2. Explain the code
        1. Webdriver= interface
        2. Driver= object of chromedriver (class)
        3. New = java keyword means to create something new
        4. ChromeDriver = class
  3. Can u use this code 🡺 ChromeDriver driver = new ChromeDriver(); 🡺 Yes work
  4. Then why we use this code🡺 WebDriver driver = new ChromeDriver();
  5. Answer: all selenium method are abstract and located inside Webdriver interface
* **WebDriver internal structure**

**A diagram of a software company

Description automatically generated**

* How to close a browser?
  1. Driver.close()
  2. Driver.quite()
  3. Why two methods

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| --- | --- |
| close | quite |
| Close only current tab/browser | Close all tabs /all browser |
| Browser = only browser close  Driver = not close | Driver & browser = both close |
| Can not free all system memory | Free all system memory |
| Why 🡺 IE browser use only close method |  |

* How to go to any application link or URL?
  1. Driver.get();
  2. Driver.navigate().to();

|  |  |
| --- | --- |
| Get() | Navigate() |
| Go to URL & nothing else | to() 🡺 open any URL |
|  | Back()🡺 can go previous page |
|  | Forward()🡺 can go next page |
|  | Refresh()🡺 reload the browser |
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* How to make browser bigger size?
  1. driver.manage().window().maximize() 🡺 maximum size & we can see browser border
  2. driver.manage().window().fullscreen() 🡺 maximum size & we can not see browser border

|  |  |
| --- | --- |
| Maximize() | Fullscreen() |
| Automate🡺 Application | Automate 🡺 Video, game |

* How to wait for page loading all GUI
  1. driver.manage().timeouts().pageLoadTimeout(Duration.ofSeconds(10));
* Selenium automation in GUI level or HTML level
  1. GUI 🡺 selenium no (Yes =UFT/QTP , Team complete)
  2. HTML 🡺 Selenium Yes (Faster)
* How to wait for HTML loaded properly or not
  1. Selenium Implicit wait🡺 driver.manage().timeouts().implicitlyWait(Duration.ofSeconds(10));
  2. Disadvantage: it slow down selenium automation speed 🡺 better not to use this code
* How to handle synchronization/ Ajax handling in selenium 🡺 Selenium wait:
  1. Why:

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Selenium

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Application

* 1. Unconditional
     1. Thread.sleep(time) 🡺 Actually it is a java wait
  2. Conditional (Selenium)
     1. Implicit wait
        1. Why : wait for HTML load or not
     2. Explicit wait
     3. Fluent wait

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| --- | --- | --- | --- |
|  | implicit | Explicit/WebDriver wait | Fluent |
| Why need | DOM page >>HTML load or not | Wait for Single web element until   * Visible * Clickable * Enable * Disable * selected | Same as Explicit  Plus two additional   1. Can check web element frequently (every 30 sec) 2. Can handle Stale element exception |
| Performance | Slow down whole automation | Not slow down | Not slow down |
|  |  |  |  |
|  |  |  |  |

* How to find any application element or web element in selenium?
  1. Findelement()= single
  2. Findelements() = multiple
* What are the common locators in selenium?
  1. Adress: H no, road/st, City,State,zip code
  2. Same in selenium 🡺 locator
     1. Inspect the object(twice)
     2. Check mouse over the code and your application element will be highlighted
     3. Check HTML code

<input class="oxd-input oxd-input--active" name="username" placeholder="Username" autofocus="" data-v-1f99f73c="">

* + 1. After the 1st < there is a word 🡺 known as tag
       1. Here tag name = input
    2. Look for = sign
    3. Left side of = sign known locator
    4. Right side of = sign known value of locator or attribute
  1. Common locator
     1. Class
     2. Id
     3. Name
     4. LinkText
     5. Partiallink
     6. Xpath
     7. CSSselector
* What is xpath? Tell me the formula of xpath
  1. Xpath = one of the selenium locator
  2. Formula = //\*[@locator=’value’]
  3. <input class="oxd-input oxd-input--active" name="username" placeholder="Username" autofocus="" data-v-1f99f73c="">
  4. Write xpath 🡺 //\*[@ name=’ username’]
  5. Group in = select one locator among multiple 🡺 (xpath)[no]
* What will selenium tell if any xpath wrong?
  1. Selenium exception
     1. InvalidSelectorException
     2. NoSuchElement exception
  2. Why
     1. I create wrong xpath
     2. New application version came 🡺 locator chage
     3. Dev change xpath by mistake
* Xpath correct , but selenium can not interact with application 🡺in which situation?
  1. Exception : Stale element exception \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
  2. HTML locator hidden or disable or invisible
  3. May be locator or xpath inside any iframe
* What is stale element in selenium? \*\*\*\*\*\*\*\*\*\*\*\*\*
  1. This a selenium exception
  2. Why:
     1. Here xpath correct
     2. But run time xpath or locator got hidden
  3. Selenium: can not interact in this situation with application
  4. How to handle:
     1. Fluent wait
     2. JSE
* How to handle any HTML locator with hidden/disable/invisible?
  1. JSE
* How to handle I Frame?
  1. Driver.SwitchTo(iframe index)🡺 then selenium will jump inside iFrame
* How to write xpath with text?
  1. Formula : //\*[@locator=’value’]🡺
  2. HTML>> inspect >> if any black letter = known text
  3. Text xpath formula : //\*[text()=’text’] 🡺//\*[text()=' Login ']
* How to find parent / sibling / ancestor of any locator?
* What are the types of xpath?
  1. // = only child 🡺 known as relative xpath
  2. / = GP/P/c relation🡺 absolute
  3. Example:
     1. /USA/New york/JH (GP/P/C)
     2. //JH(C)
  4. Which one is good in automation &why?
     1. Relative good
     2. Why: not depends on GP or P, less chance of break
     3. But absolute xptah depends on GP & P, so any location change in GP or P then child xpath will be break
* Which locator do u use in your automation?
  1. Xpath
     1. Formula
     2. Text
     3. Method
     4. other
  2. CSSselector🡺
     1. Identify locator = better to use id & class
     2. Formula :
        1. Id=# locatorvalue
        2. Class=.locatorvalue

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| --- | --- | --- |
|  | Xpath | CSS selector |
| Dynamic web element | Yes (methods) | No |
| Color | Possible by xpath.getCSSValue() | Best |
| Font type |  | Best |
| Font size |  | Best |
| Browser: IE | slow | Good |

IE browser challenges:

1. Only close()
2. CSS selector good

* Dynamic Web element= locator value change frequently
  1. V1 :Password🡺 @id=pass 🡺 NY
  2. V2:Password🡺 @id=pass222🡺 CA
  3. V3: Password🡺 @id=pass333🡺 London
  4. How to write a single xpath who can identify all 3 locator
     1. Basic formula: //\*[@id=’pass333’]🡺3rd
     2. Method🡺 contains()🡺 //\*[contains(@id,’pass’)]== all 3

A screenshot of a computer

Description automatically generated

//\*[contains(@class,’oxd - form’)]

* What are the methods of xpath? 🡸 Expert QA
  1. Contains() 🡺 formula : //\*[contains(@locator,’value’)]
  2. Start-with()
  3. Following-code()
  4. Preceding-node()
  5. Selenium Other locator method:
     1. Text()
     2. Parent ::
     3. Sibling ::
     4. Ancestor ::
     5. Note: in java 8 change method sign
        1. Java 1 to Java 7 method sign = ()
        2. Java 8 method sign = () or ::
* How to handle xpath in your automation framework?
  1. PF or POM:
     1. I have to create separate class >> all or store all xpath inside that class page by page
        1. LoginPage ..> all login page xpath
        2. Xpath can not store with java String
        3. Need to store xpath PF/POB concept

|  |  |
| --- | --- |
| PF | POM |
| @Findby | BY |
| Faster  🡺@CacheLookup | Fast |
| Can handle larger application (>500 web element) | Can handle smaller application |
|  |  |

* How to handle dynamic Web elements in selenium?
* How to handle color, font size , font type in selenium?
* How to send any text or write text in selenium?
* How to click any application button in selenium?
  1. Selenium
     1. Click()
     2. Submit()
  2. Other way to click (supporting selenium)
     1. Actions class
        1. Click()
        2. Click&Hold()
        3. DoubleClick()
        4. ContextClick() 🡺 rt click
     2. JavaScriptExecutor 🡺 best for click
        1. Hidden = selenium can not click , Actions class Not
        2. Only JSE can click hidden
  3. How to click in selenium
     1. 1st try selenium click()
     2. If failed then try actions class click
     3. If failed then JSE click🡺 if nothing work then try JSE click
     4. If u need double click 🡺 Actions class
     5. If u need rt click 🡺 Actions class
     6. If hidden🡺 JSE
* How to Know any button visible/enable /selected in selenium?
* How to validate any test pass or fail in Automation?
* Which locators do u use in your current project and why?
* Automation framework
  1. Src/main/java
     1. Package
        1. com.generic 🡺 common code
           1. login 🡺 Code
           2. Product🡺 Code
           3. Payment🡺 Code
        2. com.pageobjectmodel🡺 PF/POM
        3. com.util🡺 small supporting method
           1. BseConfig
           2. SeleniumWait
           3. Selenium Click
  2. src/main/resources
  3. src/test/java
     1. Package
        1. Com.regression
           1. TestRun
        2. Com.smoke
        3. Com.functional
  4. Src/test/resources
* Java based framework 🡺 Main method run the test🡺 done
  1. No body use it
  2. Why:
     1. Can not generate any automation report
* Unit testing framework 🡺 no need main method, @Test will run the code
  1. TestNG
  2. Junit
     1. Why
        1. It can generate report (Extents reporting)
        2. It can handle each test or each unit checking
* BDD framework (Cucumber) 🡺 run code by runner file
  1. Why
     1. It can generate report (cucumber maven reporting)

Java 17 🡺 java 1 to java 17 (not 18,19,20,21)

Selenium 4 🡺 Selenium 1 to selenium 4 (include 3)

Selenium 3: open browser🡺 JSON wire protocol

1. System.setPrioperties()
2. WebDriver Manager

Selenium 4 : Webdriver protocol

* Webdriver driver = new ChromeDriver()

---------------------------- GITHUB------------------------------------------------------------------------------

Actually this is unix/linux/SH

Coding in black screen:

1. Windows 🡺 unix /CMD/command prompt
2. Mac 🡺 terminal /SH
3. Linux 🡺 linux script

How to push code 1st time:

1. Git init
2. Git add .
3. Git commit -m “your text”
4. Git remote add origin repoURL
5. Git push -u origin master

How to push later:

* Git add .
* Git commit -m “your text”
* Git push -u origin master

How to pull the code:

* Git clone repoURL

============================= TestNG =========================================

* What is testng?
  + Unit testing framework
  + Based on JAVA
  + Any other similar framework in java = Yes (Junit)
* Why need TestNG
  + To generate automation report (extents reporting)
  + Write test description
  + Test grouping🡺 can possible to run only smoke or regression
  + Change the test order with priority
  + Disable test run with enable=false
  + Can possible to run multiple test/class/method🡺 test suite from testng.xml
  + Can run only failed test cases from tesng-failed.xml
  + Testng.xml
    - Run test suite/class/test/method
    - Can run specific test group = smoke/regression/unit
    - To generate report
    - Parallel test execution
      * Create testng.xml>> parallel = class, Theard count = how many class / how many group
    - @parameter 🡺 can read data from testng.xml
* Test run 🡺 @Test
* Tell me other testng annotation
  + @BeforeSuite = before all & one time
  + @BeforeClass= before all class & one time
  + @BeforeTest 🡺 setup (open browser & go URL) : before all test & one time
  + @BeforeMethod🡺 run before each @test
  + @Test
  + @Test🡺 run test
  + @Test
  + @AfterMethod🡺 run after each @Test
  + @AfterTest🡺 close all connection (close browser /driver) : after all test & one time
  + @afterClass🡺 after all class & one time
  + @AfterSuite 🡺 after all & one time
  + Tell me other testng annotation \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
    - @parameter = read data from testng.xml
    - @dataprovider= handle test data, specially from Excel file
    - @factory = handle & pass test data to multiple class or method
    - @Listener = listen test status 🡺 Pass/Fail (how listener annotation understand test pass or fail🡺 by using one interface ItestListener)
* How to change the test order priority=0
* How to grouping the test group =”smoke”
* How to tell the test name description =” Login function”
* How to run specific 3 test out of 10 test cases
  + No need to run 7 🡺 enable =false
* How to run test suite
  + Test suite mean = multiple test cases or multiple classes
  + How to run test suite:
    - Need to create testng.xml file >> inside I have to pass package name.class name
* Tell me what is regression test or regression suite?
* When to run regression?
  + After bug fix
  + Application version change
  + New feature added
  + New data load or data refresh
  + Usually need to run regression at least one time in every sprint
  + Current project :
    - I ran regression from CI tool 🡺 Jenkins
    - How many test cases ? 700+
    - How much time it takes to finish all test run? 1 to 2 hours 🡺 70 minutes
    - When: Mon to Friday at midnight (12 am)
    - Jenkin auto email to team regarding test build = P/F
    - 10 test failed🡺 how to handle failed test cases in your project?
      * Find out the reason – why the test failed
        + If valid reason >open defect & manage defect
        + If automation coding issue >> check & fix the code, debugging
      * Rerun the failed test
        + Testng-failed.xml