**CLASS -01 SELENIUM**

What is software testing?

Identify the correctness of application. Software testing is the process of evaluating and verifying that a software product or application does, what it is supposed to do. The benefits of testing include

Types of testing?

Manual testing: Manual Testing is done manually by QA analyst (Human) whereas Automation Testing is done with the use of script, code and automation tools.

Automation testing

When we do automation testing.?

After manual testing is passed.

What it testing environment? It will be stable which ever the environment.

**What tools other than selenium for testing;**

Cucumber, UFT,sypress, testNG, katalon studio

**What are levels of testing ?**

--unit test which do developers

-- acceptance testing—done by both developers and tester

-- system testing—whole system testing done by developer and tester

-- integration testing – combining front end and back end , done both dev and tester.

A level of software testing is a process where every unit or component of a software or system is tested. The main reason for implementing the levels of testing is to make the software testing process efficient and easy to find all possible test cases at a specific level.

**Types of testing ?**

Functional testing; smoke test, regression testing

Non-functional testing ; performance testing, security testing, load testing

The difference between functional testing and non-functional testing is what they test. Functional testing ensures that the functions and features of the application work properly.

Non-functional testing examines other aspects of how well the application works. Functional testing tests the functionality of an app.

**What is selenium ?**

**Selenium is a set of tool which helps us test application mainly used to perform functional testing.**

Selenium is a free (open-source) automated testing framework used to validate web applications across different browsers and platforms.

This post provides a list of major differences between Functional Testing and Non-Functional Testing.

Definition

Functional Testing is a process to validate that each functionality of a software application is implemented according to the end-user or customer expectations conforming to the software specification document.

Non-Functional Testing ensures that the software application meets the specified performance requirements. It includes testing or readiness of several non-functional aspects of the application specific to performance, reliability, security etc.

Timing

Functional Testing will always be done prior to Non-Functional Testing to make sure that the application works according to the specifications.

Non-Functional Testing will be done once Functional Testing completes. It assumes that the application works according to the business and functional requirements, hence focuses on other aspects of the application.

Resources

Functional Testing can be performed manually. It is preferred to test the application manually before automating the manual test cases. Test automation has to be done based on application stability and the project budget.

Non-Functional Testing is difficult to perform manually. It always needs good tools and experienced resources to cover non-functional aspects of the application.

Testing Types

Types of Functional Testing includes Unit Testing, Smoke Testing, Integration Testing, Regression Testing, System Testing, User Acceptance Testing.

Types of Non-Functional Testing includes Volume testing, Load Testing, Stress Testing, Recovery Testing, Scalability Testing, Security Testing

Test Cases & Test Data Source

In Functional Testing, test cases and test data preparation always need the functional specification document.

In Non-Functional Testing, the performance requirements can be considered as the source to prepare test cases and test data.

Testing Tools

Testing tools used for Functional Testing includes UFT(Previously QTP), Selenium,

Rano-rex, Telerik Test Studio, Micro Focus, Sahi, Test Complete, IBM Rational.

Testing tools used for Non-Functional Testing includes JMeter, LoadRunner, WebLOAD, Neo-Load, Load-Complete.

Test Case Example

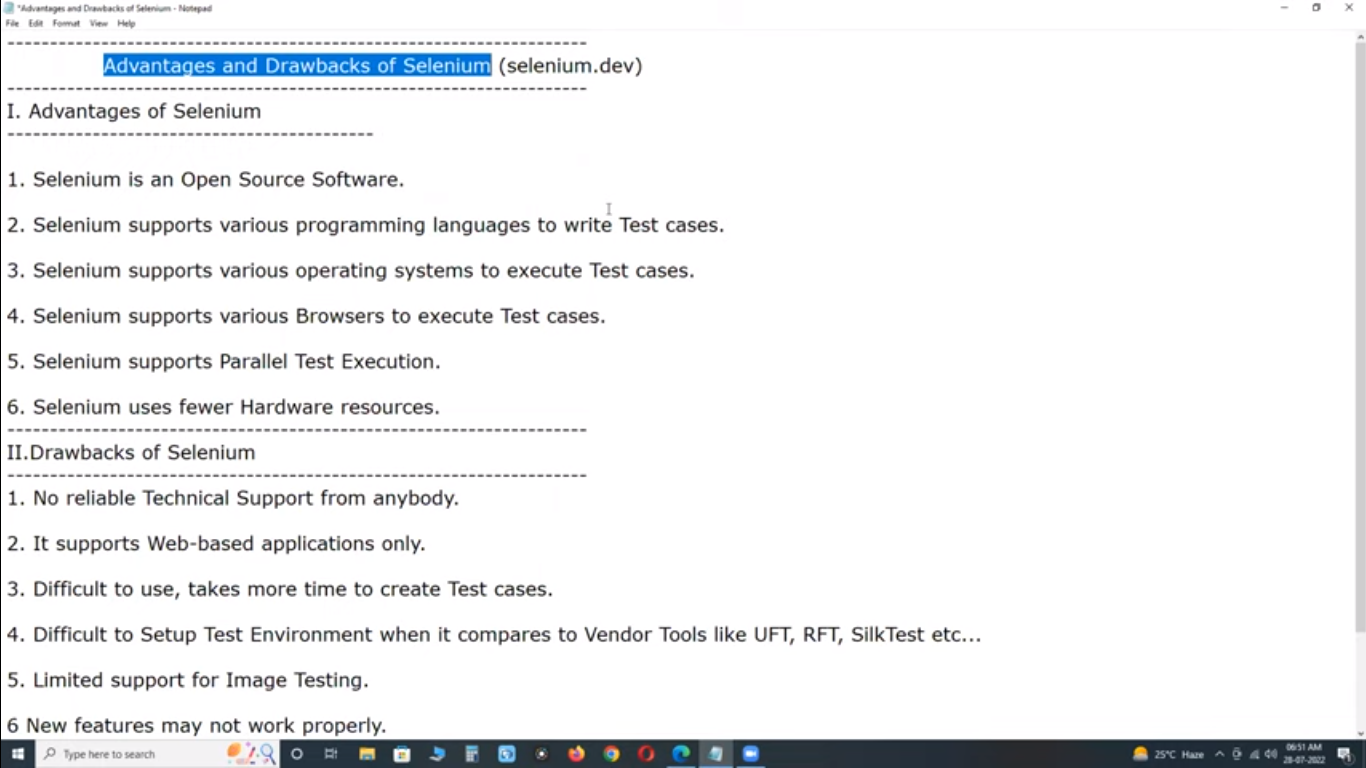
Functional Testing - Test whether the user is able to login to the application.

Non-Functional Testing - Time required to load the home page

There are four components of selenium?

**Selenium Components;**

* Selenium IDE.
* Selenium RC.
* Selenium WebDriver.
* Selenium Grid



Selenium IDE- integrated development environment

Selenium Grid- fire-fox plugin

Selenium wed Driver

Selenium RC- remote control

**What is selenium ?**

Selenium is open-source automation tool which is used to automate the web application.

**Web driver is an interface.**

Advantages and disadvantages of selenium web driver.

Advantage; open source free to install, download and use.

2. work with different languages, ruby, c sharp, python, java script, java.

3. it support multiple browser (chrome, fire fox, edge, opera, safari, internet explorer), support cross browser testing

4, you can use it with window, mac, Linux. Os independent.

Go to selenium website to check its details.

Disadvantages;

1. Not technical support. Because it is free.
2. It is only support webpage application it does not automate desktop application.
3. Can not test capchas, images, videos.

Create more time to create test cases.

Get current url , why I need the url?

url is needed to check the that the url is correct after navigate to the page.

2. to get the title on the tab of page.

**There are two methods to get navigate**

1. Get method
2. Navigate method

**What is difference between them.**

Get method don not have history of page

Get method wait to overload the page completely

Navigate do not wait to load fully the page, it keeps history of page.

Navigate is used to move forward and backward, and you can also refresh the page.

Navigate().back(); method is used to move back.

Navigate().forward(); method is used to forward the tab.

Navigate().refresh(); this is used to refresh / reload the page.

**What is difference in close (); and quit(); method.**

Quit method terminate all the tabs running.

Close method close only one tab.

drive.manage().window().maximize(); *// this is the method to maximize windwo.*drive.manage().window().fullscreen(); *// this is method for full screen./ occupy the whole screen, you don’t see url box.*

Methods in first video, first learn .

To get

To navigate to forward, to back , to refresh, to thread, sleep.

To close

To quit

To manage window maximize

To manage window full screen

To get url

To get title

First set property

Then create object of your browser

Then navigate to Facebook , YouTube , URL

After that maximize your window.

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**CLASS 02 SELENIUM**

**What is web elements ???**

Any thing you see on web page is called web element   
  
In Selenium, **Web Element** is an interface representing an HTML element on a web page. It provides methods to interact with and manipulate various elements on a web page such as buttons, input fields, checkboxes, dropdowns, etc.

HTML,html stands for what**; The HyperText Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser..**

Extensible Markup Language (XML)

DOM; document object model. It is internal view of webpage. It is also called developer’s tool.

Each and every line in HTML is called object

The purpose of HTML is to structure and organize content on a webpage, while CSS is used to style and visually enhance the presentation appearance of that content. By combining HTML and CSS, web developers can create visually appealing and well-structured web pages that are easy to read, navigate, and interact with.

Use of locator to find element.

Fine element method

By locator name

Send keys method

Click method.

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What is locator ??

Locator is the address or position of web element on the web page.

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Why we do need locators in selenium???????????

We need locator to locate or identify web elements on web pages.

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An attribute and values, in the context of web development and HTML, refers to additional information provided within the tags of an HTML element that helps define its characteristics or behavior.

Attributes and values are key-value pairs added to HTML elements to provide additional information or to modify the behavior of the element.

For example, in the HTML element **<img src="example.jpg" alt="Example Image">**, **src** and **alt** are attributes. In this case:

* **src** attribute specifies the source URL of the image.
* **alt** attribute provides alternative text for the image, which is displayed if the image cannot be loaded or for accessibility purposes.

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Link text locator is used when the html has “<a” tag and it should have text. It should have a link where it will take to you .And text will be between opening angle and closing angle >forgotten password<

There are 8 eight locators;

1. Id

If id locator has number then it is not secure it can be change when the websites will updated. If id has number then you should use other locator.

(<a id="ctl00\_logout" href="javascript:\_\_doPostBack('ctl00$logout','')">Logout</a>)

1. Name
2. Tag name
3. link text
4. partial link text
5. xpath
6. css selector (Cascading Style Sheets What is CSS? Cascading Style Sheets (CSS) is a simple mechanism for adding style (e.g., fonts, colors, spacing) to Web documents. These pages contain information on how to learn and use CSS and on available software. )
7. class

this is website of first task.

<http://secure.smartbearsoftware.com/samples/TestComplete11/WebOrders/Login.aspx>

<https://parabank.parasoft.com/parabank/initializeDB.htm;jsessionid=9A28DB5938014C79992791607865D2D0>

1. why we have so many locators in selenium?

Because some locators might have duplicate values/attribute values on ther nodes.

1. Who provide us the locators? Developers, they can not provide locator for every web element we have to find best locator of that web element form specified locator.
2. Some locators are not applicable for the elements we are looking for.

Link text and partial link text are used only for link web elements.

“a” tag is also called anchor tag it is used for link web elements.

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What is x-path and css selector? Why we do need x and css path??

With x and cc path we can locate the element by any given attribute.

X-path is query language (is a language to identify and finding elements on web page.) it help us to identify elements uniquely on the web page.

**Types of x-path?**

**1. absolute x-path?** It starts from starting node html. It is not used so much. It always start with single (/). Control+F shortcut to search box on dom. We will not use absolute x path because it is risky.

Why we don’t use absolute x path? because it is very long to locate the locator. I

1. If developers update the website and add on more div between two then your absolute path will be get error.

**2. Relative x path?** Starts from any node in html starts from //

? Is mostly used locator after th ID locator.

When you want to go on second div then you use index

/html/body/div[2] it starts from one in x path. But arrays starts with zero.

//input[@id='email']

//a[text()='Create new account']

How find element by x path

First of all you have to write a query language in DOM to find elements by x path.

//a[text()='Create new account'] // we did not use @ sign because text is not an attribute. If you will put @ sign then it will not work.

//a[contsins (@onclick , 'require')] contains method // put partial text

This is contais method of facebook create new account.

//a[starts-with(text(),'open')]

**//a[contains(@data-testid,'open')] // contains method.**

**You use contains method instead of start method and ends method.**

**These method are not available in version 2.**

**3. Advanced x path ?**

**siblings**

**//input[@class='facebook first name']/following-sibling::div**

**Amazon search bar advanced x path**

**Preceding**

**//input[@type='hidden']/preceding::label**

**Parent**

**Amazon search bar advanced x path**

**//input[@type='hidden']/parent::div**

**Ancestor x path**

**//input[@type='hidden']/ancestor::body**

**By indexes**

**//input[@type='hidden']/ancestor::div[3]**

**(//input[@type='hidden'])[2]**

**Note; when you are using text type in x path locator. How will you identify that it is text or not. Answer, the color of text will be black and it will be inside <> opening and closing angle brackets.**

**If you want from parent to child then you will use absolute x path**

**Java script will built functionality**

**Css will give**

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Recap of x path topic in starting of video lec 4.

What is x pah

What are types of x path

What is absolute path

What is relative path

What are different methods or manipulation of x path you learned.

End x path is not available in version 2, it was available in x path version 1.

Advanced x path has a big family , it has child, sbilings, parent, ancestor.

Preceding-sibling, following-sibling, parent is container like div.

How we know the siblings, they are present in one node.

Any thing above parent node will be ancestor.

When there is no method available lik parent , child, ancestor then you will go for Index

(//img[@class=’email’])[2]

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What is CSS selector.?????(cascading styling sheet(aabshaar, barish ka pani neechy girta howa, jharna))

It is another way of locating elements.

All the design in coding like , fonts, space, fonts, colour is done by css language but we are studying css selector not css language.

In relative x path there is text() method to identify but in css text method is not available.

Syntax projects website link.

<https://syntaxprojects.com/index.php>

CSS syntax for class.

This is element example <label class="\_58mt" for="u\_4\_4\_3B">Female</label>

CSS syntax for class; label.\_58mt 🡨---- here dot (. ) mean class attribute

CSS syntax for ID.

Tagname#IDvalue

button#loginbutton 🡨------ here # sign mean ID locator.

this is contains method in CSS

input[type \*='text']

CSS this is starts -with method in css.

input[attribute ^='starting attribute value']

CSS ends-with method

input[attribute $='ending attribute value']

img[src$=svg]

disadvantages of CSS locator;

1. We don’t have text method, starts with and end with are used when attribute has values and you ca use partial part of text by starts and ends method..
2. Wo can not go forward and backward in css selector as we will do in x path .
3. In CSS selector we can not use those attributes whose values have spaces int them. Because css selector is not written inside single quotes, which become like a container. But SCC is in parts each value is considered as part.
4. Class=num 43f-34 fn 34fr/>
5. Don’t select the attribute whose value is large. Use shorter values only.

syntax hrm link

<http://hrm.syntaxtechs.net/humanresources/symfony/web/index.php/auth/validateCredentials>

input#user-message

//button[text()='Show Message']

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Web Elements commands;

Methods are action which we can perform on elements or some time we can get state of element this is called command.

**What is mean by state of element ?**

State is the physical property of a button or a link or text box or check box which is appearing on webpage.

Facebook login button what is state of this button.

isEnabled -------------- this return Boolean value

isDisplayed -------------- this return bolean value

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Check box on any webpage give us selected and unselected action to perform so there is method for this

Is Selected method --------------- this return Boolean value

if I want to put any-thing in text box but if this text box already has text in it then we will do clear method

clear method -------------------- return no-thing mean it is void method

click metho --- return void

submit method -----------return void

both are used mostly.

Submit mean you submit action to processing on it by webserver

click mean you want to go over an-other page, link or website.

Get text method ---------------------- is used to get text from the element return string value

Get attribute ------------- retrun string

**Selenium Class 05**

**What is button and check box**

Buttons are used to trigger (give motion) action, used to submitting a form, save changing.

Check boxes are used for making selection or choices.

**What are attributes in html?**

Attributes are special words which store additional information about html element. They have name and value.

**What is dropdown?**

Is a list of options, its like a menu.

Dropdown is a list of option or choices to choose the any one option of your choice.

* **Radio Button**: Allows selecting only one option from a list, deselecting others automatically. Represented by small circles.
* **Checkbox:** Allows selecting multiple options independently from a list. Represented by small square boxes.
* **Dropdown:** Displays a menu of options from which one can be selected. Users click to reveal available choices and select one from the list.Top of Form

**Type of dropdown?**

1. Single selects
2. Multiple select, has multiple method to check whether dropdown is multiple select or not.

**Handling of dropdown**

1. Using select class method. In order to use select class we must sure that dropdown has select tag.

Other wise we wont be able to use select class from selenium library.

There is a select class in selenium you should make an object of select class then you will see these options

**There are three ways to select an option from dropdown**

1. By index
2. By visible text
3. By value

**To get all option of a dropdowns there is get-option() method in select class.**

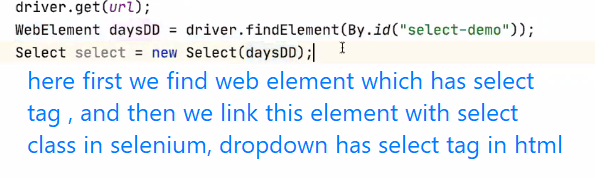
**There are four deselect methods**

1. Deselect by index
2. Deselect by visible text
3. Deselect by value
4. Deselect all

Note : in java and selenium index always starts from zero except in x path. X path index zero mean you are element is zero. At zero place there exist no thing in x path. Always we start element from one. Mean to say that element number one. Not mean element number zero

When using iterator then after while loop the next method having value web element not string type value.

In Selenium, the **Select** class is used to interact with dropdown menus or select elements on a web page. Dropdown menus in HTML are represented by **<select>** tags. The **Select** class provides methods to select options, deselect options, get all options, get the selected option, etc.



Disabled method not exist In selenium. You use ! method to solve your problems.

* **select\_by\_index(index)**: Selects the option at the specified index.
* **select\_by\_value(value)**: Selects the option with the given value attribute.
* **select\_by\_visible\_text(text)**: Selects the option with the visible text matching the provided text.
* **deselect\_all()**: Deselects all selected options within the dropdown.
* **deselect\_by\_index(index)**: Deselects the option at the specified index.
* **deselect\_by\_value(value)**: Deselects the option with the given value attribute.
* **deselect\_by\_visible\_text(text)**: Deselects the option with the visible text matching the provided text.
* **is\_multiple()**: Returns a boolean indicating whether the dropdown allows multiple selections.

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**How to Handling multiple window?**

In order to handle multiple window we have **two methods**

1. Get Window handle ()
2. Get Window handles ()

**What is window handle?**

Window handle is unique id that holds/contains the address of window or a tab.

It is approximately consist of almost 40 alpha numeric character.

**The main purpose of handles is to keep track of tabs and to switch those tabs.**

**Important note;** when you using link text to find an element then make sure that the spaces before and after the text you removed other wise it will give error. Because developer don’t remove the spaces for his convenient . if they want new separate window they will use spaces and if they want use same window with many tabs they us without space.

**Set<String> allhandles = driver.getWindowHandles();**: This retrieves all window handles currently open by the WebDriver. This includes both the main window and any additional pop-up windows or tabs that might have been opened.

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**What is synchronization(waqiyaat ka ake saath hona.) ?**

In English its mean , arrange the two or more events at same time , co-occur.

**In selenium its mean bringing the speed of two or more components at the same level.**

We are bringing our script and page or element at same level of speed.

Thread. Sleep () ; ---- > is static wait/unconditional wait

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**There are three types of waits in selenium**

1. Implicit wait
2. Explicit wait
3. Fluent wait

Implicit wait --- > it tells to web driver wait for certain amount of time before throwing an exception(aytraaz). It is global wait.

It will only be written once and will be applied to the whole session of the execution.

Implicit wait is a type of wait in Selenium that tells the WebDriver to wait for a certain amount of time  
 before throwing a NoSuchElementException.  
It is applied globally for all elements on which the WebDriver interacts.

Usually implicit wait is set 20 seconds.

Suppose you set 20 seconds time and it find element in 5 seconds the rest of time will be ignored and code will be executed. If it does not find element in 20 seconds then exception error will occur.

It will only work with single element. It does not work with list of collection elements, ok.

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**Class Selenium -08 Date; 15-Nov-23**

What is explicit wait?

You set the time for single any specific element , it is not used as global.

Syntax explicit waits link

<https://syntaxprojects.com/dynamic-data-loading-demo.php>

chat GPT explanation (

The code you provided is written in Java and uses the Selenium WebDriver library for automated testing. Let me explain what each part of the code does:

1. **WebDriverWait wait = new WebDriverWait(driver, 20);**: This line initializes a WebDriverWait object, which is used to wait for a certain condition to be met before proceeding with the execution of the test. The **driver** object is the instance of the WebDriver that interacts with the browser, and **20** is the maximum amount of time to wait for the condition to be true.
2. **wait.until(ExpectedConditions.visibilityOfAllElementsLocatedBy(By.xpath("//p[contains(text() ,'First Name ')]")));**: This line waits until all elements located by the specified XPath are visible on the web page. The condition is implemented by the **visibilityOfAllElementsLocatedBy** ExpectedCondition.
3. **WebElement firstName = driver.findElement(By.xpath("//p[contains(text() ,'First Name ')]"));**: Once the visibility condition is met, this line finds the first element on the web page that matches the specified XPath, which contains the text "First Name." The located element is then assigned to the **firstName** variable of type **WebElement**.

In summary, this code waits for the visibility of all elements with the specified XPath containing the text "First Name" on the web page and then assigns the first matching element to the **firstName** variable for further interaction in your test script.

)

Wait.until (the condition is that all elements located by the specified XPath should become visible within the specified time frame (20 seconds).)

the key difference is that point 2 is waiting for a condition to be satisfied (visibility of elements), and point 3 is finding and assigning a WebElement to a variable for further interaction in your test script. The waiting mechanism ensures that the web page is in the desired state (with elements visible) before you proceed with interacting with those elements.

What is difference in implicit and explicit waits

Implicit and explicit waits are techniques used in Selenium WebDriver to handle synchronization issues in test automation.

The difference is of condition.

In implicit you only waiting the element to be found. In this the element may not be visible or it might not be enable to click on it. Implicit wait only will help you to find the element.it is not going to tell you that okay I found element but it is not enabled or disabled.

But in explicit you are setting different condition for a specifically this or that element.

1. **Scope of Application:**
   * **Implicit Wait:** It is set globally for the entire WebDriver instance. Once set, it is applicable to all subsequent findElement() or findElements() calls throughout the script.
   * **Explicit Wait:** It is applied selectively to specific elements or conditions. You can specify different wait conditions for different elements or situations.
2. **Wait Condition:**
   * **Implicit Wait:** It waits for a specified amount of time for the element to be present in the DOM. If the element is found before the timeout expires, the script continues execution. If the timeout is reached, a **NoSuchElementException** is thrown.
   * **Explicit Wait:** It waits for a certain condition to be met before proceeding with the execution. Conditions can include element visibility, presence, clickability, etc. You can specify the expected conditions and maximum time to wait.
3. **Flexibility:**
   * **Implicit Wait:** It provides less flexibility as it is a global setting applied to all elements. If a certain element needs a longer or shorter wait time, it cannot be easily adjusted without changing the global timeout.
   * **Explicit Wait:** It offers more flexibility as you can specify different wait conditions and timeouts for different elements or scenarios. This allows for a more fine-grained control over synchronization.
4. **Performance:**
   * **Implicit Wait:** when the element is not found It waits until the set time is not finished. especially if the specified wait time is too long.
   * **Explicit Wait:** It is more performance-efficient as it waits only as long as necessary for a specific condition to be met.
5. **Exception Handling:**
   * **Implicit Wait:** It may lead to unexpected delays or timeouts as it is not tied to a specific condition. A generic **NoSuchElementException** is thrown if the element is not found within the specified time
   * **Explicit Wait:** It allows for better exception handling. You can catch more specific exceptions, such as **TimeoutException** or **ElementNotVisibleException**, and take appropriate actions based on the type of exception.

In summary, implicit waits are simpler to use but less flexible, while explicit waits provide more control and are better suited for complex synchronization scenarios in test automation. It's often recommended to use explicit waits over implicit waits for more robust and maintainable test scripts.

Link for testing of wait , implicit , explicit.

<https://syntaxprojects.com/synchronization-waits.php>

dynamic loading

<https://syntaxprojects.com/dynamic-elements-loading.php>

Explicit task website link

<https://syntaxprojects.com/dynamic-data-loading-demo.php>

important note wild card is only used with x path only. It does not use with scc selector or other locator. Wild card is used when the tag name in html is changeable when developers make update page. Like header , h1, h2, h3 these header may change , you use star \* symbol inplace of tag name.

//\*[contains(text(), ‘welcome’)] this is the syntax for wild card.

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**Fluent wait ?** it is used to tell web driver wait for certain condition as well as its frequency.

It is not used in real work, it is outdated type of wait. Do not go deep inside it.

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**What are web tables ?**

Web tables are web element which constructed by having rows and columns

**Types of web tables**

1. Static web tables
2. Dynamic web tables

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Web tables link

<https://syntaxprojects.com/table-search-filter-demo.php>

web order website link

<http://secure.smartbearsoftware.com/samples/TestComplete11/WebOrders/Login.aspx>

Stale element reference exception ; this error comes when your page is refreshed automatically or the element locator is no found correct.

It is worst error in life of automation engineer. How to handle this error.

Please refresh you page.

Fine locator correctly on DOM.

<https://the-internet.herokuapp.com/dynamic_controls>

Syntax hrm link

<http://hrm.syntaxtechs.net/humanresources/symfony/web/index.php/leave/viewLeaveList>

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**Class 09 Selenium**

**What is pagination ?** Pagination in Selenium is navigating across multiple pages of a website.

**Keys of key board working in selenium ?**

In selenium there is option where you can use keys of key board;

Here is question that what is difference in enter key and click button?

As a tester our job is to check the functionality of login button. But enter key board key not tell us the functionality of button.

Pagination link

<https://syntaxprojects.com/table-pagination-demo.php>

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**Class 10**  Date; 18-Nov-23

**What is screen shot in selenium ?**

Basic purpose of screen shot is for proof.

Take screen shot to show bug in case of failure of code.

Take screen short for record keeping.

Take screen short for as a document.

Take screen short to verify that from where code was giving error.

**What is actions class?**

Action class is used to interact with actions performed by keyboard and mouse.

Actions class is used where click and send keys are not useful enough.

What are methods are operator in actions class ?

The method which we learnt in class are

1. Right click
2. Double click
3. Perfom
4. Build
5. Pick and hold
6. Drop

Guru 99 website link

<https://demo.guru99.com/test/simple_context_menu.html>

<https://www.guru99.com/selenium-tutorial.html>

when you uploading a file, the make sure the file upload button must have the tag name input.

file uploading website

<https://the-internet.herokuapp.com/upload>

if file not uploading by send key method then please learn about robot class library in java.

Robot class has many method to handle window based Alert.

What is java scrip executor ?

It is interface provided by selenium.

It is a library present in selenium , it also can be run in different languages

Java script is an interface it has many different methods.

When we will use java script library ?

Only only will be using

1. When click option not working
2. And when opening a new tab.

Action which can be performed by java script executor;

1. Click
2. Scroll the page
3. Refresh the page
4. Open a new tab
5. Highlight the element
6. Scroll the element

Java script executor give two methods

1. Execute script
2. Execute Async script

We will study only first one.

Why and when we will use highlight element action of java script executor

We will you when you need take a screen shot where the important point is located.

You will save that screen shot as a proof.

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**CLASS 12**

What is page object model.?

It is a design pattern; it enhances the test maintenance and reduce the duplication of code.

It is going to help us to make lot of things reuseable.

We divide our project into four packages

1. Base class
2. Common utilities
3. Your pages
4. Your test

What is page factory and without page factory ?

Both are approaches in selenium how to implement the page object model POM .

Main difference between them is how the elements on web page are initialized and accessed.

What is Web Driver in selenium ?

Web driver is an interface in selenium that allows to interact with web pages.