Selenium Locating Strategy

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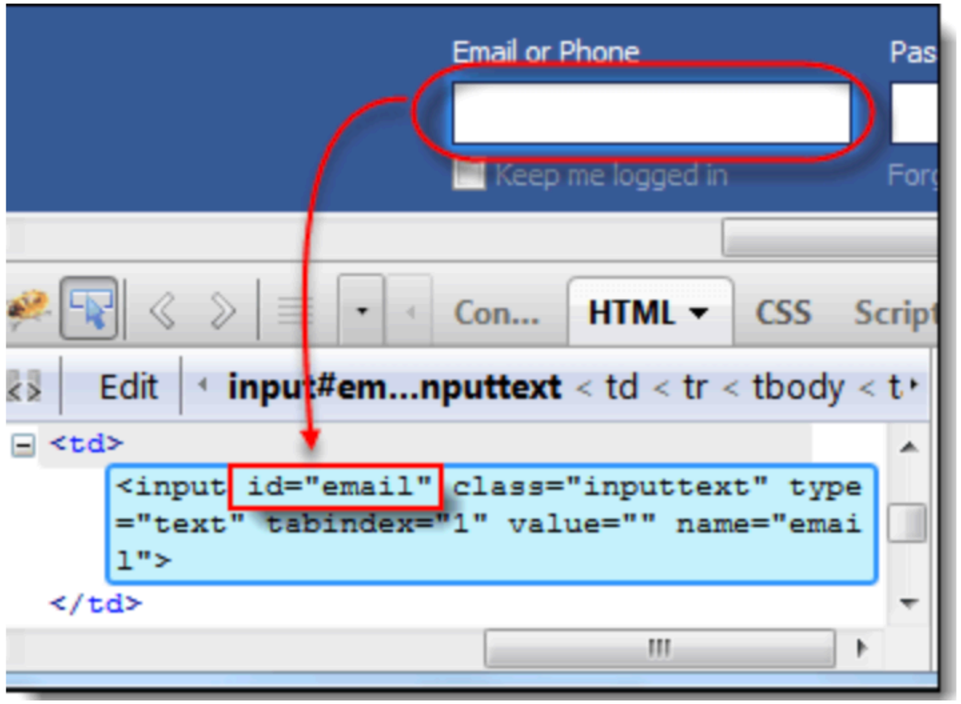
Type of Locators

- ID Locator
- Name Locator
- Class name
- Link Text Locator
- Partial Link text
- Tag Name
- XPath Locator
- CSS

- **id** *Select element with the specified* ***@id*** *attribute.*
- **Name** *Select first element with the specified* ***@name*** *attribute.*
- **Linktext** *Select link (anchor tag) element which contains text matching the specified link text*
- **Partial Linktext** *Select link (anchor tag) element which contains text matching the specified partial link text*
- **Tag Name** *Locate Element using a Tag Name .*
- **Class name** *Locate Element using a class Name ..*
- **Css** *Select the element using css selectors. You can check here for refer W3C CSS Locatros*
- **Xpath** *Locate an element using an XPath expression.*

Locating by ID

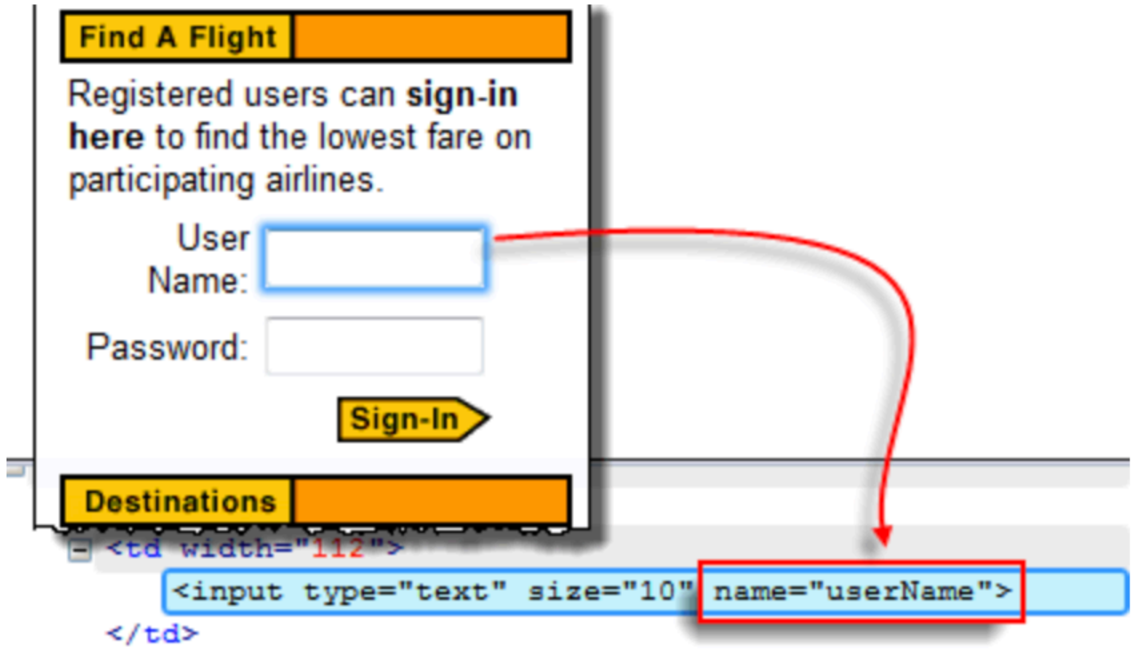
- **Target Format:** id=*id of the element*



```
<td>
    <input id="email" class="inputtext" type
="text" tabindex="1" value="" name="emai
l">
</td>
```

Locating by Name

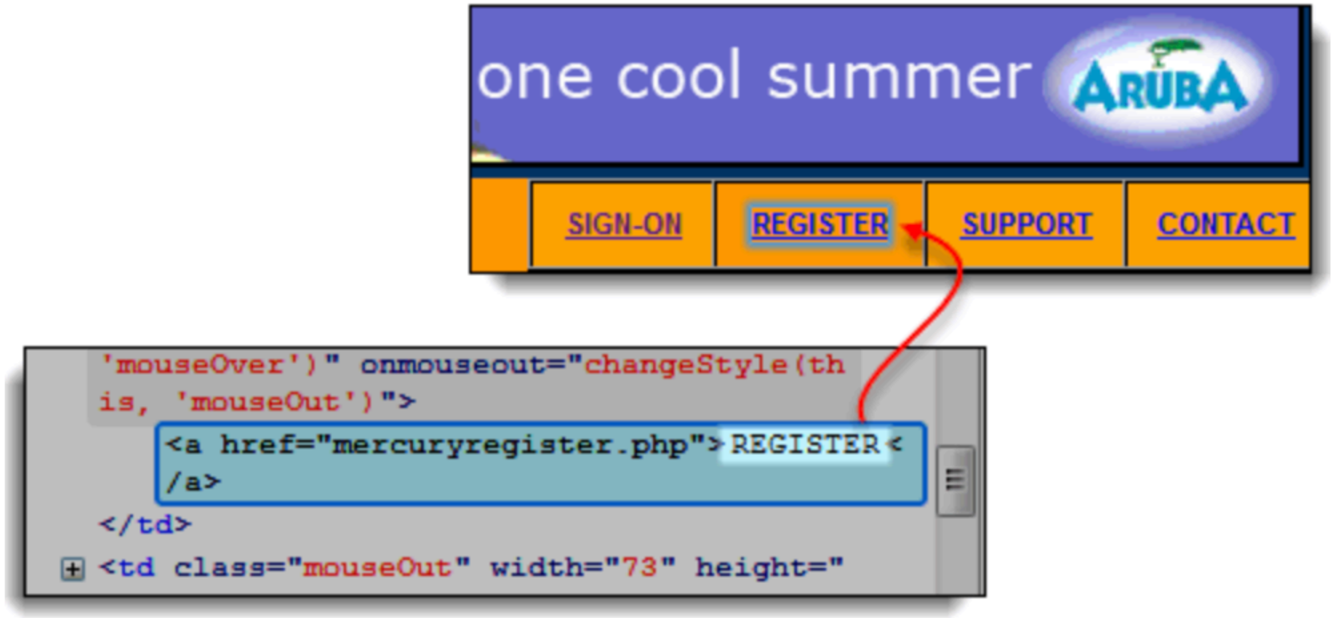
- **Target Format:** name=*name of the element*


Find A Flight
Registered users can **sign-in here** to find the lowest fare on participating airlines.
User Name:
Password:
Sign-In
Destinations

```
<td width="112">
    <input type="text" size="10" name="userName">
</td>
```

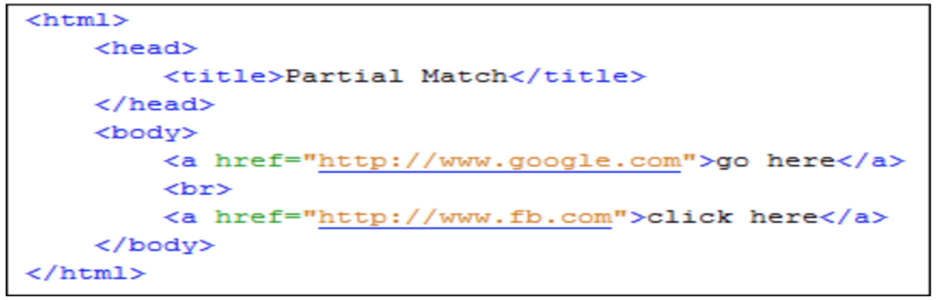
Locating by Link Text

Target Format: link=*link_text*

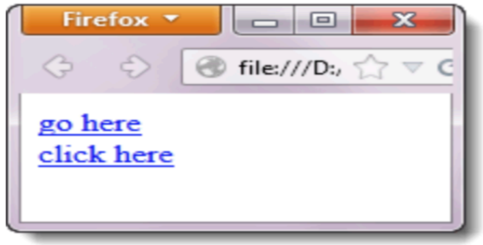


```
'mouseOver')" onmouseout="changeStyle(th
is, 'mouseOut')">
    <a href="mercuryregister.php">REGISTER<
    /a>
</td>
<td class="mouseOut" width="73" height="
```

Locating by Partial Link Text

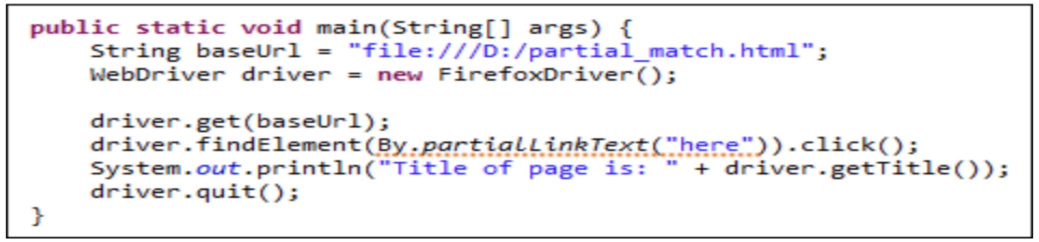


```
<html>
    <head>
        <title>Partial Match</title>
    </head>
    <body>
        <a href="http://www.google.com">go here</a>
        <br>
        <a href="http://www.fb.com">click here</a>
    </body>
</html>
```



go here
click here

When you execute the WebDriver code below, you will still be taken to Google.

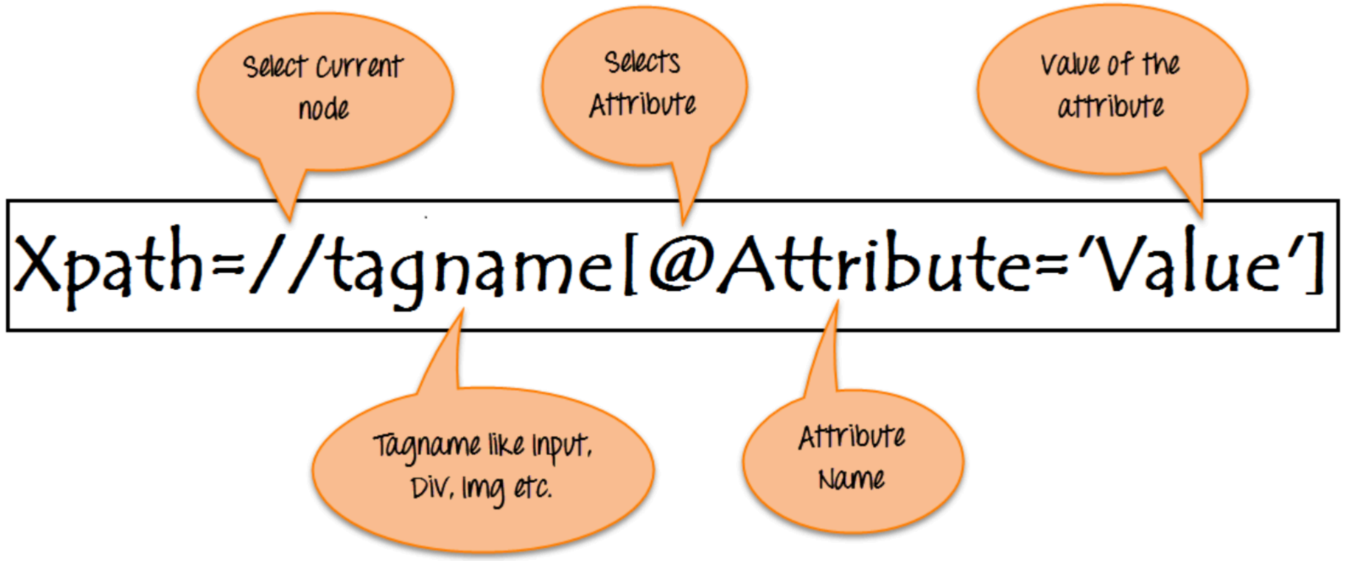


```
public static void main(String[] args) {
    String baseUrl = "file:///D:/partial_match.html";
    WebDriver driver = new FirefoxDriver();

    driver.get(baseUrl);
    driver.findElement(By.partialLinkText("here")).click();
    System.out.println("Title of page is: " + driver.getTitle());
    driver.quit();
}
```

Locating by XPath

- Syntax for Xpath : Xpath=//tagname[@attribute='value']



Types of X-path

- There are two types of XPath:

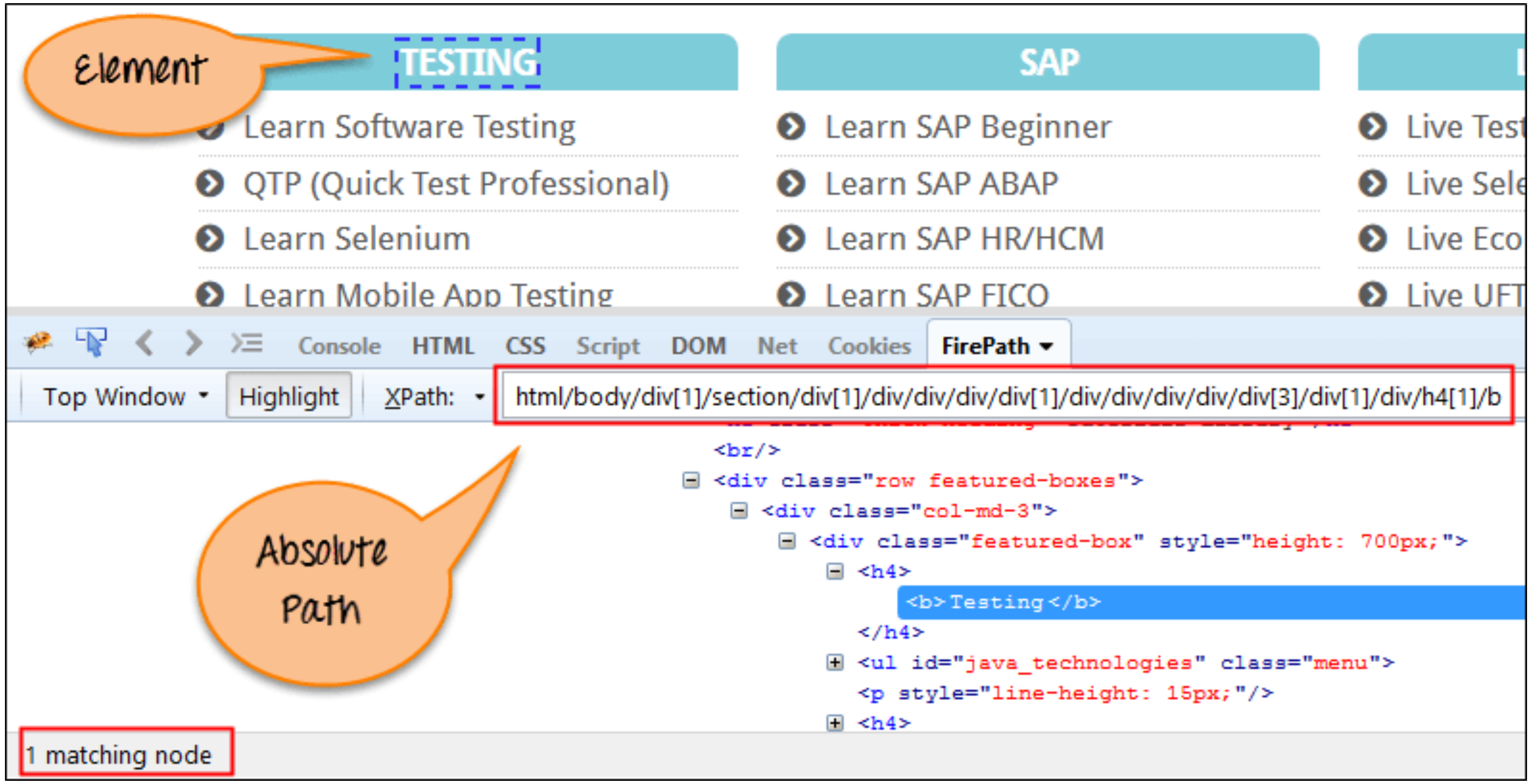
  1) Absolute XPath .

  2) Relative XPath .

Absolute XPath :

- It is the direct way to find the element, but the disadvantage of the absolute XPath is that if there are any changes made in the path of the element then that XPath gets failed.
- The key characteristic of XPath is that it begins with the single forward slash(/) ,which means you can select the element from the root node.
- **Absolute xpath:** /html/body/div[1]/section/div[1]/div/div/div/div[1]/div/div/div/div/div[3]/div[1]/div/h4[1]/b

Absolute xpath:



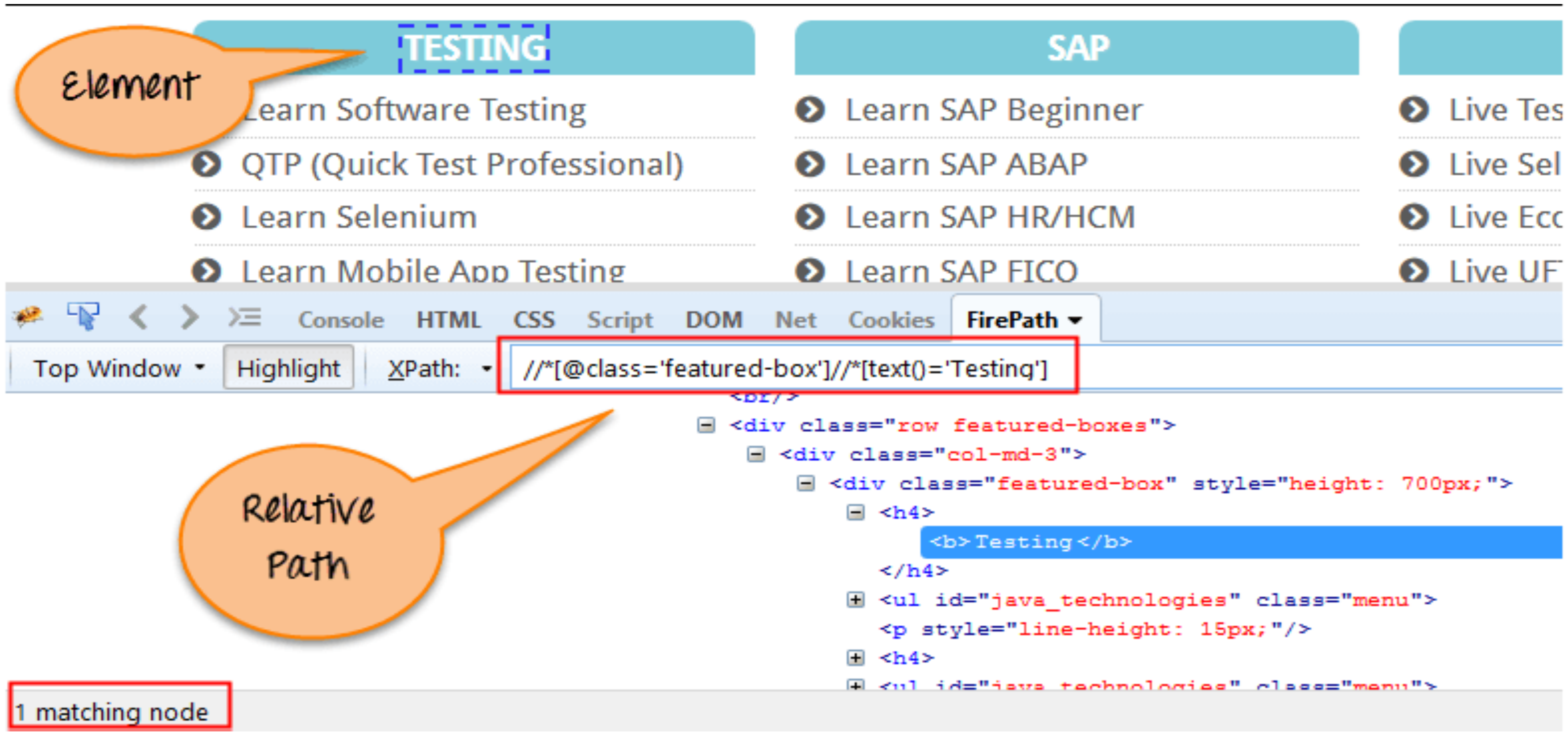
```
html/body/div[1]/section/div[1]/div/div/div[1]/div/div/div/div/div[3]/div[1]/div/h4[1]/b
```

```
<br/>
<div class="row featured-boxes">
  <div class="col-md-3">
    <div class="featured-box" style="height: 700px;">
      <h4>
        <b>Testing</b>
      </h4>
      <ul id="java_technologies" class="menu">
      <p style="line-height: 15px;"/>
      <h4>
```

Relative xpath:

- For Relative Xpath the path starts from the middle of the HTML DOM structure. It starts with the double forward slash (//), which means it can search the element anywhere at the webpage.
- You can start from the middle of the HTML DOM structure and no need to write long xpath.
- Relative xpath: //*[@class='featured-box']//*[text()='Testing']

Relative xpath:



```
//*[@class='featured-box']//*[text()='Testing']
```

```
<div class="row featured-boxes">
  <div class="col-md-3">
    <div class="featured-box" style="height: 700px;">
      <h4>
        <b>Testing</b>
      </h4>
      <ul id="java_technologies" class="menu">
      <p style="line-height: 15px;"/>
      <h4>
      <ul id="java_technologies" class="menu">
```

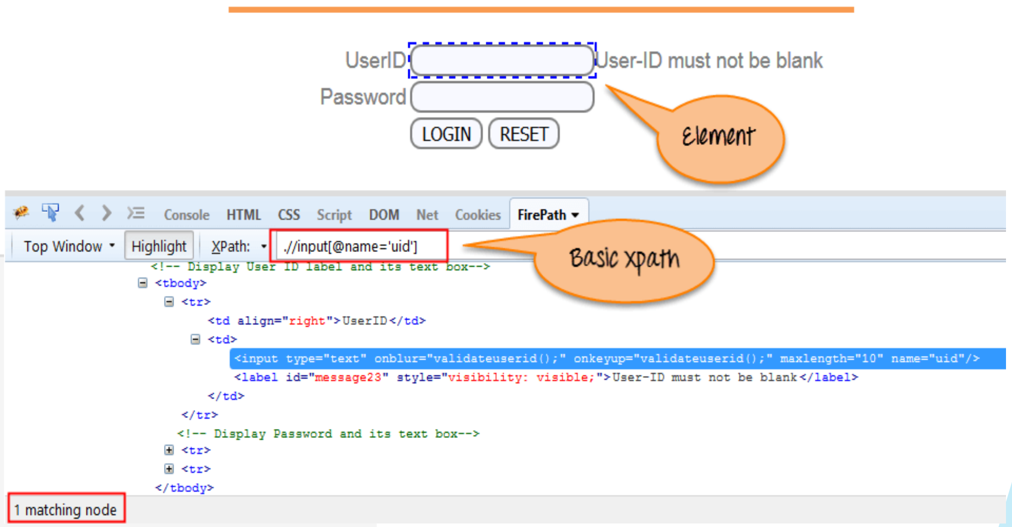
1 matching node

Using XPath Handling complex & Dynamic elements in Selenium

- **What are XPath axes.**
  - XPath axes search different nodes in XML document from current context node. XPath Axes are the methods used to find dynamic elements, which otherwise not possible by normal XPath method having no ID , Classname, Name, etc.
  - Axes methods are used to find those elements, which dynamically change on refresh or any other operations. There are few axes methods commonly used in Selenium Webdriver like child, parent, ancestor, sibling, preceding, self, etc.

1. Basic XPath:

- XPath expression select nodes or list of nodes on the basis of attributes like **ID** , **Name, Classname**, etc. from the XML document as illustrated below.
- Syntax: Xpath=//input[@name='uid']



```
<!-- Display User ID label and its text box-->
<tbody>
  <tr>
      <td align="right">UserID</td>
    <td>
        <input type="text" onblur="validateuserid();" onkeyup="validateuserid();" maxlength="10" name="uid"/>
        <label id="message23" style="visibility: visible;">User-ID must not be blank</label>
      </td>
  </tr>
  <!-- Display Password and its text box-->
  <tr>
  <tr>
</tbody>
```

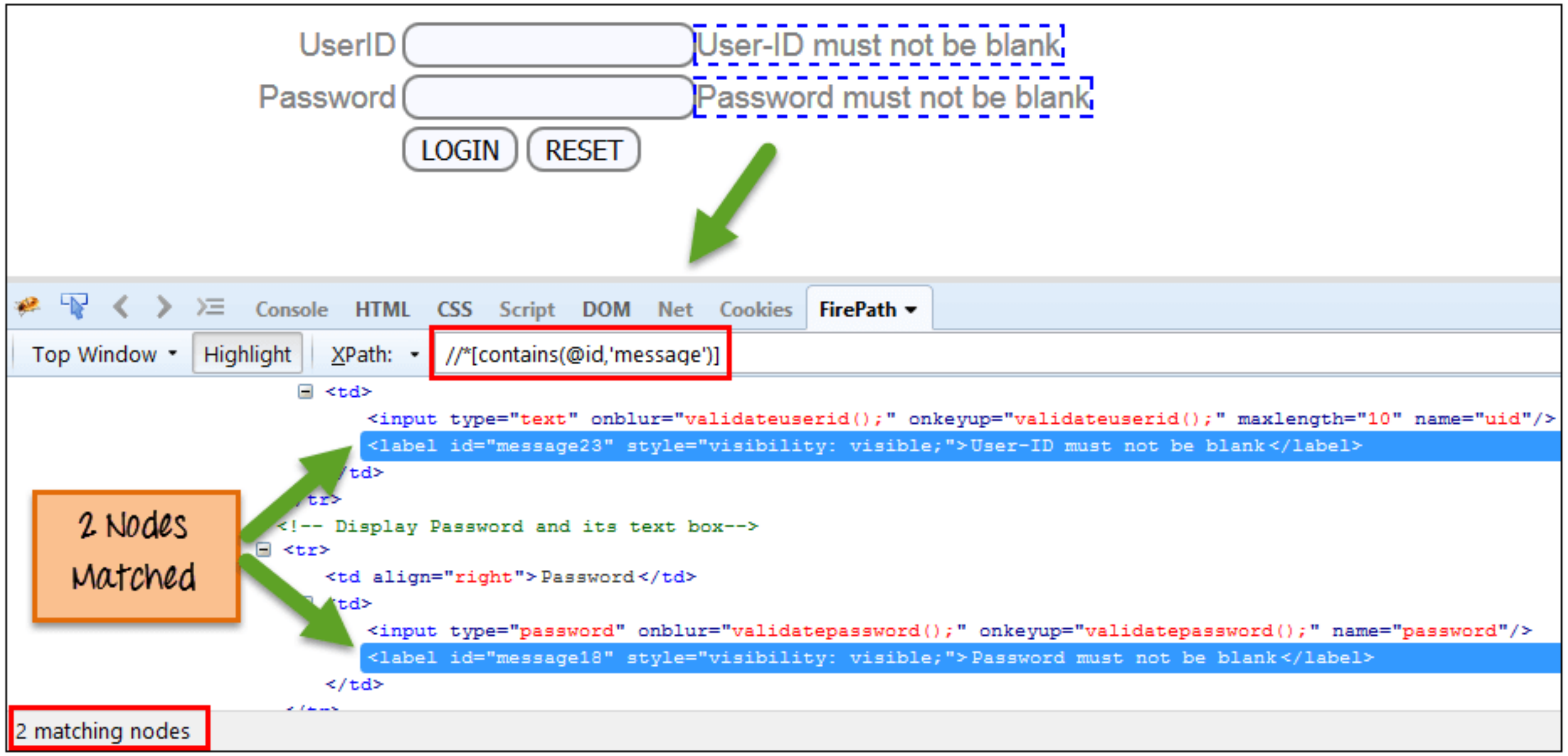
Some more basic xpath expressions:

```
Xpath=//input[@type='text']
Xpath=  //label[@id='message23']
Xpath=  //input[@value='RESET']
Xpath=//*[@class='barone']
Xpath=//a[@href='http://demo.guru99.com/']
Xpath= //img[@src='//cdn.guru99.com/images/home/java.png']
```

2. Contains()

- Contains() is a method used in XPath expression. It is used when the value of any attribute changes dynamically, for example, login information.
- The contain feature has an ability to find the element with partial text as shown in below example.
- In this example, we tried to identify the element by just using partial text value of the attribute. In the below XPath expression partial value 'sub' is used in place of submit button. It can be observed that the element is found successfully.
- Complete value of 'name' is 'btnLogin' but using only partial value 'btn’.
  - Xpath=.//*[contains(@name,'btn')]
- Complete value of 'Type' is 'submit' but using only partial value 'sub'.
  - Xpath=//*[contains(@type,'sub’)]

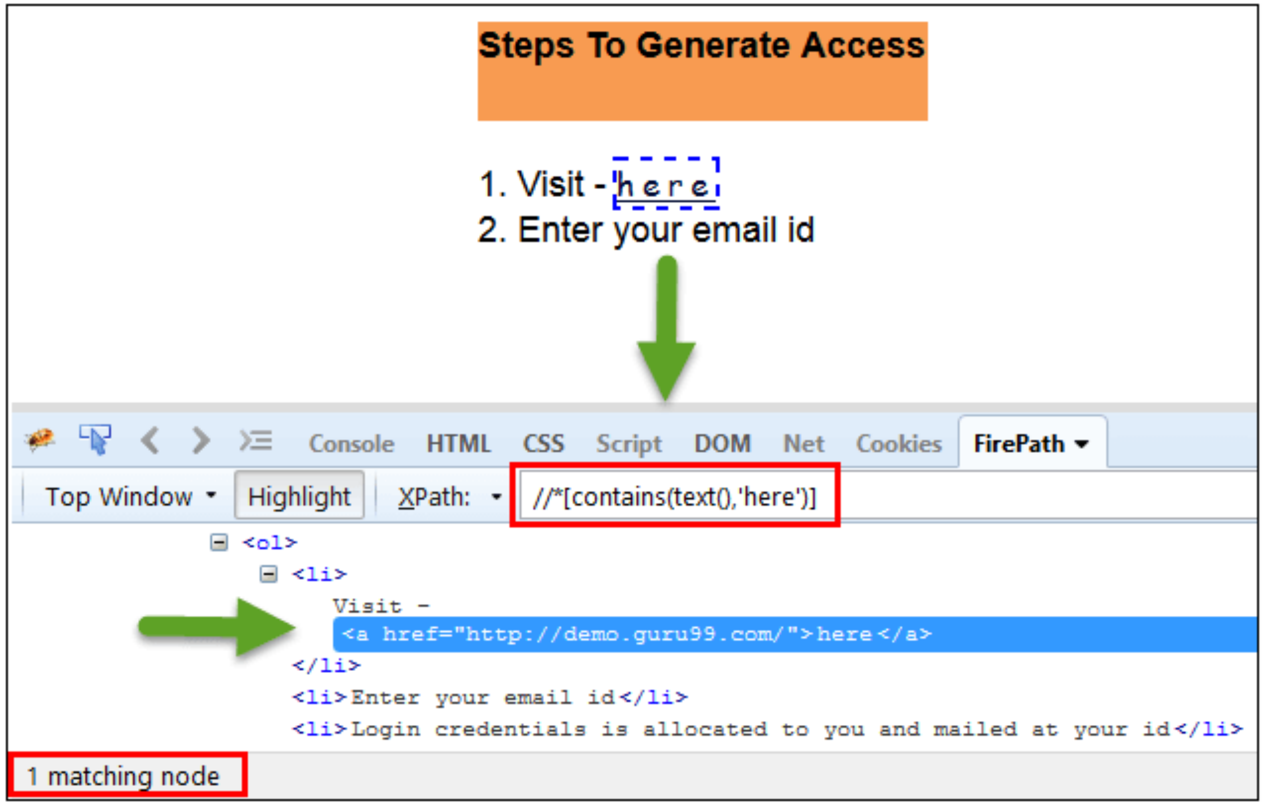
- Xpath=//*[contains(@id,'message')]



```
//*[contains(@id,'message')]
```

```
<td>
    <input type="text" onblur="validateuserid();" onkeyup="validateuserid();" maxlength="10" name="uid"/>
    <label id="message23" style="visibility: visible;">User-ID must not be blank</label>
</td>
</tr>
<!-- Display Password and its text box-->
<tr>
  <td align="right">Password</td>
  <td>
    <input type="password" onblur="validatepassword();" onkeyup="validatepassword();" name="password"/>
    <label id="message18" style="visibility: visible;">Password must not be blank</label>
  </td>
```

- In the below expression, we have taken the "text" of the link as an attribute and 'here' as a partial value as shown in the below screenshot. This will find the link ('here') as it displays the text 'here'.
  - Xpath=//*[contains(text(),'here')]
  - Xpath=//*[contains(@href,'guru99.com')]

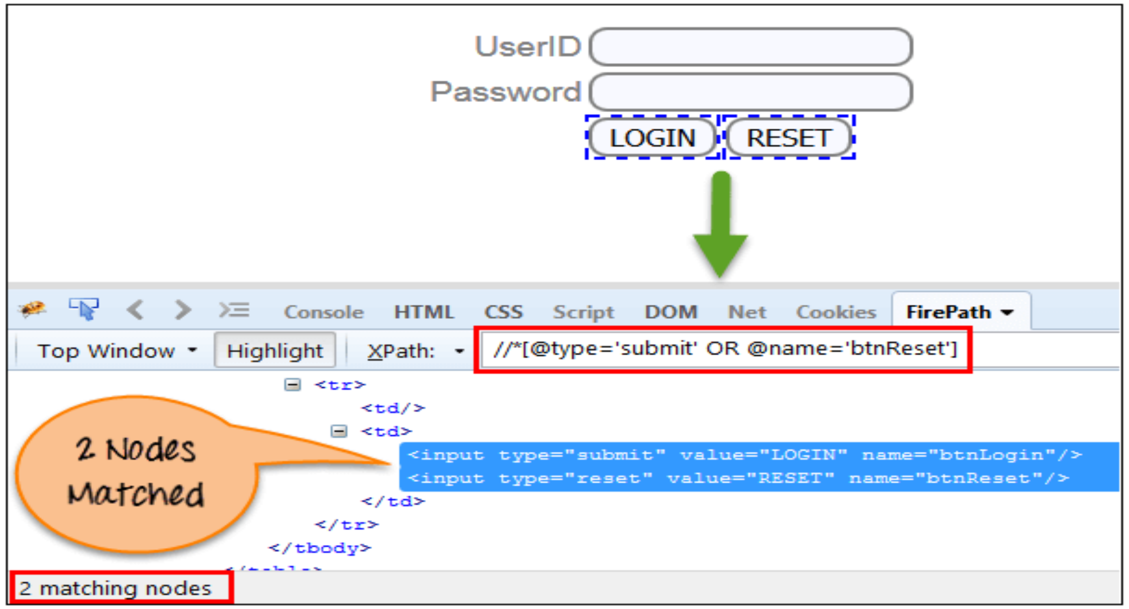


```
//*[contains(text(),'here')]
```

```
<ol>
  <li>
    Visit -
    <a href="http://demo.guru99.com/">here</a>
  </li>
  <li>Enter your email id</li>
  <li>Login credentials is allocated to you and mailed at your id</li>
```

3. Using OR & AND:

- In OR expression, two conditions are used, whether 1st condition OR 2nd condition should be true. It is also applicable if any one condition is true or maybe both. Means any one condition should be true to find the element.
- In the below XPath expression, it identifies the elements whose single or both conditions are true.
  - Xpath=//*[@type='submit' OR @name='btnReset']
- Highlighting both elements as "LOGIN " element having attribute 'type' and "RESET" element having attribute 'name'.


UserID
Password
LOGIN
RESET
Console HTML CSS Script DOM Net Cookies FirePath
Top Window Highlight XPath:
2 Nodes Matched

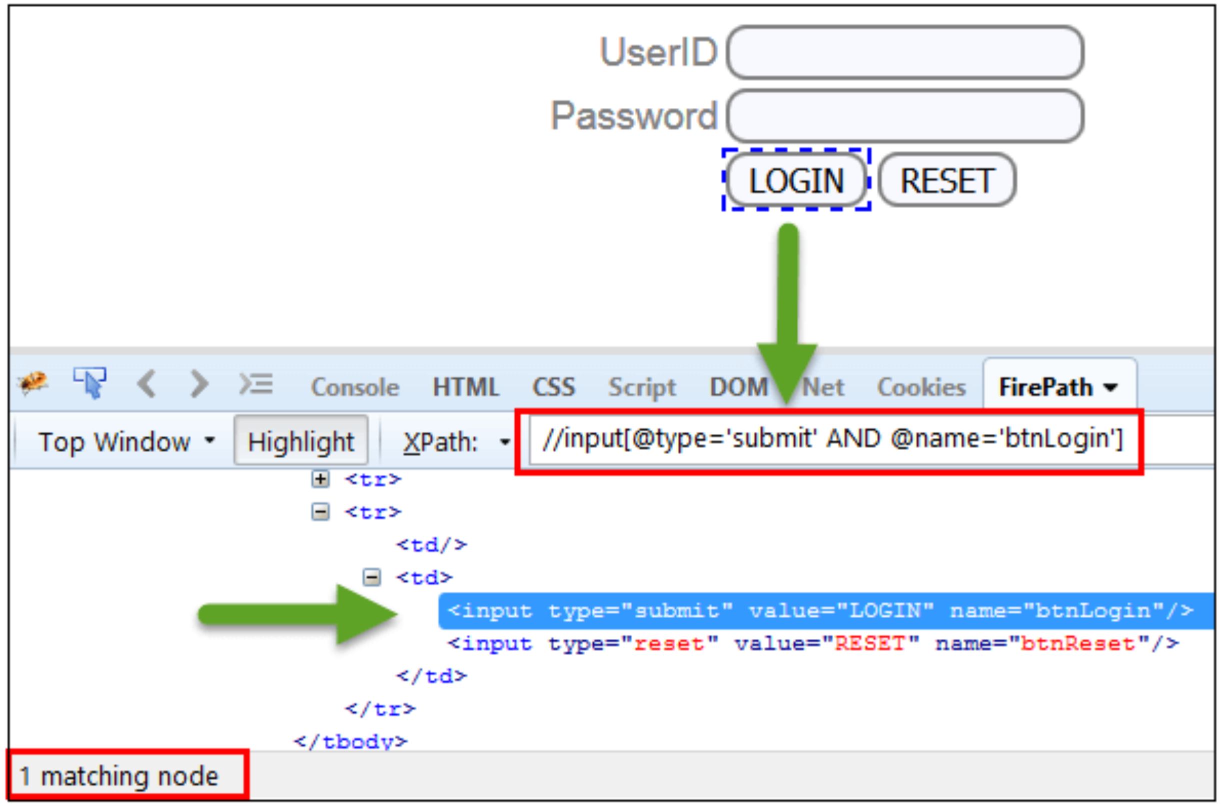
//*[@type='submit' OR @name='btnReset']

```
<tr>
    <td/>
  <td>
    <input type="submit" value="LOGIN" name="btnLogin"/>
    <input type="reset" value="RESET" name="btnReset"/>
    </td>
  </tr>
</tbody>
```

2 matching nodes

AND

- In AND expression, two conditions are used, both conditions should be true to find the element. It fails to find element if any one condition is false.
- Syntax Xpath=//input[@type='submit’ and @name='btnLogin']



```
//input[@type='submit' AND @name='btnLogin']
```

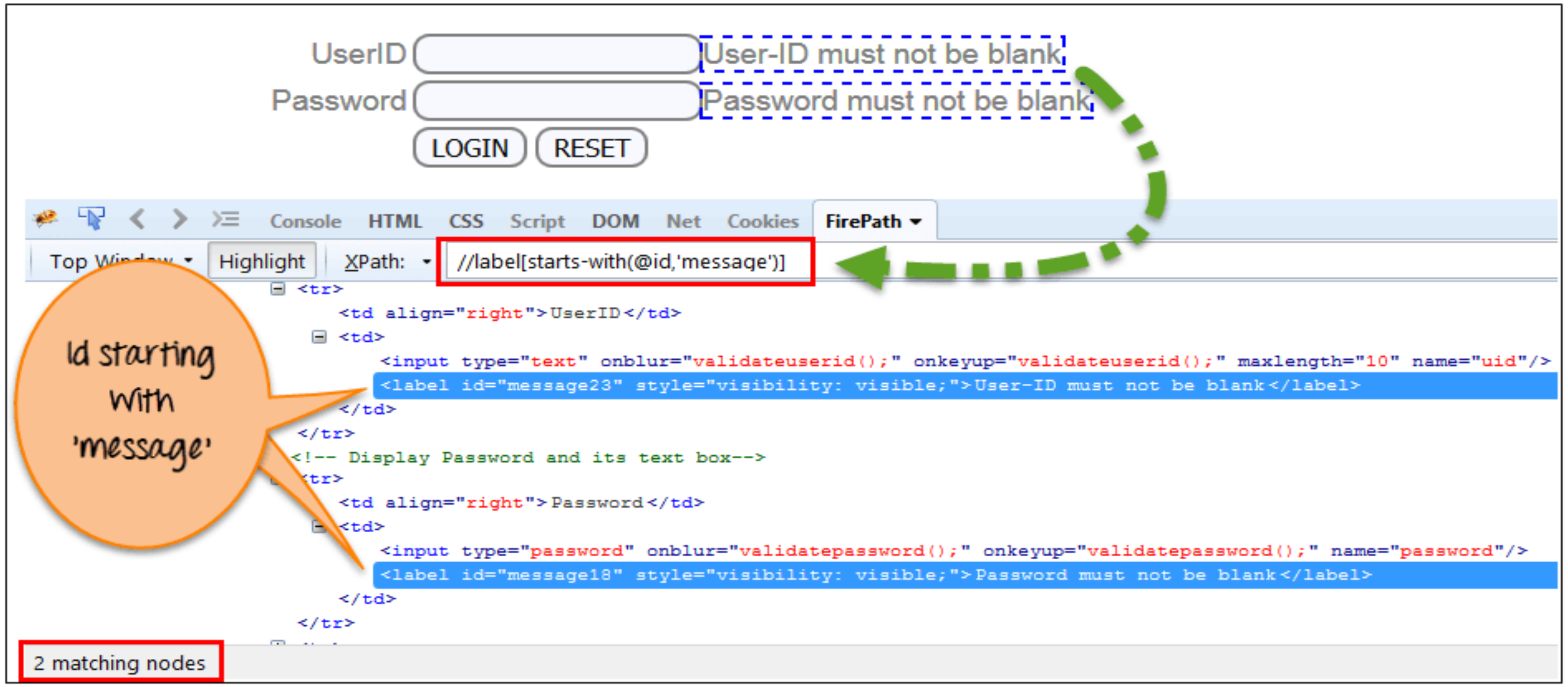
```
<tr>
<tr>
    <td/>
    <td>
        <input type="submit" value="LOGIN" name="btnLogin"/>
        <input type="reset" value="RESET" name="btnReset"/>
    </td>
</tr>
</tbody>
```

1 matching node

4. Start-with function:

- Start-with function finds the element whose attribute value changes on refresh or any operation on the webpage. In this expression, match the starting text of the attribute is used to find the element whose attribute changes dynamically. You can also find the element whose attribute value is static (not changes).
- For example -: Suppose the ID of particular element changes dynamically like:
  1. Id=" message12"
  2. Id=" message345"
  3. Id=" message8769"
- and so on.. but the initial text is same. In this case, we use Start-with expression.

- In the below expression, there are two elements with an id starting "message"(i.e., 'User-ID must not be blank' & 'Password must not be blank'). In below example, XPath finds those element whose 'ID' starting with 'message’.
- Syntax: Xpath=//label[starts-with(@id,'message')]



UserID
Password
User-ID must not be blank
Password must not be blank
LOGIN
RESET
Console HTML CSS Script DOM Net Cookies FirePath
Top Window
Highlight
XPath:
Id starting with 'message'

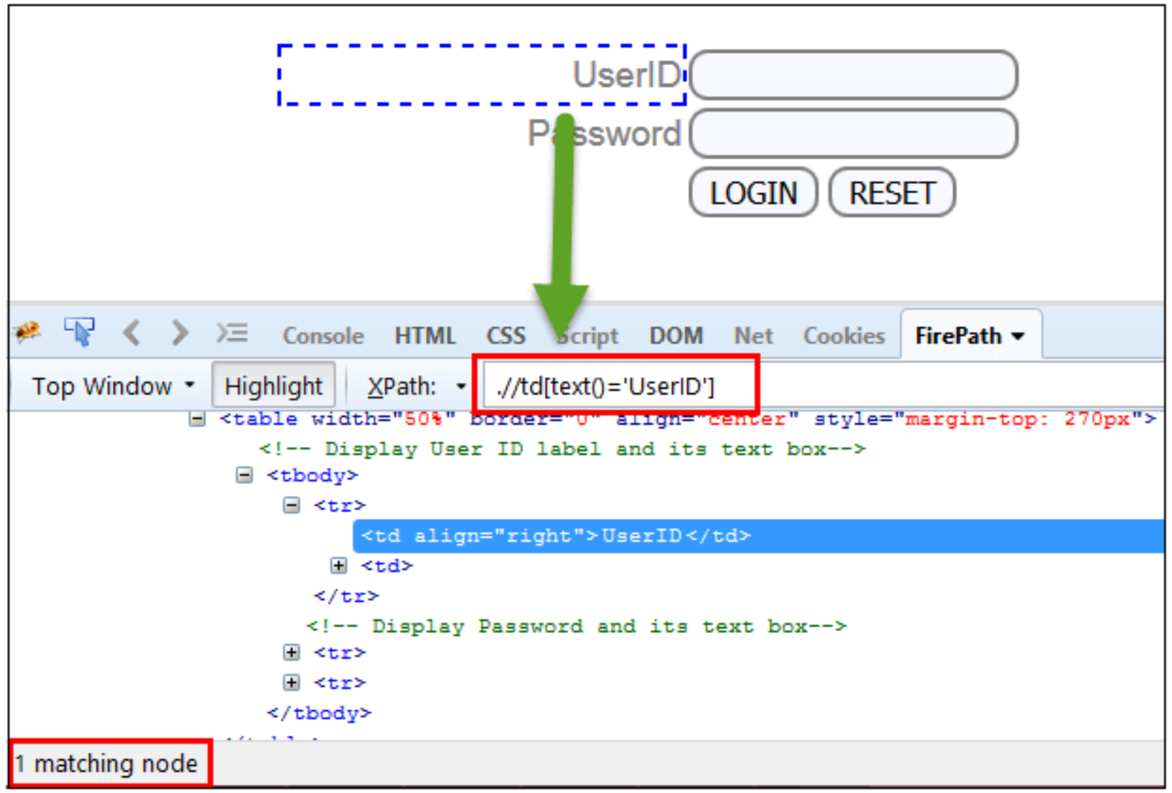
```
//label[starts-with(@id,'message')]
```

```
<tr>
    <td align="right">UserID</td>
    <td>
        <input type="text" onblur="validateuserid();" onkeyup="validateuserid();" maxlength="10" name="uid"/>
        <label id="message23" style="visibility: visible;">User-ID must not be blank</label>
    </td>
</tr>
<!-- Display Password and its text box-->
<tr>
    <td align="right">Password</td>
    <td>
        <input type="password" onblur="validatepassword();" onkeyup="validatepassword();" name="password"/>
        <label id="message18" style="visibility: visible;">Password must not be blank</label>
    </td>
</tr>
```

2 matching nodes

5. Text()

- In this expression, with text function, we find the element with exact text match as shown below. In our case, we find the element with text "UserID".
- Syntax: Xpath=//td[text()='UserID']



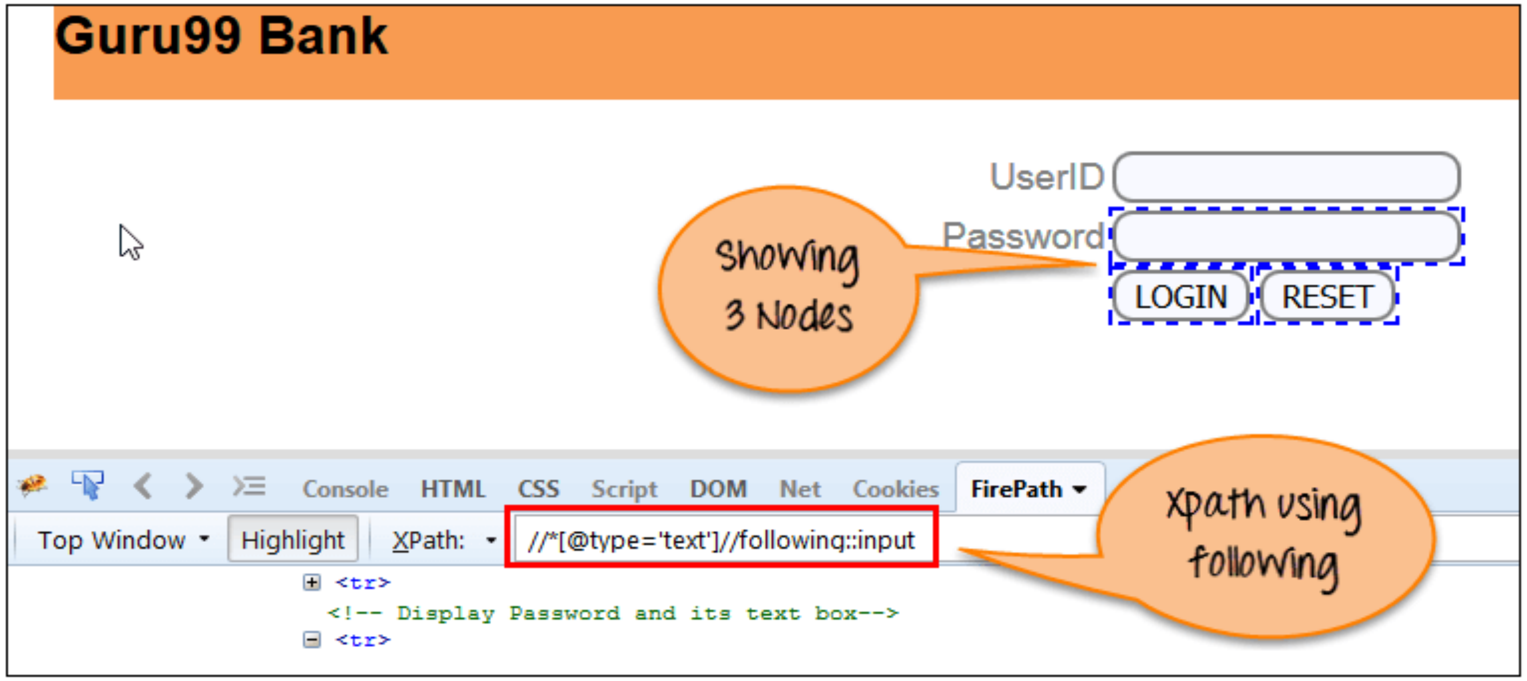
.//td[text()='UserID']

```
<table width="50%" border="0" align="center" style="margin-top: 270px">
  <!-- Display User ID label and its text box-->
  <tbody>
    <tr>
      <td align="right">UserID</td>
      <td>
    </tr>
    <!-- Display Password and its text box-->
    <tr>
    <tr>
  </tbody>
```

1 matching node

6.XPath axes methods

- These XPath axes methods are used to find the complex or dynamic elements. Below we will see some of these methods.
- **a) Following**: Selects all elements in the document of the current. node( ) [UserID input box is the current node] as shown in the below screen.
- Syntax: Xpath=//*[@type='text']//following::input



```
//*[@type='text']//following::input
<tr>
<!-- Display Password and its text box-->
<tr>
```

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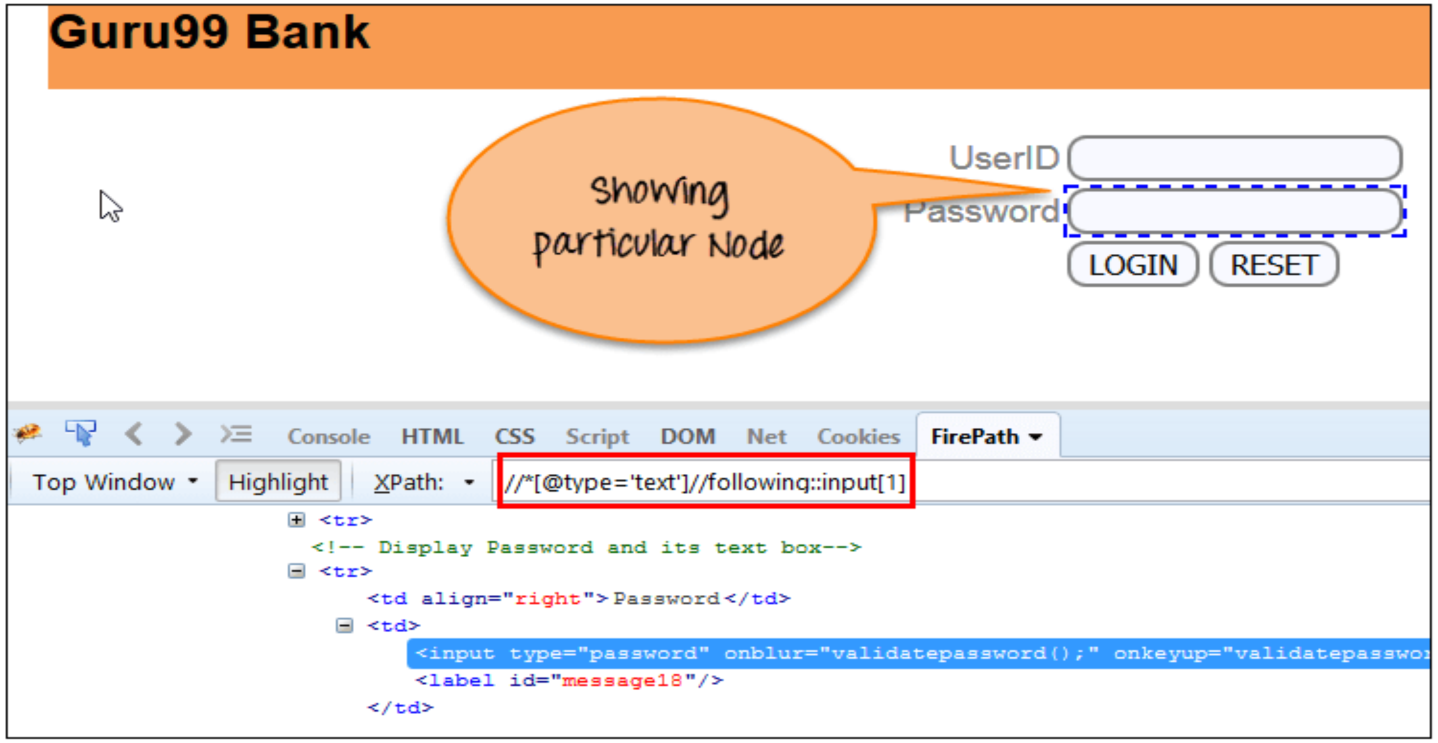
- There are 3 "input" nodes matching by using "following" axis- password, login and reset button. If you want to focus on any particular element then you can use the below XPath method:
- Syntax: Xpath=//*[@type='text']//following::input[1]
- You can change the XPath according to the requirement by putting [1],[2]...........and so on.

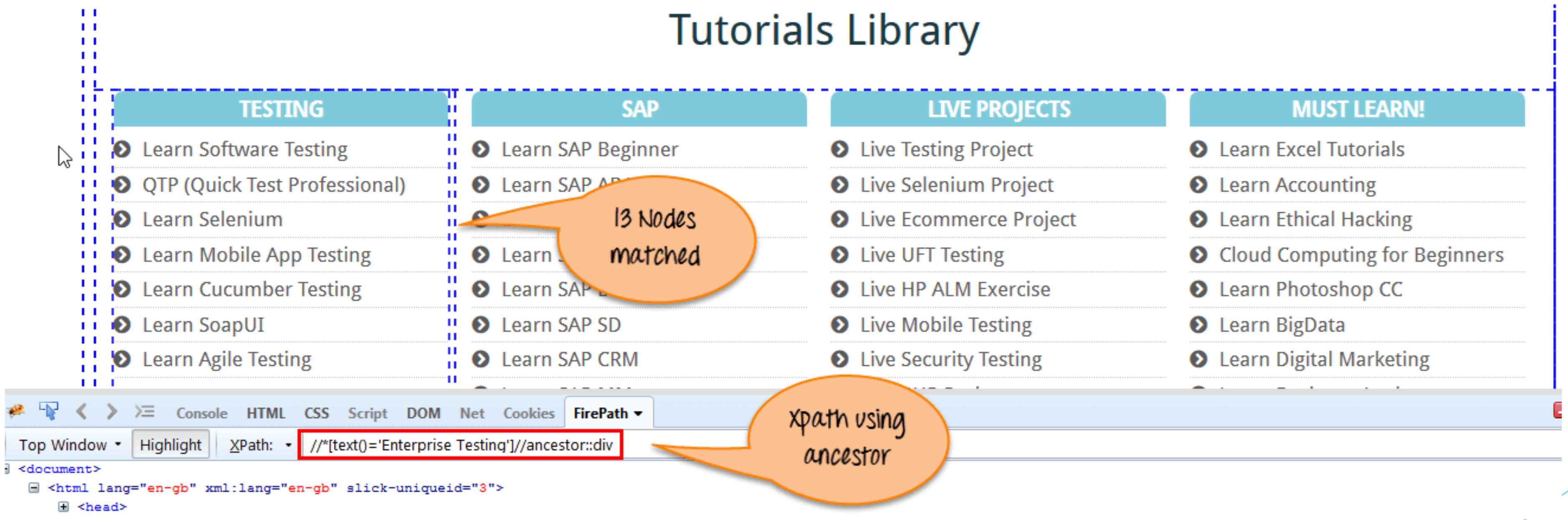


```
//*[@type='text']//following::input[1]
```

```
⊞ <tr>
  <!-- Display Password and its text box-->
⊟ <tr>
      <td align="right">Password</td>
    ⊟ <td>
          <input type="password" onblur="validatepassword();" onkeyup="validatepasswo
          <label id="message18"/>
      </td>
```

b. Ancestor:

- The ancestor axis selects all ancestors element (grandparent, parent, etc.) of the current node as shown in the below screen.
- In the below expression, we are finding ancestors element of the current node("ENTERPRISE TESTING" node).
- Syntax: Xpath=//*[text()='Enterprise Testing']//ancestor::div



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13 Nodes matched
Xpath using ancestor
Console HTML CSS Script DOM Net Cookies FirePath
Top Window Highlight XPath:

```
//*[text()='Enterprise Testing']//ancestor::div
```

```
<document>
  <html lang="en-gb" xml:lang="en-gb" slick-uniqueid="3">
    <head>
```

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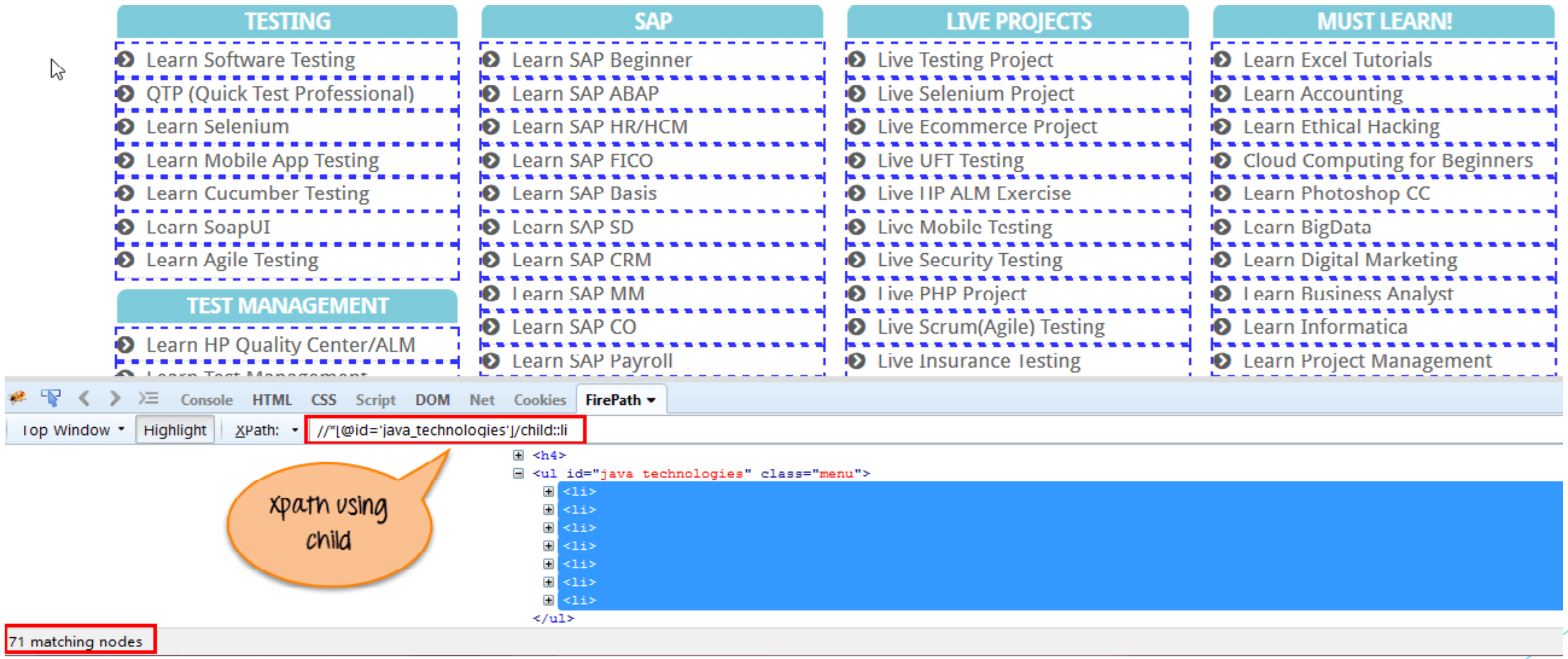
c.Child

- Selects all children elements of the current node (Java) as shown in the below screen.
- Syntax: Xpath=//*[@id='java_technologies']/child::li



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Learn Agile Testing	Learn SAP CRM	Live Security Testing	Learn Digital Marketing
TEST MANAGEMENT	Learn SAP MM	Live PHP Project	Learn Business Analyst
Learn HP Quality Center/ALM	Learn SAP CO	Live Scrum(Agile) Testing	Learn Informatica
	Learn SAP Payroll	Live Insurance Testing	Learn Project Management

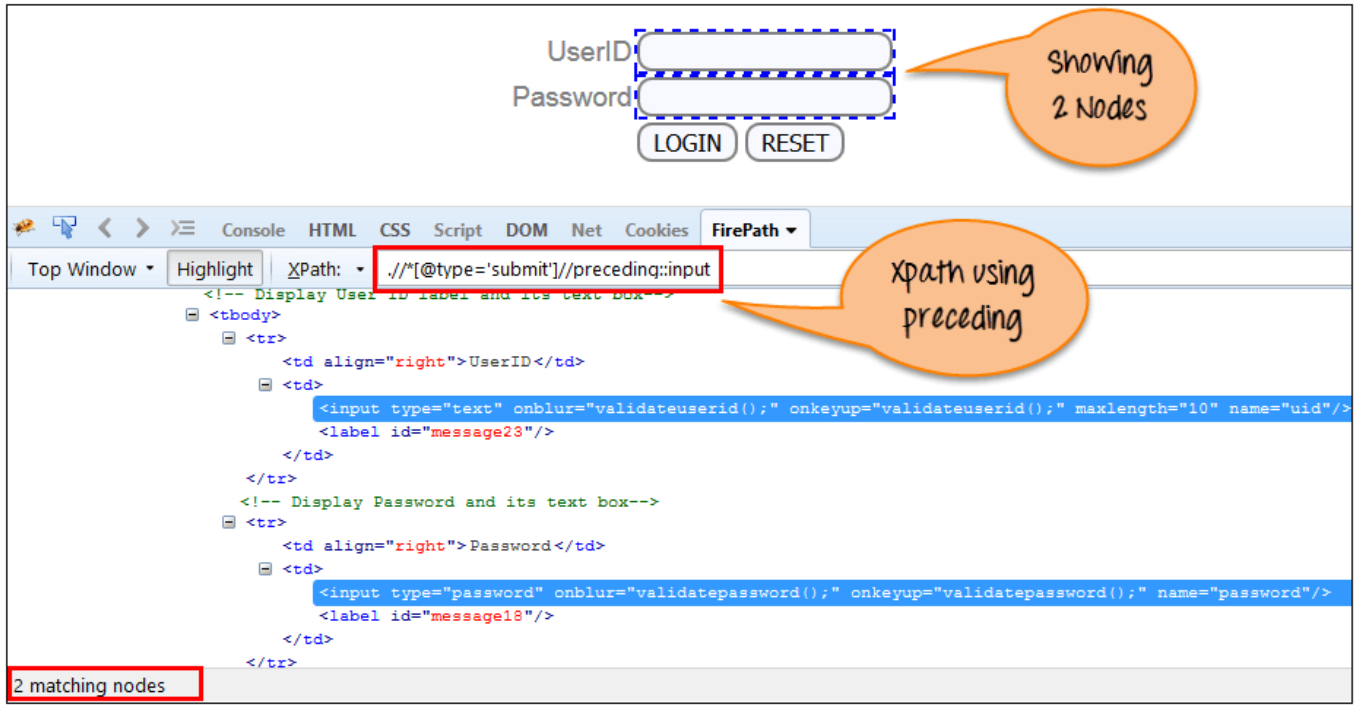
```
//*[@id='java_technologies']/child::li
```

```
<h4>
<ul id="java technologies" class="menu">
  <li>
  <li>
  <li>
  <li>
  <li>
  <li>
  <li>
</ul>
```

71 matching nodes

d. Preceding:

- Select all nodes that come before the current node as shown in the below screen.
- Syntax: Xpath=//*[@type='submit']//preceding::input



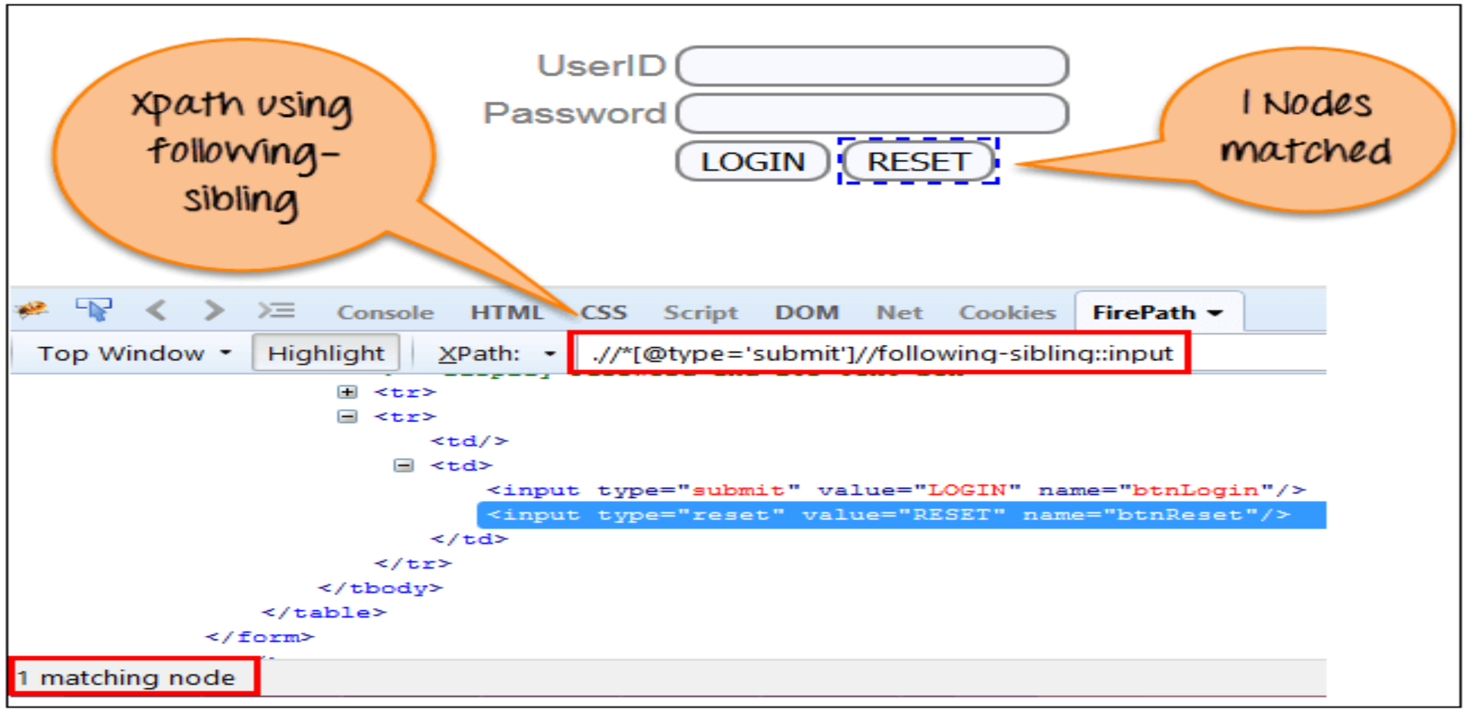
```
.//*[@type='submit']//preceding::input
```

```
<!-- Display User ID label and its text box-->
⊟ <tbody>
  ⊟ <tr>
      <td align="right">UserID</td>
    ⊟ <td>
        <input type="text" onblur="validateuserid();" onkeyup="validateuserid();" maxlength="10" name="uid"/>
        <label id="message23"/>
      </td>
    </tr>
    <!-- Display Password and its text box-->
  ⊟ <tr>
      <td align="right">Password</td>
    ⊟ <td>
        <input type="password" onblur="validatepassword();" onkeyup="validatepassword();" name="password"/>
        <label id="message18"/>
      </td>
    </tr>
```

2 matching nodes

e. Following-sibling:

- Select the following siblings of the context node. Siblings are at the same level of the current node as shown in the below screen. It will find the element after the current node.
- Syntax: xpath=//*[@type='submit']//following-sibling::input



```
.//*[@type='submit']//following-sibling::input
```

```
<tr>
<tr>
    <td/>
    <td>
        <input type="submit" value="LOGIN" name="btnLogin"/>
        <input type="reset" value="RESET" name="btnReset"/>
    </td>
</tr>
</tbody>
</table>
</form>
```

```
1 matching node
```

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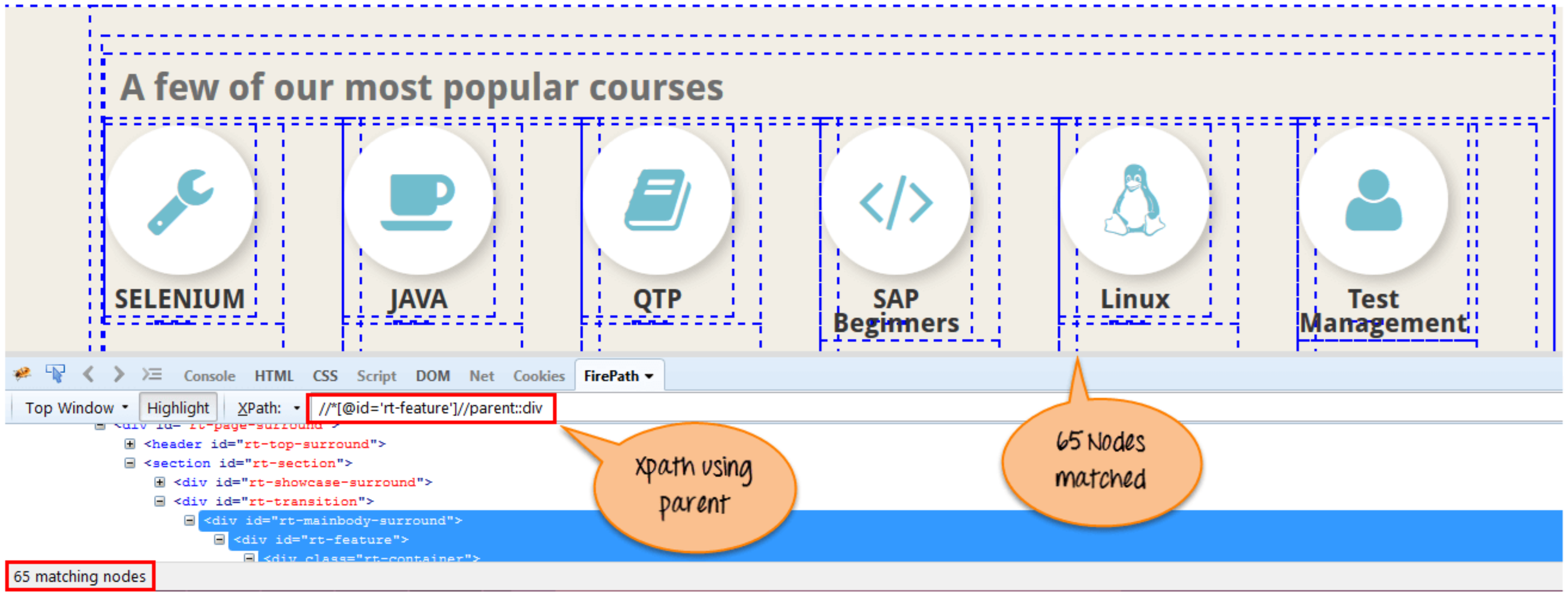
f.Parent:

- Selects the parent of the current node as shown in the below screen.
- Synatax: Xpath=//*[@id='rt-feature']//parent::div



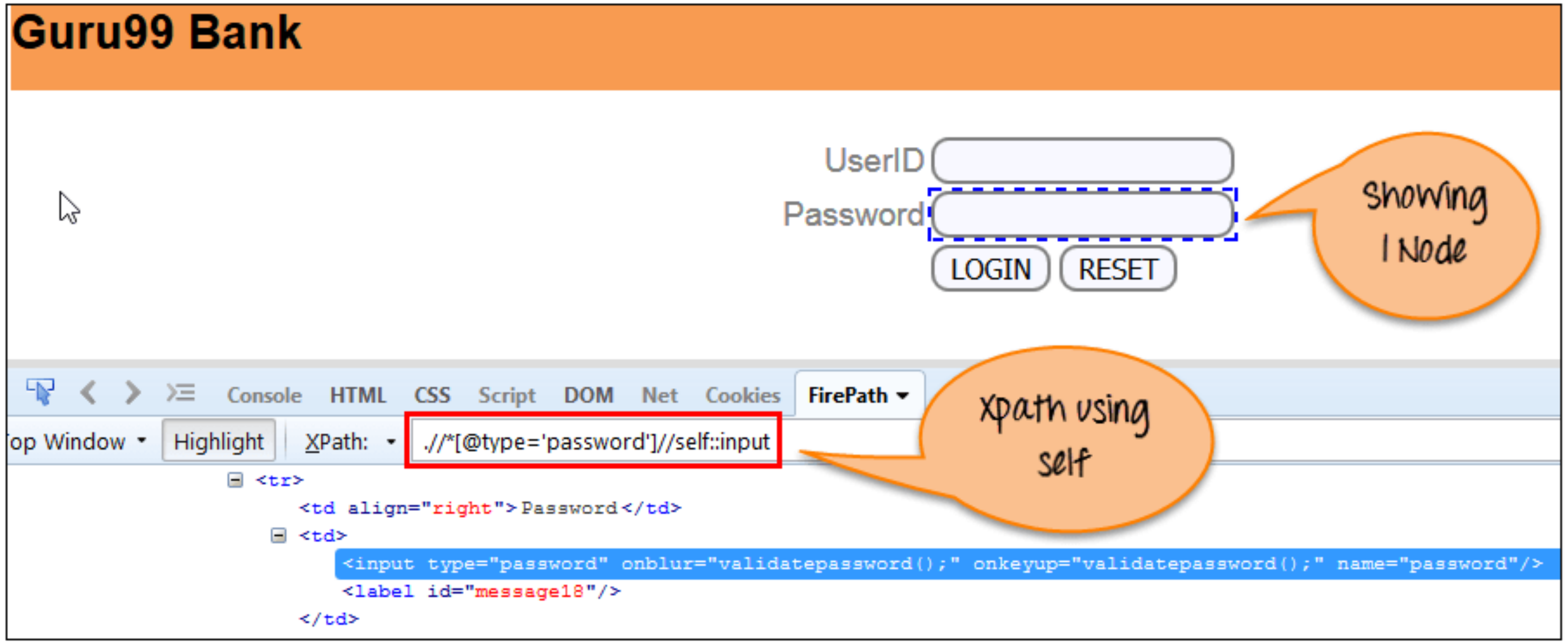
```
//*[@id='rt-feature']//parent::div
```

```
<div id="rt-page-surround">
  <header id="rt-top-surround">
  <section id="rt-section">
    <div id="rt-showcase-surround">
    <div id="rt-transition">
      <div id="rt-mainbody-surround">
        <div id="rt-feature">
          <div class="rt-container">
```

65 matching nodes

g. Self:

- Selects the current node or 'self' means it indicates the node itself as shown in the below screen.
- Syntax: Xpath =//*[@type='password']//self::input


Guru99 Bank
UserID
Password
LOGIN
RESET
Showing 1 Node
Console HTML CSS Script DOM Net Cookies FirePath
op Window Highlight XPath:
Xpath using self

```
.//*[@type='password']//self::input
```

```
<tr>
    <td align="right">Password</td>
  <td>
      <input type="password" onblur="validatepassword();" onkeyup="validatepassword();" name="password"/>
      <label id="message18"/>
    </td>
```

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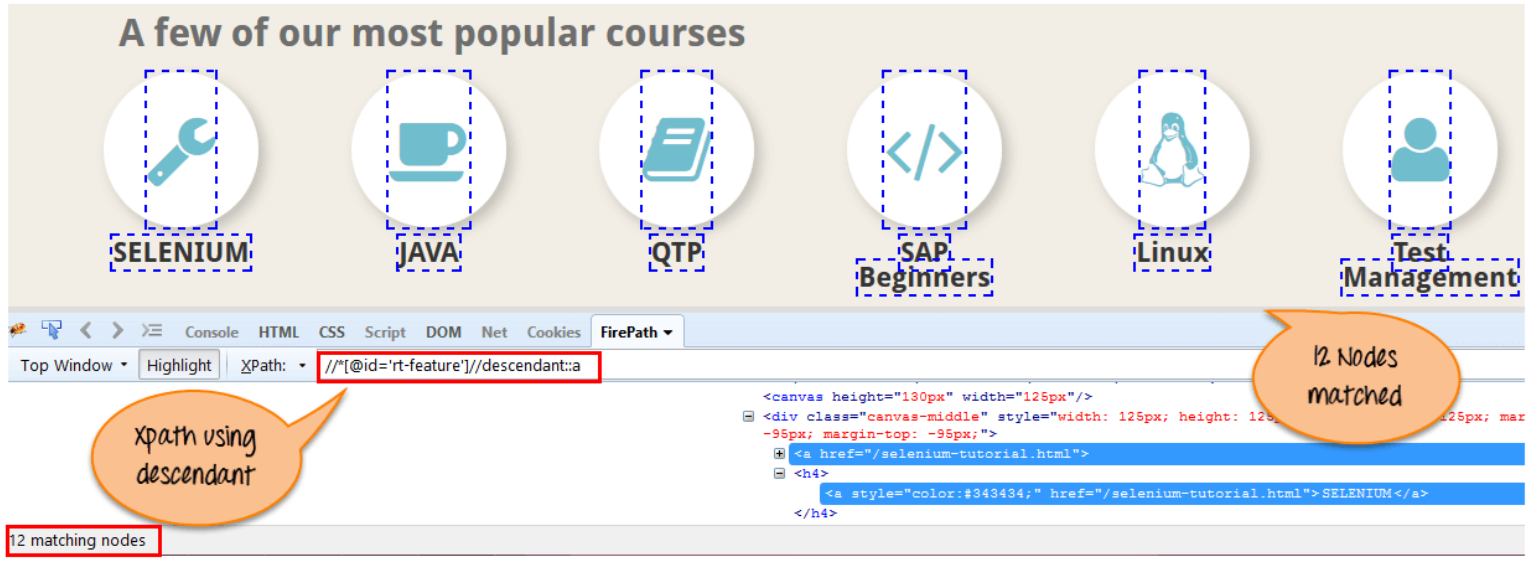
h. Descendant:

- Selects the descendants of the current node as shown in the below screen.
- In the below expression, it identifies all the element descendants to current element ('Main body surround' frame element) which means down under the node (child node , grandchild node, etc.).
- Syntax: Xpath=//*[@id='rt-feature']//descendant::a



```
//*[@id='rt-feature']//descendant::a
```

```
<canvas height="130px" width="125px"/>
<div class="canvas-middle" style="width: 125px; height: 12          25px; mar
-95px; margin-top: -95px;">
  <a href="/selenium-tutorial.html">
  <h4>
    <a style="color:#343434;" href="/selenium-tutorial.html">SELENIUM</a>
  </h4>
```

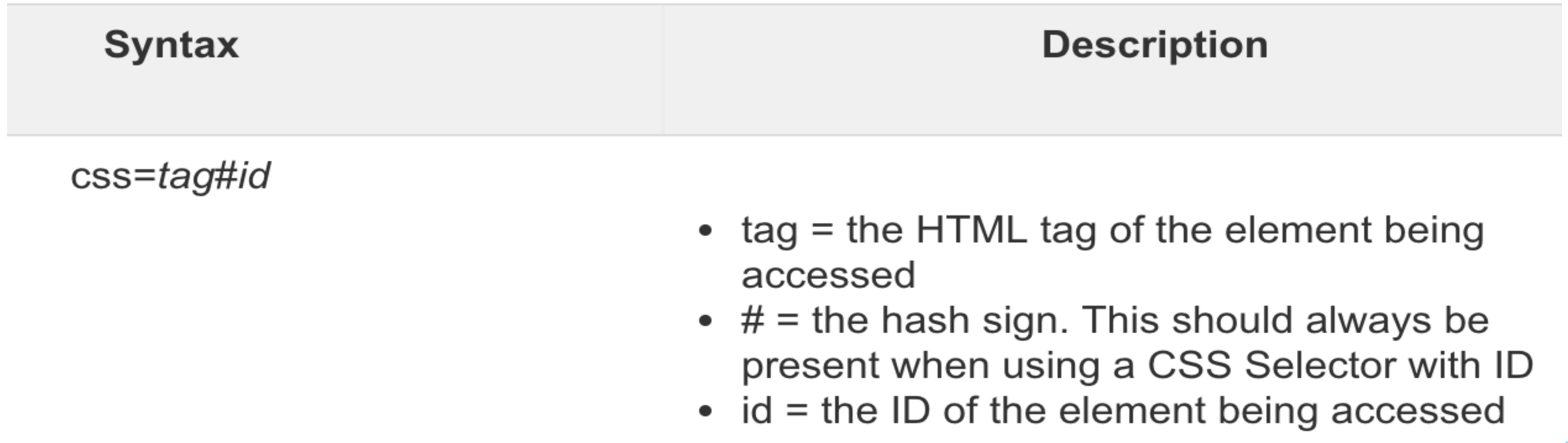
12 matching nodes

Locating by CSS Selector

- CSS Selectors are string patterns used to identify an element based on a combination of HTML tag, id, class, and attributes. Locating by CSS Selector is more complicated than the previous methods, but it is the most common locating strategy of advanced Selenium users because it can access even those elements that have no ID or name.
- CSS Selectors have many formats, but we will only focus on the most common ones.
  - ✓ Tag and ID
  - ✓ Tag and class
  - ✓ Tag and attribute
  - ✓ Tag, class, and attribute
  - ✓ Inner text

Locating by CSS Selector - Tag and ID

- Again, we will use Facebook's Email text box in this example. As you can remember, it has an ID of "email," and we have already accessed it in the "Locating by ID" section. This time, we will use a CSS Selector with ID in accessing that very same element.
- Syntax: d.findElement(By.cssSelector("#twotabsearchtextbox"))
- **Keep in mind that the ID is always preceded by a hash sign (#).**



Syntax	Description
css=*tag#id*	• tag = the HTML tag of the element being accessed • # = the hash sign. This should always be present when using a CSS Selector with ID • id = the ID of the element being accessed

Locating by CSS Selector - tag, class, and attribute

Syntax	Description
css=*tag.class*[*attribute*=*value*]	• tag = the HTML tag of the element being accessed • . = the dot sign. This should always be present when using a CSS Selector with class • class = the class of the element being accessed • [and] = square brackets within which a specific attribute and its corresponding value will be placed • attribute = the attribute to be used. It is advisable to use an attribute that is unique to the element such as a name or ID. • value = the corresponding value of the chosen attribute.

Locating by CSS Selector - tag, class, and attribute

- TAGNAME[attribute=‘value’][attribute=‘value’]
- Input[id=‘email’][type=‘text’]

Locating by CSS Selector - Class

- Syntax: d.findElement(By.cssSelector(”.twotabsearchtextbox"))
- To find unique element by using more attributes
  - Input.formBtn[name=go]

Locating by CSS Selector - inner text

- As you may have noticed, HTML labels are seldom given id, name, or class attributes. So, how do we access them? The answer is through the use of their inner texts. **Inner texts are the actual string patterns that the HTML label shows on the page.**

Syntax	Description
css=*tag*:contains("*inner text*")	• tag = the HTML tag of the element being accessed • inner text = the inner text of the element

There are there important special characters:

1. '^' symbol, represents the starting text in a string.

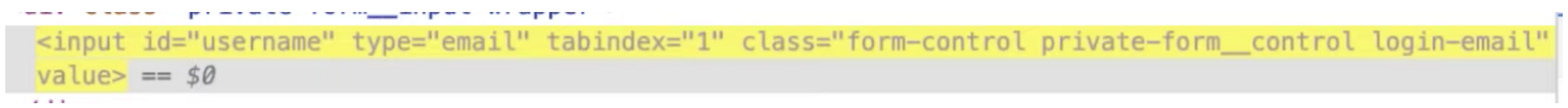
   Syntax: css=input[id^='ema']
2. '$' symbol represents the ending text in a string.

   Syntax: css=input[id$='mail']
3. '*' symbol represents contains text in a string.

   Syntax: css=input[id*='mai']

CSS with Cascading classes part 1

- Syntax:
  - Tagname.classname.classname.classname



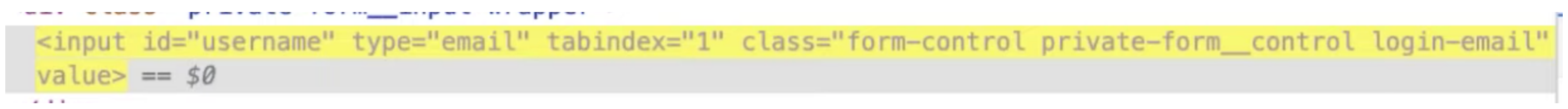
```
<input id="username" type="email" tabindex="1" class="form-control private-form__control login-email"
value> == $0
```

Example1:input.form-control.private-form_control.login-email

Example2:.form-control.private-form_control.login-email

CSS with Cascading classes part 2

- Syntax:
  - Tagname.classname.classname.classname (any one class can also be used)

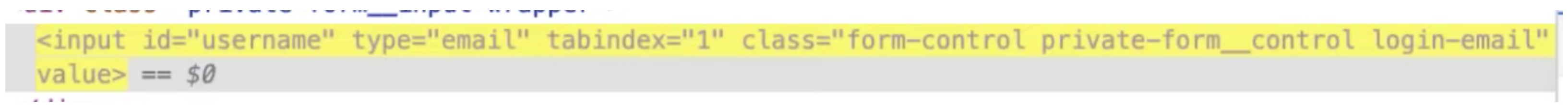


```
<input id="username" type="email" tabindex="1" class="form-control private-form__control login-email"
value> == $0
```

Example:input.login-email

CSS with Cascading classes with id

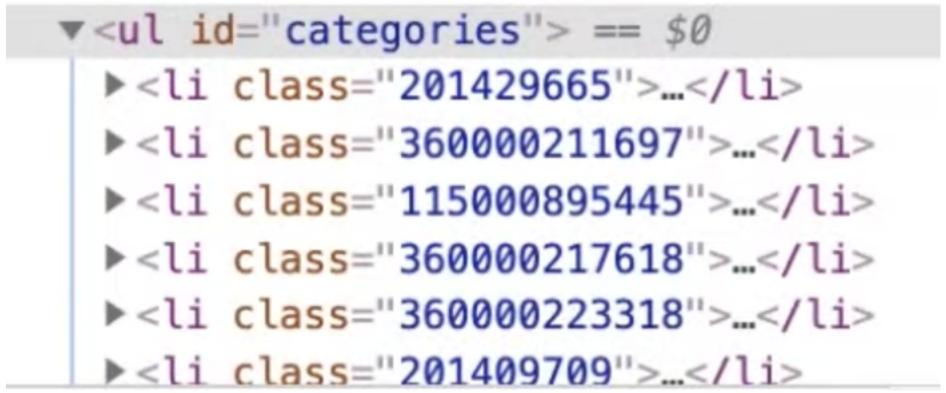
- Syntax:
  - Tagname#id.classname.classname.classname



```
<input id="username" type="email" tabindex="1" class="form-control private-form__control login-email"
value> == $0
```

Example:input#username.form-control.private-form_control.login-email

CSS to find List of values

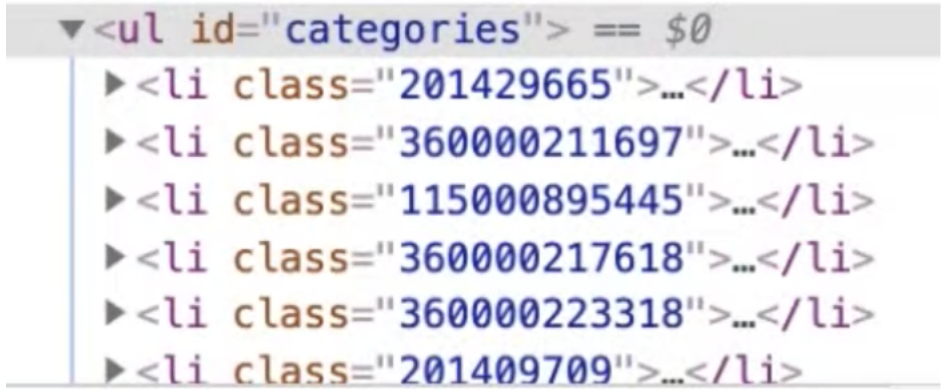


```
▼<ul id="categories"> == $0
  ▶<li class="201429665">…</li>
  ▶<li class="360000211697">…</li>
  ▶<li class="115000895445">…</li>
  ▶<li class="360000217618">…</li>
  ▶<li class="360000223318">…</li>
  ▶<li class="201409709">…</li>
```

ul#categories>li → list of elements 1 of 14

ul#categories>li:nth-of-type(n) → list of elements 1 of 14

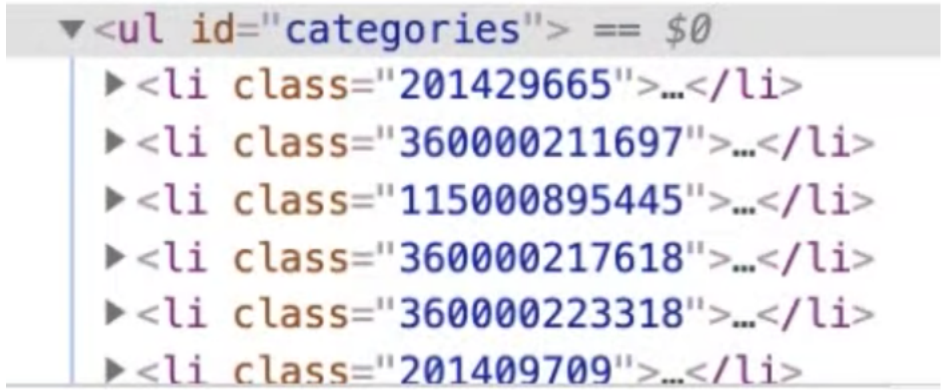
CSS to find specific element in list of values using nth-of-type



```
▼<ul id="categories"> == $0
  ▶<li class="201429665">…</li>
  ▶<li class="360000211697">…</li>
  ▶<li class="115000895445">…</li>
  ▶<li class="360000217618">…</li>
  ▶<li class="360000223318">…</li>
  ▶<li class="201409709">…</li>
```

ul#categories>li:nth-of-type(2) → list of elements 1 of 1

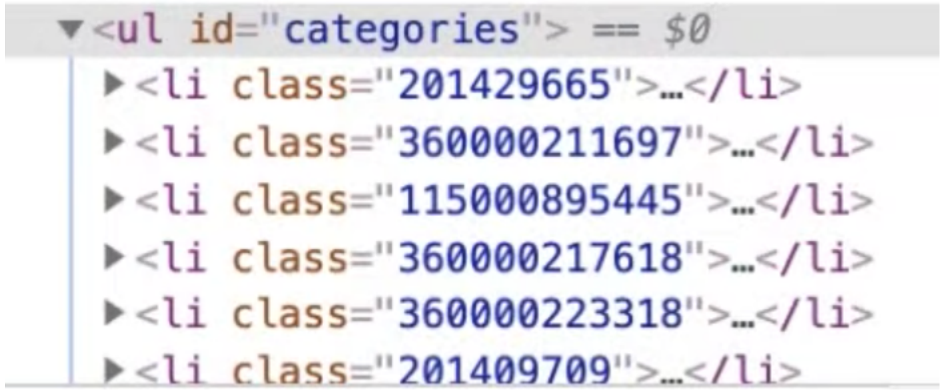
CSS to find FIRST value in list of values using first-of-type



```
▼<ul id="categories"> == $0
  ▶<li class="201429665">…</li>
  ▶<li class="360000211697">…</li>
  ▶<li class="115000895445">…</li>
  ▶<li class="360000217618">…</li>
  ▶<li class="360000223318">…</li>
  ▶<li class="201409709">…</li>
```

ul#categories>li:first-of-type → list of elements 1 of 1

CSS to find LAST value in list of values using last-of-type



```
▼<ul id="categories"> == $0
  ▶<li class="201429665">…</li>
  ▶<li class="360000211697">…</li>
  ▶<li class="115000895445">…</li>
  ▶<li class="360000217618">…</li>
  ▶<li class="360000223318">…</li>
  ▶<li class="201409709">…</li>
```

ul#categories>li:last-of-type → list of elements 1 of 1