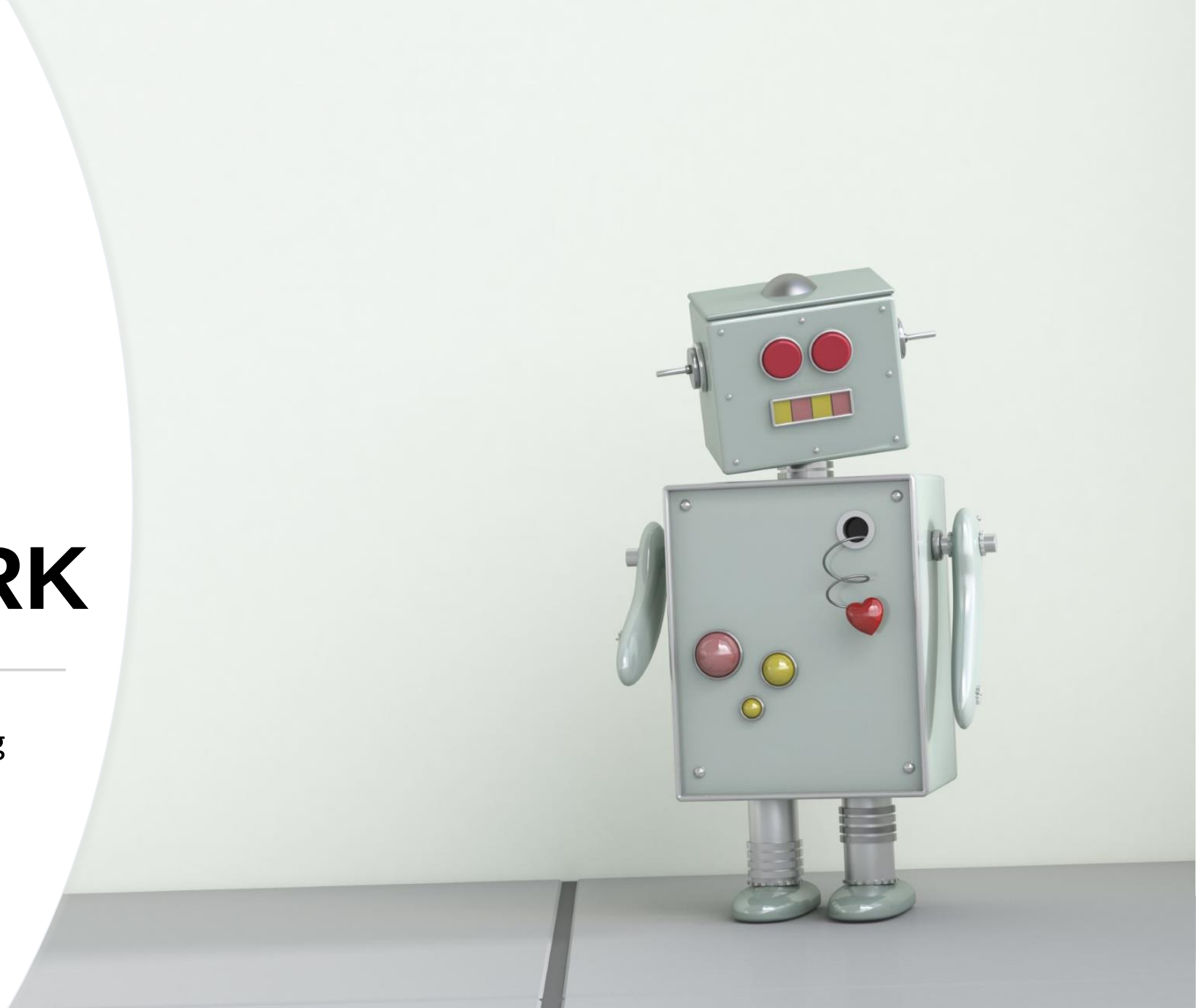
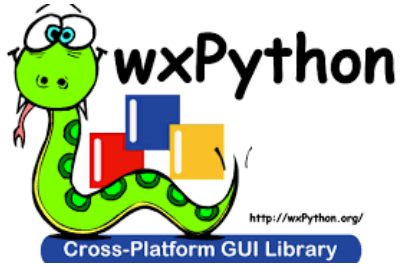
ROBOT FRAMEWORK

Building Automation Testing Using Robot Framework



PRE-REQUISITES

You need to complete these before



SeleniumLibrary

ROBOT FRAMEWORK

Introduction robot framework

Introduction Robot Framework

is a Python-based

extensible keyword-driven automation framework for acceptance testing

acceptance test driven development (ATDD),

behavior driven development (BDD)

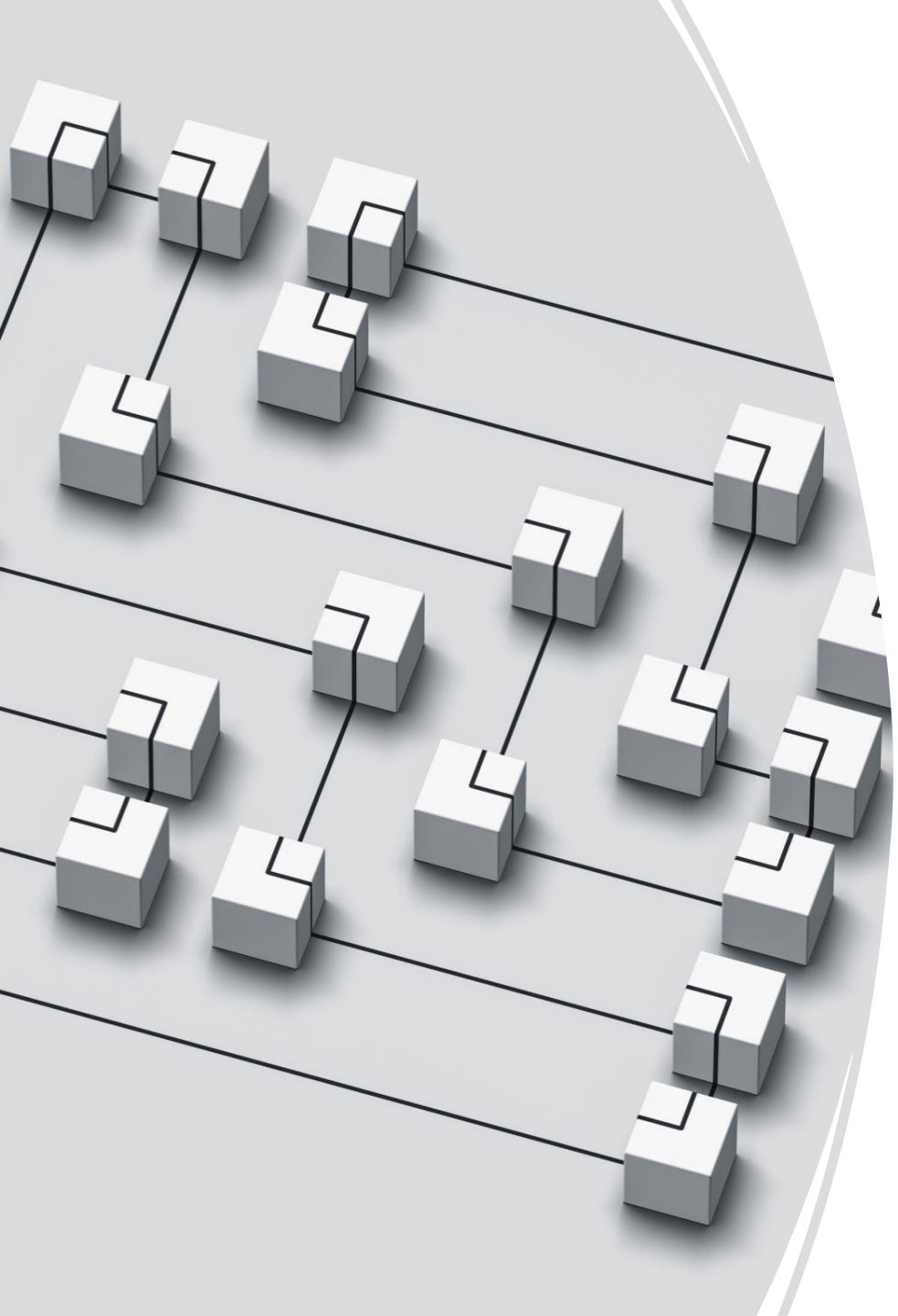
robotic process automation (RPA)

Introduction Robot Framework

free to use without licensing costs

easy syntax, utilizing human-readable keywords

Its capabilities can be extended by libraries implemented with Python, Java or many other programming languages

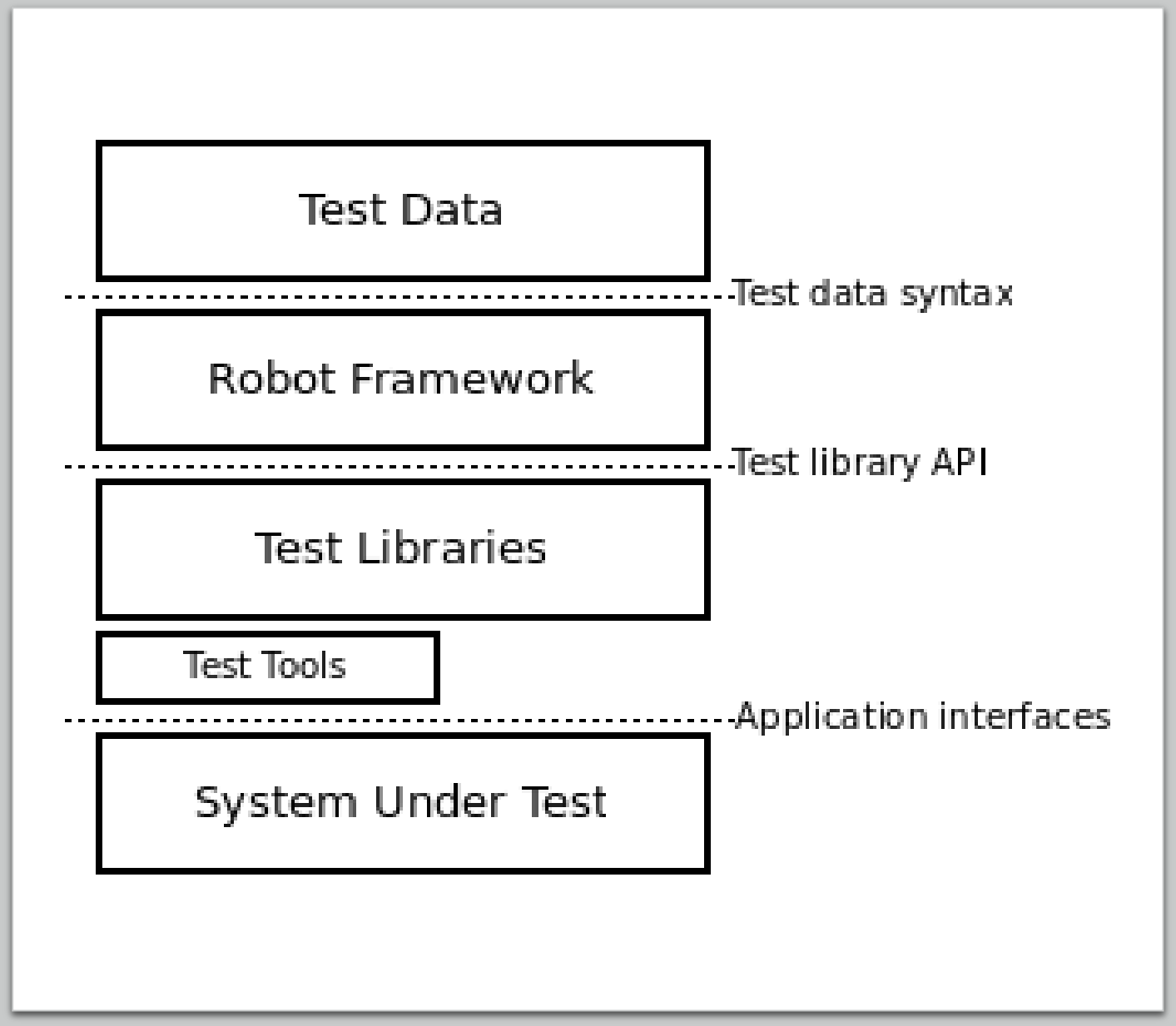


Why Robot Framework

- Enables easy-to-use tabular syntax for creating test cases in a uniform way.
- Provides ability to create reusable higher-level keywords from the existing keywords.
- Provides easy-to-read result reports and logs in HTML format.
- Is platform and application independent.
- Provides a simple library API for creating customized test libraries which can be implemented natively with Python.
- Supports creating data-driven test cases.
- Has built-in support for variables, practical particularly for testing in different environments.

High-level architecture

- Robot Framework is a generic, application and technology independent framework
- It has a highly modular architecture illustrated in the diagram



Features of Robot Framework

- Keywords

Robot framework comes with built-in keywords available with robot framework, keywords available from the libraries like Selenium Library (open browser, close browser, maximize browser, etc.). We can also create user-defined keywords, which are a combination of other user-defined keywords or built-in or library keywords. We can also pass arguments to those keywords, which make the user-defined keywords like functions that can be reused.

- Variables

Robot framework supports variables – scalar, list and dict. Variables in robot framework are easy to use and are of great help while writing complex test cases.

Features of Robot Framework

- Libraries

  Robot framework has support for a lot of external libraries like Selenium Library, Database Library, FTP Library and http library. Selenium Library is mostly used as it helps to interact with the browsers and helps with web application and UI testing. Robot framework also has its own built-in libraries for strings, date, numbers etc.

- Resources

  Robot framework also allows the import of robot files with keywords externally to be used with test cases. Resources are very easy to use and are of great help when we need to use some keywords already written for other test projects.

- Data driven test cases

  Robot framework supports keyword driven style test cases and data driven style. Data driven works with high-level keyword used as a template to the test suite and the test cases are used to share data with the high-level keyword defined in the template. It makes the work very easy for testing UI with different inputs.

Features of Robot Framework

•Test Case Tagging

Robot framework allows to tag test-cases so that we can either run the tags test-cases or skip the tagged testcases.
Tagging helps when we want to run only a group of test cases or skip them.

•Reports and Logs

Robot framework provides all the details of test suite, test case execution in the form of report and logs.
All the execution details of the test case are available in the log file. The details like whether the test case has failed or passed, time taken for execution, steps followed to run the test case are provided.

Limitation robot framework for automation testing

- Robot framework does not support parallel execution
- Hard to customize html report
- Robot framework is hard to maintain
- Some error are difficult to debug
- Robot framework has strict indentation rules

Installing Robot Framework

- Robot Framework is implemented with Python, so you need to have Python installed.
- On Windows machines, make sure to add Python to PATH during installation.

Install python

Files

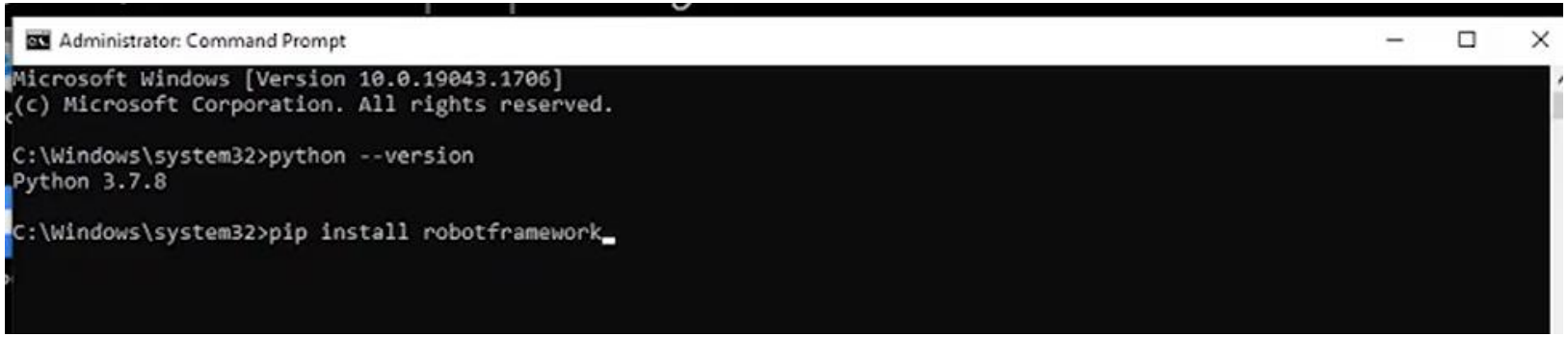
Version	Operating
Gzipped source tarball	Source rel
XZ compressed source tarball	Source rel
macOS 64-bit installer	macOS
Windows help file	Windows
Windows x86-64 embeddable zip file	Windows
Windows x86-64 executable installer	Windows
Windows x86-64 web-based installer	Windows
Windows x86 embeddable zip file	Windows
Windows x86 executable installer	Windows
Windows x86 web-based installer	Windows

Check python use command prompt

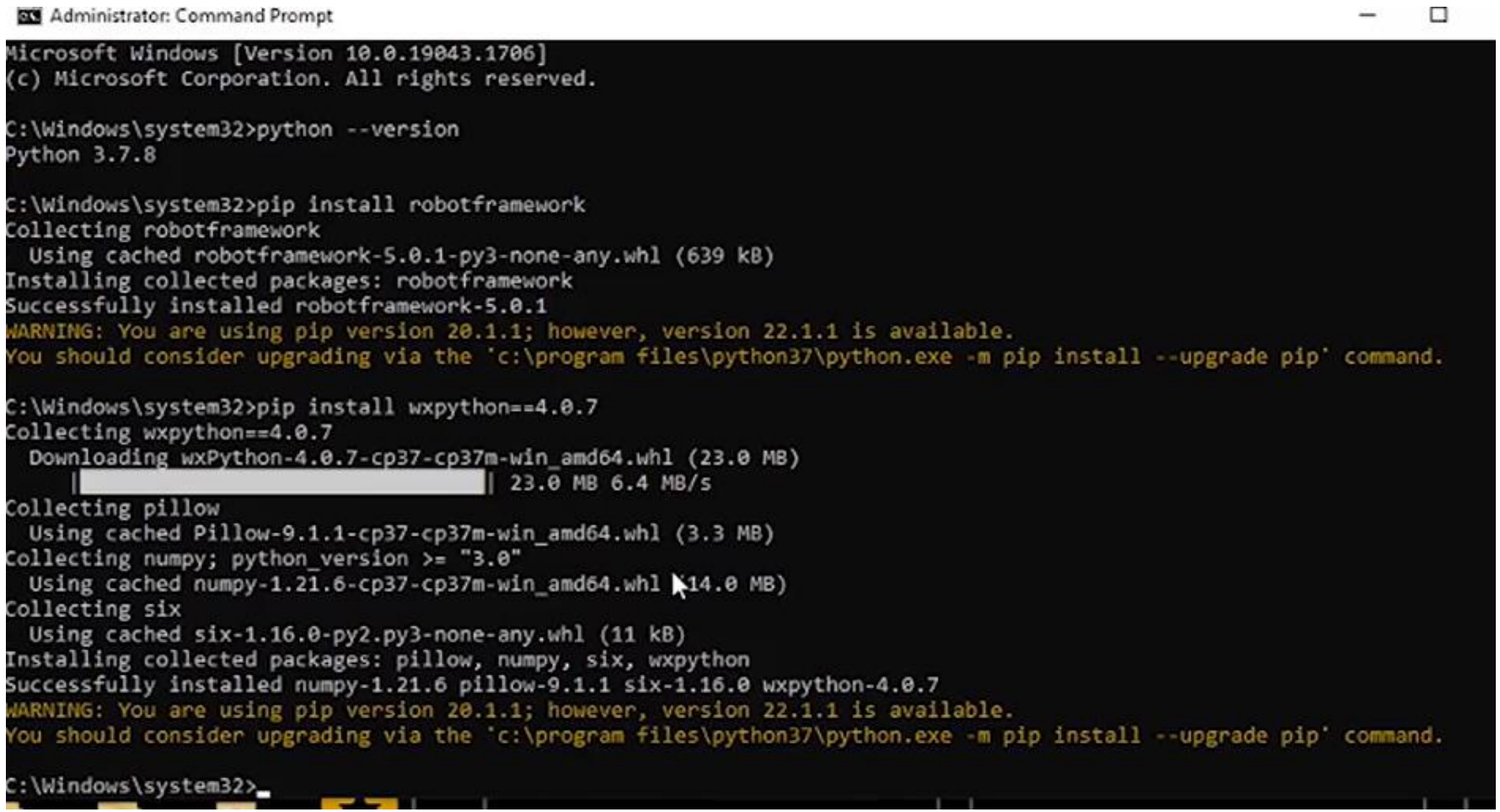
Open cmd

Python --version

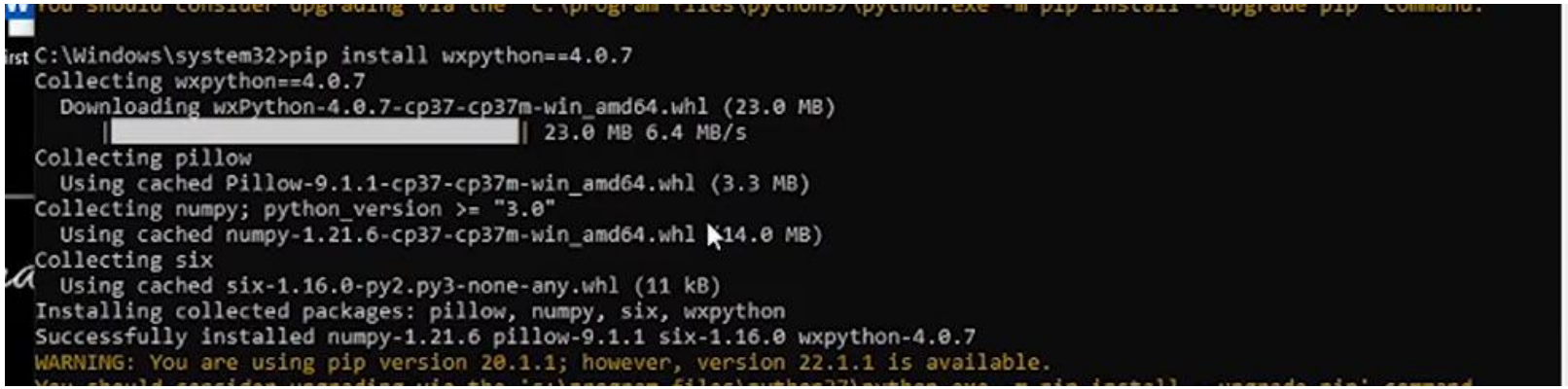
Install robot framework



Type pip install robotframework

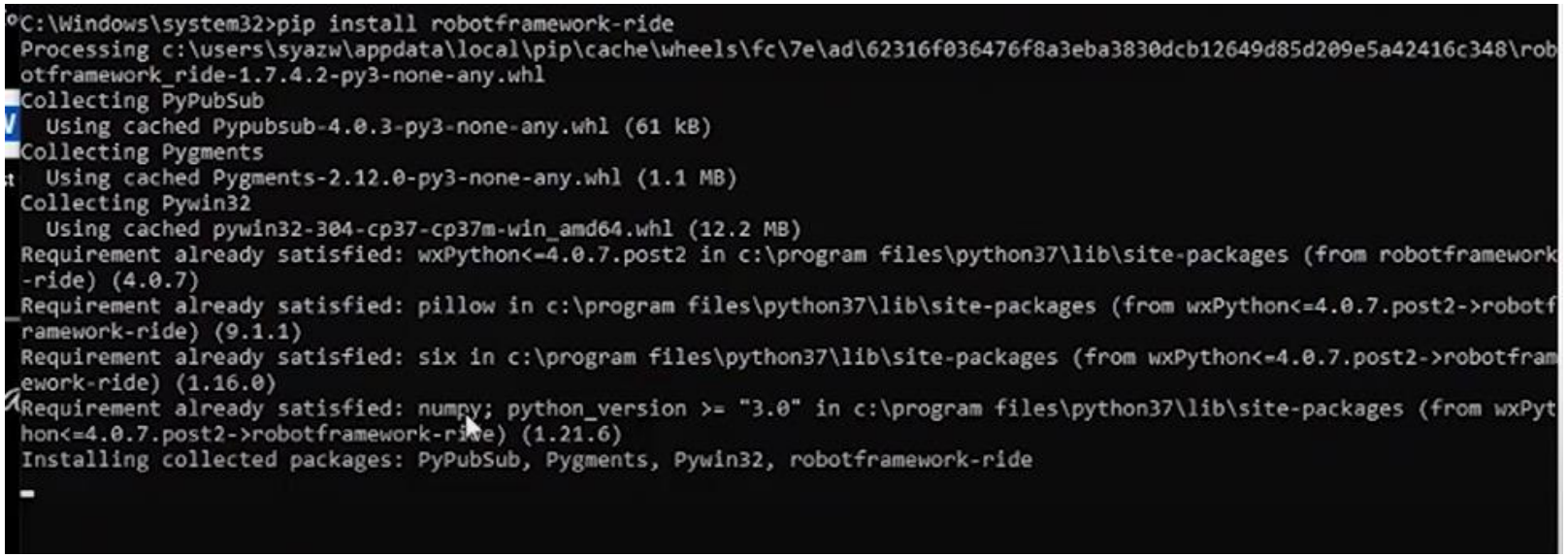

Administrator: Command Prompt
Microsoft Windows [Version 10.0.19043.1706]
(c) Microsoft Corporation. All rights reserved.
C:\Windows\system32>python --version
Python 3.7.8
C:\Windows\system32>pip install robotframework
Collecting robotframework
Using cached robotframework-5.0.1-py3-none-any.whl (639 kB)
Installing collected packages: robotframework
Successfully installed robotframework-5.0.1
WARNING: You are using pip version 20.1.1; however, version 22.1.1 is available.
You should consider upgrading via the 'c:\program files\python37\python.exe -m pip install --upgrade pip' command.
C:\Windows\system32>pip install wxpython==4.0.7
Collecting wxpython==4.0.7
Downloading wxPython-4.0.7-cp37-cp37m-win_amd64.whl (23.0 MB)
23.0 MB 6.4 MB/s
Collecting pillow
Using cached Pillow-9.1.1-cp37-cp37m-win_amd64.whl (3.3 MB)
Collecting numpy; python_version >= "3.0"
Using cached numpy-1.21.6-cp37-cp37m-win_amd64.whl (14.0 MB)
Collecting six
Using cached six-1.16.0-py2.py3-none-any.whl (11 kB)
Installing collected packages: pillow, numpy, six, wxpython
Successfully installed numpy-1.21.6 pillow-9.1.1 six-1.16.0 wxpython-4.0.7
WARNING: You are using pip version 20.1.1; however, version 22.1.1 is available.
You should consider upgrading via the 'c:\program files\python37\python.exe -m pip install --upgrade pip' command.
C:\Windows\system32>

Install wxpython



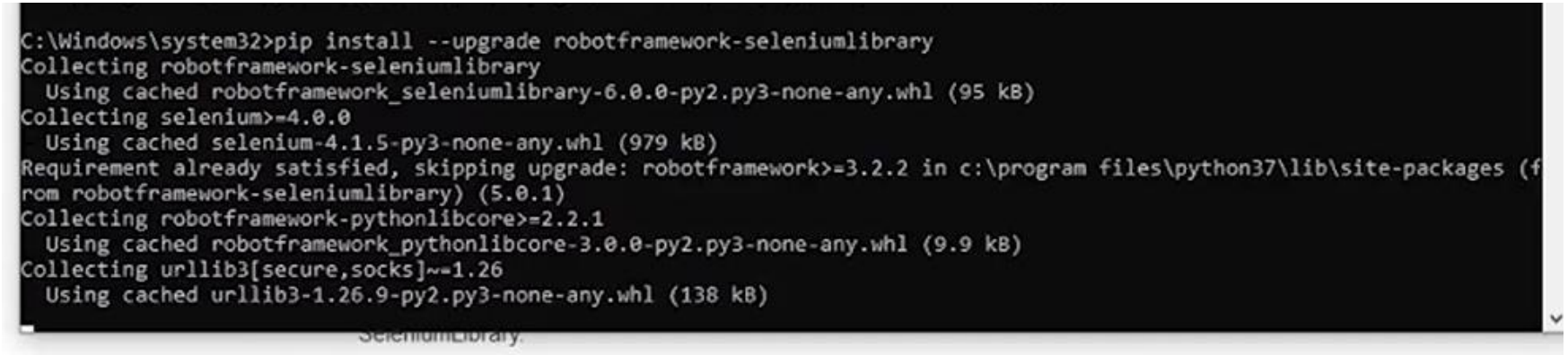
Type pip install wxpython==4.0.7

Install ride



Type pip install robotframework-ride

Install Selenium Library

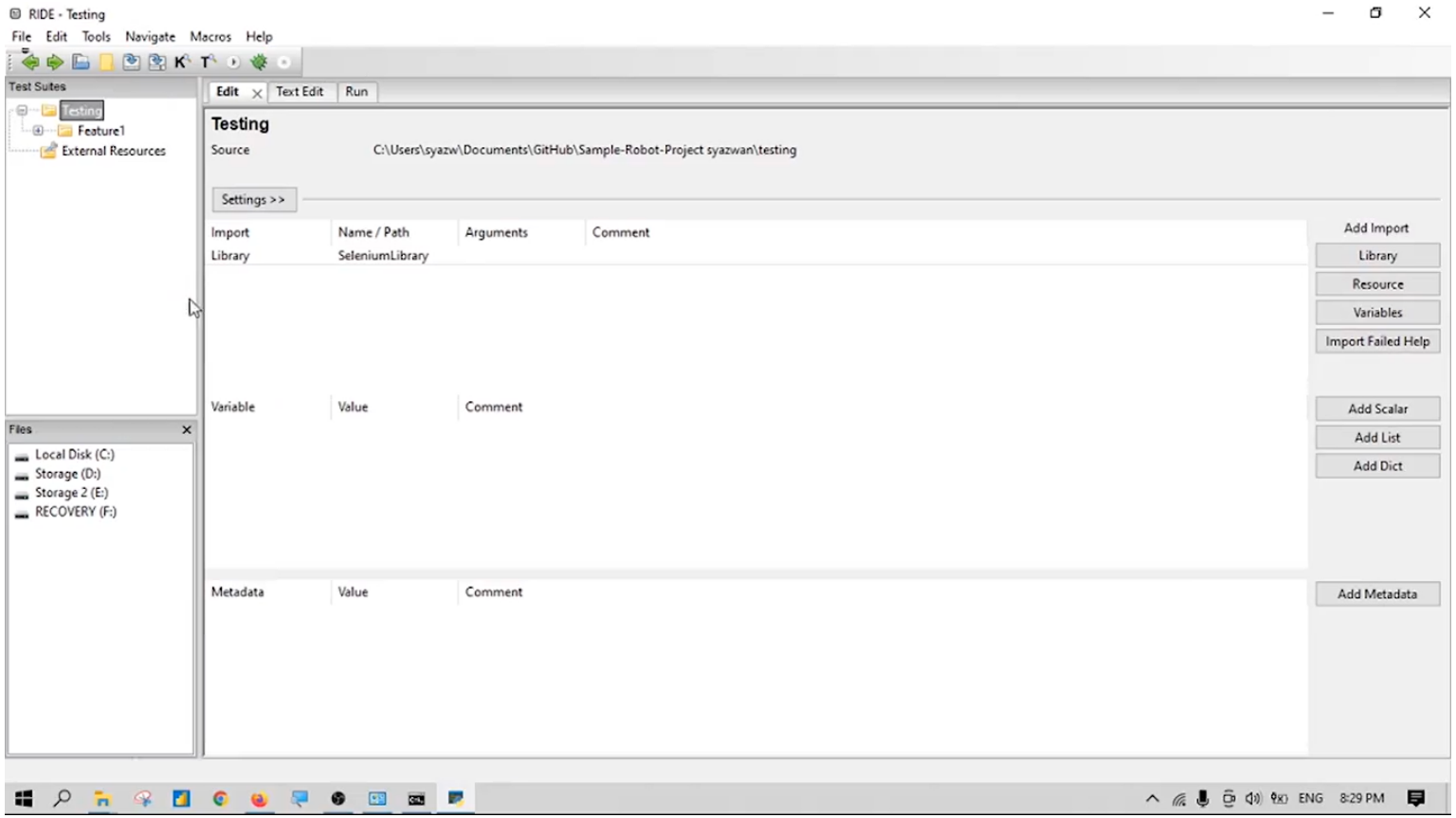


Type pip install –upgrade robotframework-seleniumlibrary

Open ride robot framework

```
C:\Windows\system32>ride.py
```

Type ride.py



Test data sections

Different sections in data	
Section	Used for
Settings	1) Importing test libraries resource files and variable files 2) Defining metadata for test suites and test cases
Variables	Defining variables that can be used elsewhere in the test data.
Test Cases	Creating test cases from available keywords.
Tasks	Creating tasks using available keywords. Single file can only contain either tests or tasks.
Keywords	Creating user keywords from existing lower-level keywords
Comments	Additional comments or data. Ignored by Robot Framework.

Keywords in Selenium Library

List of keywords that used in this project

Keywords	Deceptions
Open browser	Opens a given browser instance to the given url address
Close Browser	Closes browser window/tab
Click Element	Click the element identified by locator(element)
Input Text	Types the given text into the text field identified by locator
Select From List by Label	Selects options from selection list locator by given value
Choose File	Inputs the file_path into the file input field locator.
Element Text Should Be	Verifies that element locator contains exact the text expected

Sytax of Keywords in Table in Edit tab.

1st Column	2nd column	3rd column
Open browser	[link of website]	[webdriver] : chrome
Close Browser		
Click Element	Path of element (xpath,html, etc)	
Input Text	Path of element	Test data
Select From List by Label	Path of element	Value
Choose File	Path of element	Directory of test data file
Element Text Should Be	Path of element	text that should be

- For Choose File, recommend to save test data file into folder that save test suite. Then on third column, type ' ${CURDIR}/file name '

If want to find more library keywords, can refer to:

https://robotframework.org/SeleniumLibrary/SeleniumLibrary.html#library-documentation-top

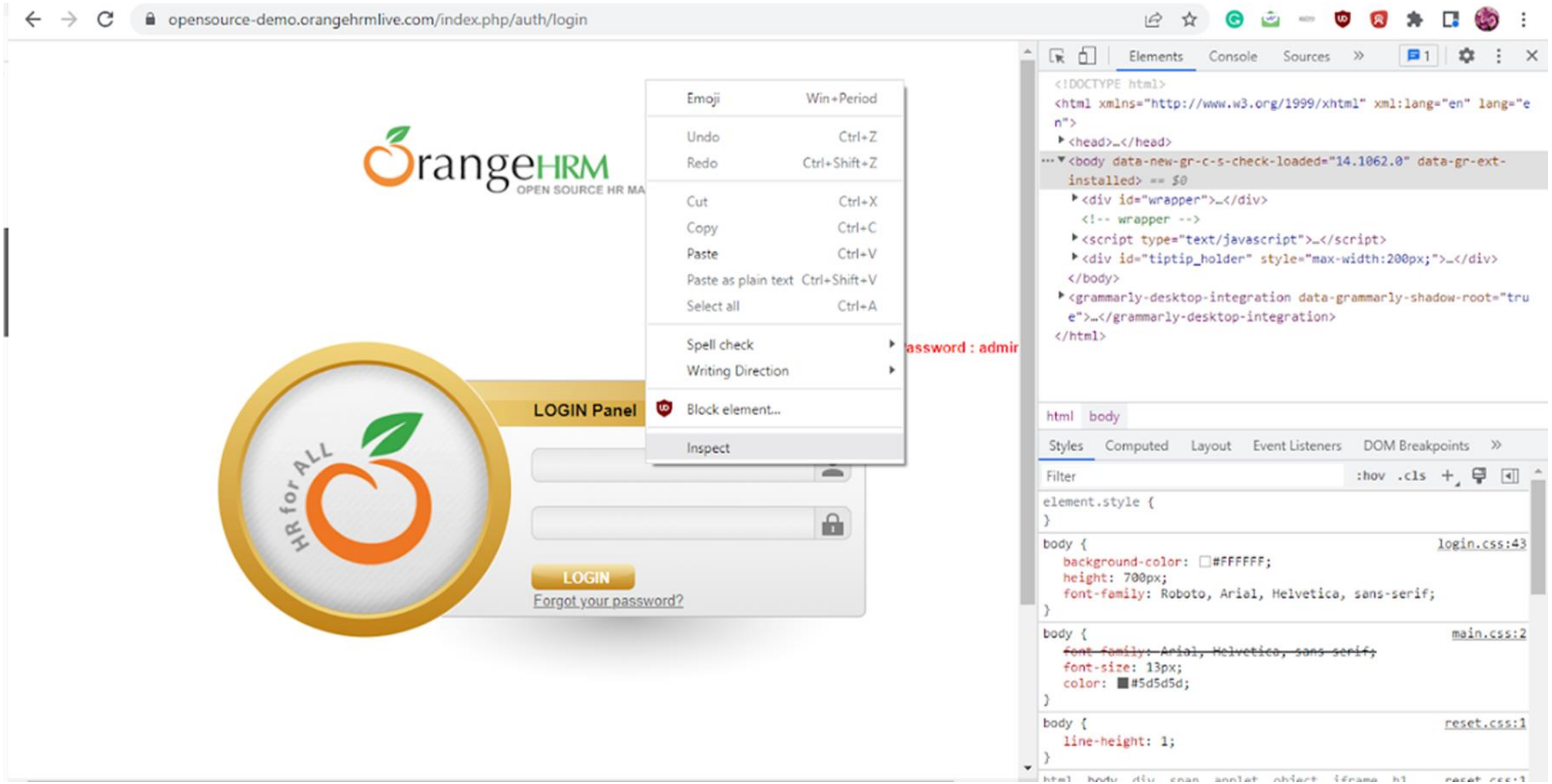
Copy Element (Xpath) in webpage

Steps:

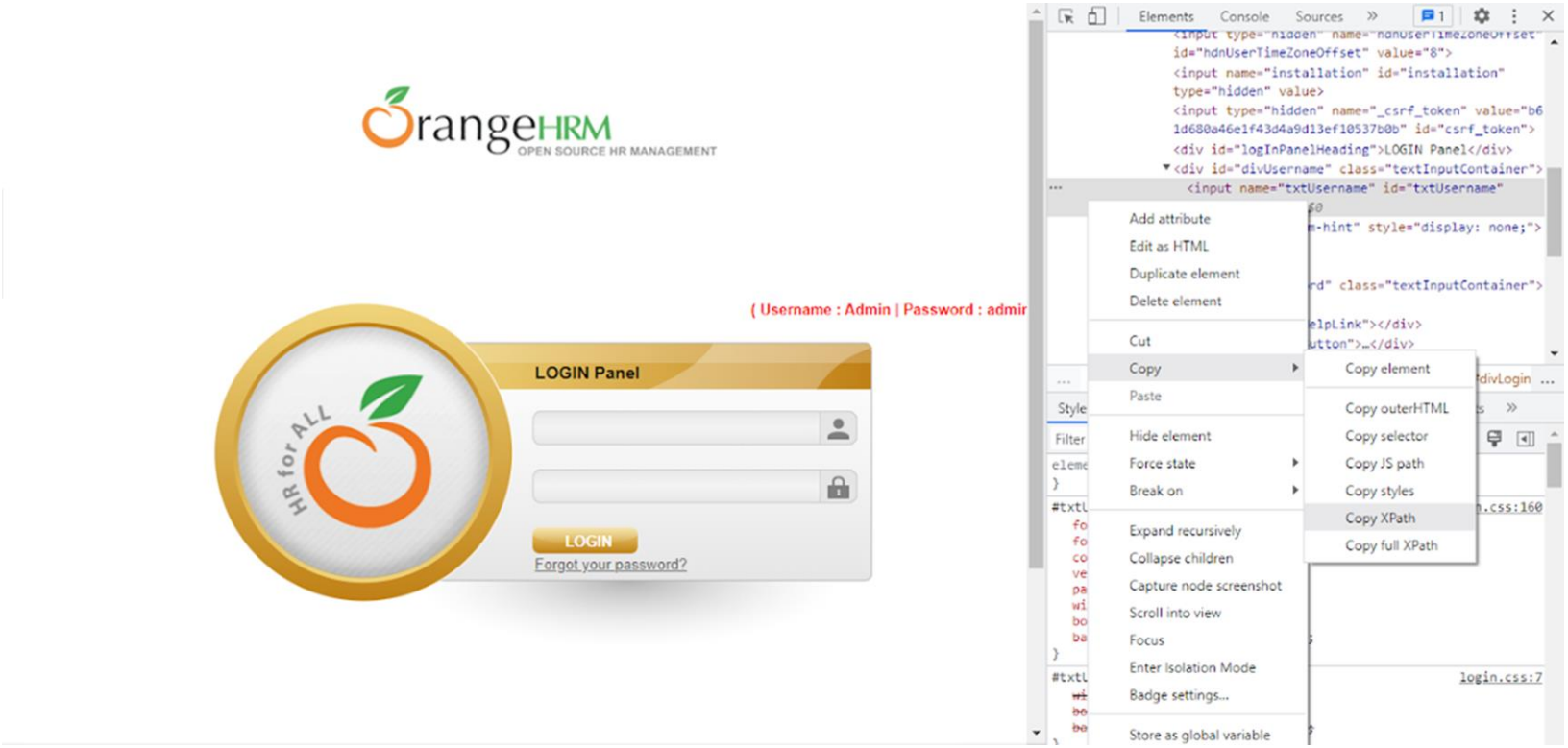
i. Choose element that want to get code

ii. Right click and then click on Inspect

iii. Inspect coding tab is shown on right (or left/below) and it will highlight code that represent


opensource-demo.orangehrmlive.com/index.php/auth/login
OrangeHRM
OPEN SOURCE HR MA
Emoji Win+Period
Undo Ctrl+Z
Redo Ctrl+Shift+Z
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Paste as plain text Ctrl+Shift+V
Select all Ctrl+A
Spell check
Writing Direction
Block element...
Inspect
assword : admir
LOGIN Panel
HR for ALL
LOGIN
Forgot your password?
Elements Console Sources
<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>…</head>
<body data-new-gr-c-s-check-loaded="14.1062.0" data-gr-ext-installed> == $0
…
<!-- wrapper -->
<script type="text/javascript">…</script>
…
</body>
<grammarly-desktop-integration data-grammarly-shadow-root="true">…</grammarly-desktop-integration>
</html>
html body
Styles Computed Layout Event Listeners DOM Breakpoints
Filter :hov .cls
element.style {
}
body { login.css:43
background-color: #FFFFFF;
height: 700px;
font-family: Roboto, Arial, Helvetica, sans-serif;
}
body { main.css:2
font-family: Arial, Helvetica, sans-serif;
font-size: 13px;
color: #5d5d5d;
}
body { reset.css:1
line-height: 1;
}

iv. Right click on the highlight code and click Copy -> Copy XPath



Open Directory Project in RIDE

1. Open RIDE
2. Click ‘File’ on top left. Then choose Open Directory.
3. Then choose project folder that consist testing script

For this tutorial choose ‘Robotframework Testing from documentation’ folder inside ‘Robotframework_ProjectAssignment_Group2’ GitHub repository.

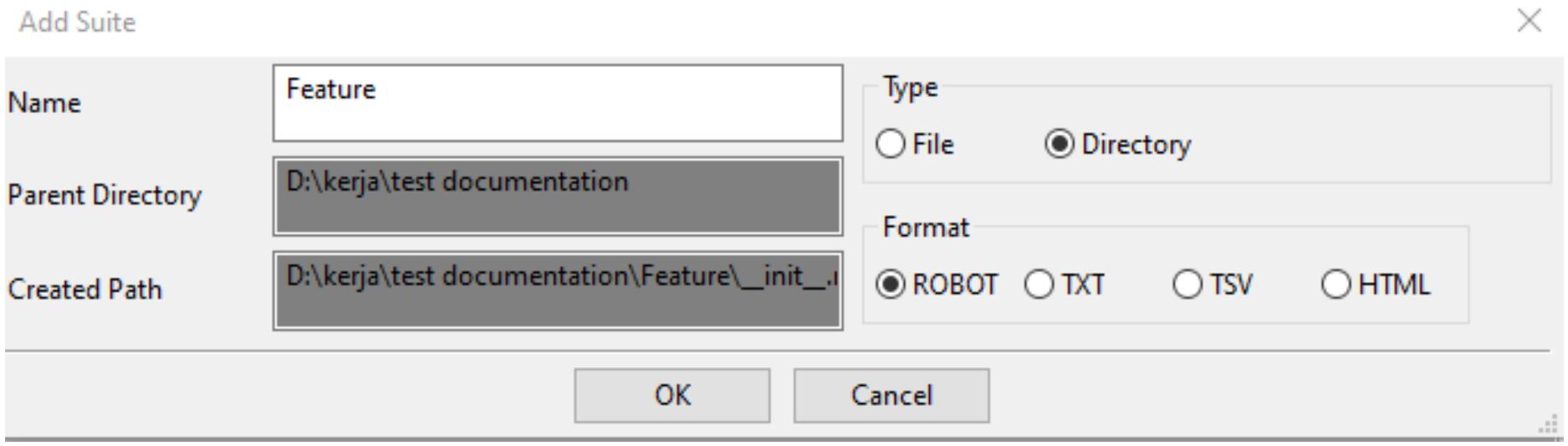
First testing

Success Adding Candidate

Step 1: Create Directory/folder

i. Create new directory/folder (optional) for saving step definitions: Right click on main directory (on left side of RIDE) and choose ‘New Suite’.

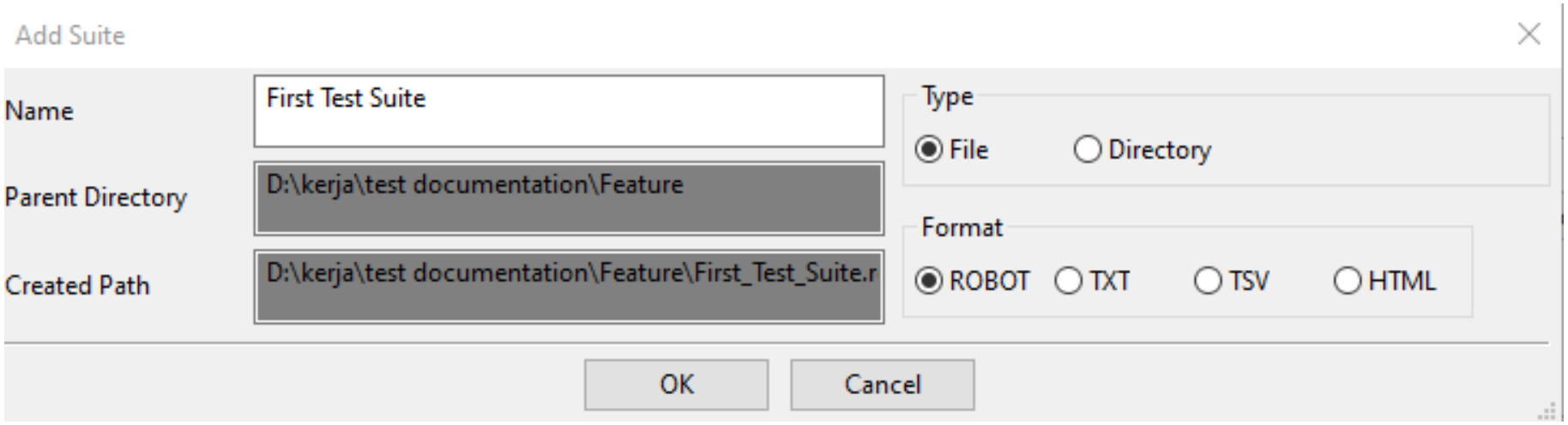
ii. In Add Suite window, change Type from ‘File’ into ‘Directory’. Then click ‘OK’. ‘Feature’ directory can be found under main directory



Step 2: Create Test Suite

i. Right click on Feature Directory and choose ‘New Suite’.

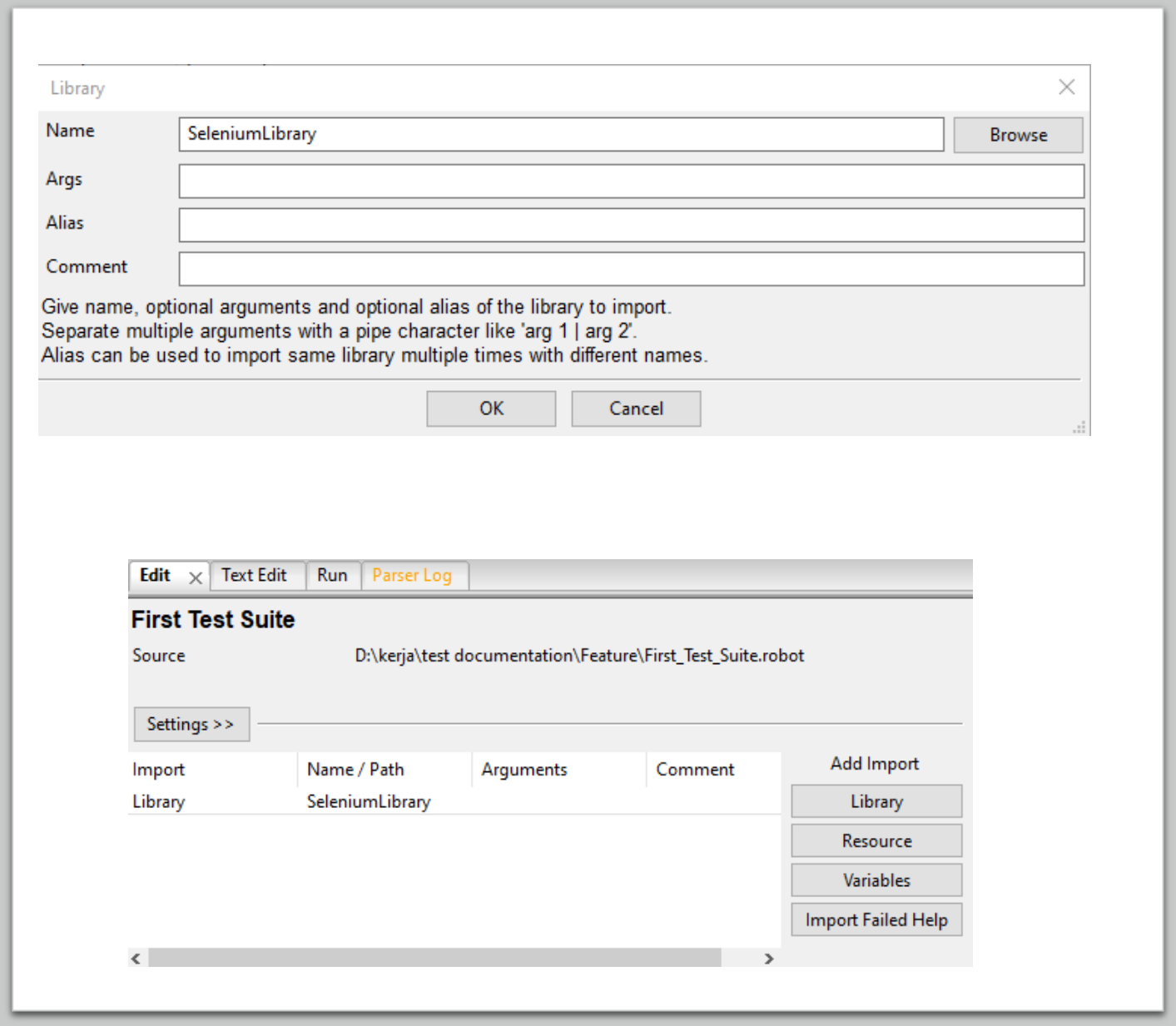
ii. In Add Suite window, named it as ‘First Test Suite’ and then click OK. This test suite can be found under Feature.



Step 3: Import Selenium Library

i. Click on library under 'import' and import Selenium Library by typing: 'SeleniumLibrary'. Then click OK.

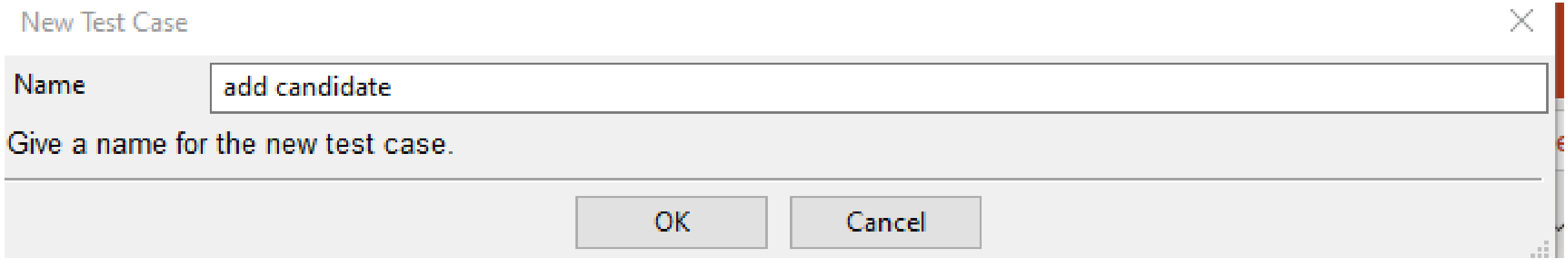
ii. On Edit Section (2nd picture), if colour of SeleniumLibrary is black, it means this library is valid. If colour is red, it means this library is invalid



Step 4: Create Test Case

i. Right click on main directory (on left side of RIDE) and choose ‘New Test Case’.

ii. In Add Suite window, named it as ‘add candidate’ and then click OK. This testcase can be found under Test Suite.



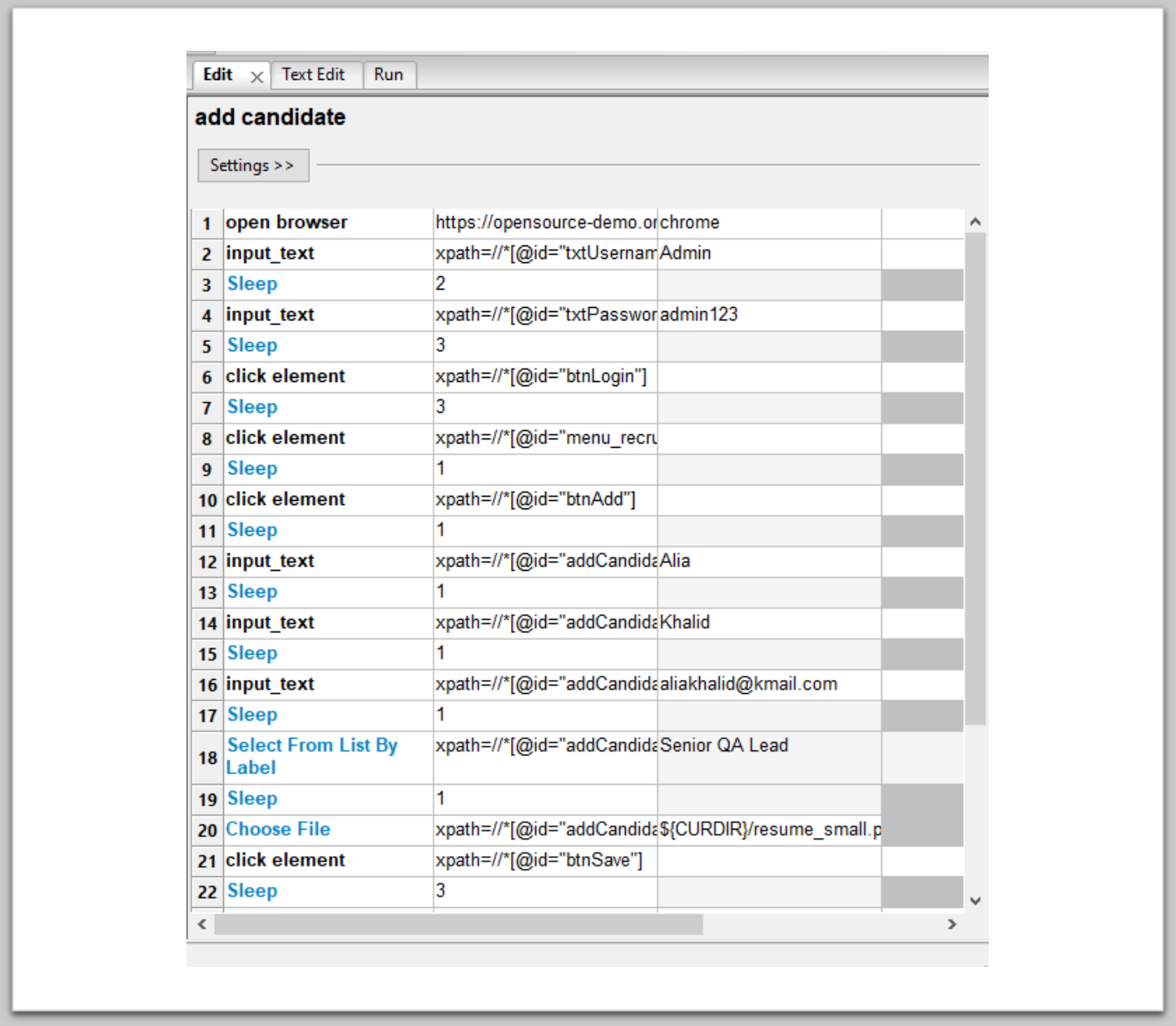
Step 5: Put test steps into Test Case

i. Click on test case and click Edit tab.

ii. In First column, put library keywords based on steps that have planned for this testing

iii. Copy element (Xpath) of object inside webpage. Then put elemets into second column

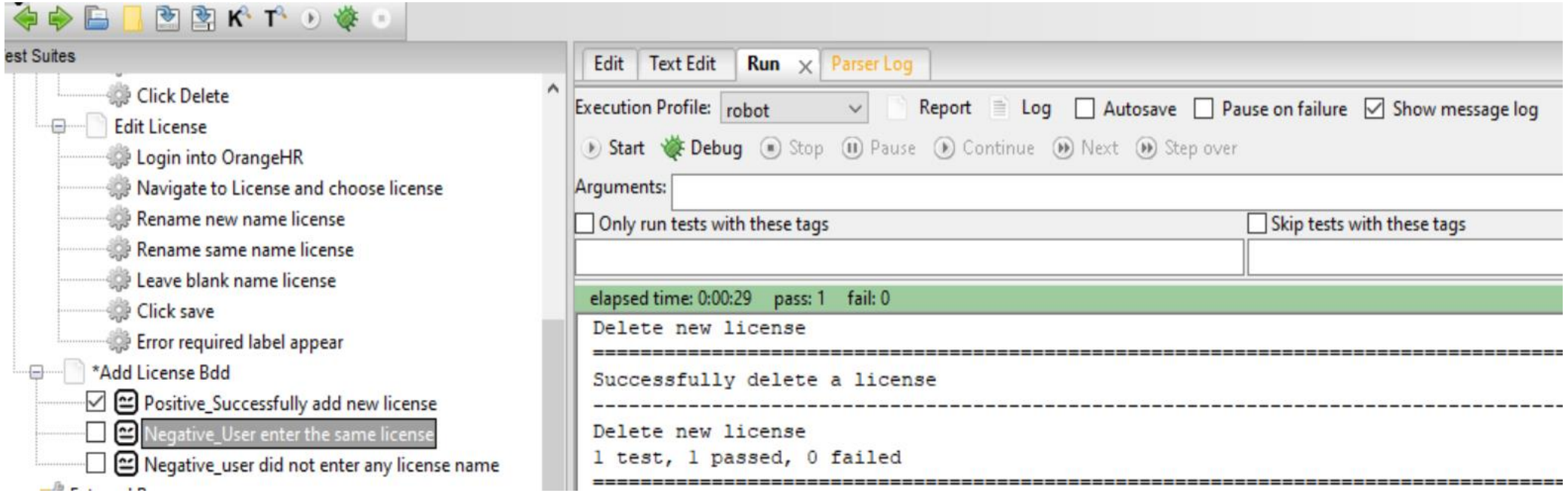
iv. Put value (only for steps that involve test data) into third column



1	open browser	https://opensource-demo.or	chrome
2	input_text	xpath=//*[@id="txtUsernam	Admin
3	Sleep	2	
4	input_text	xpath=//*[@id="txtPasswor	admin123
5	Sleep	3	
6	click element	xpath=//*[@id="btnLogin"]	
7	Sleep	3	
8	click element	xpath=//*[@id="menu_recru	
9	Sleep	1	
10	click element	xpath=//*[@id="btnAdd"]	
11	Sleep	1	
12	input_text	xpath=//*[@id="addCandida	Alia
13	Sleep	1	
14	input_text	xpath=//*[@id="addCandida	Khalid
15	Sleep	1	
16	input_text	xpath=//*[@id="addCandida	aliakhalid@kmail.com
17	Sleep	1	
18	Select From List By Label	xpath=//*[@id="addCandida	Senior QA Lead
19	Sleep	1	
20	Choose File	xpath=//*[@id="addCandida	${CURDIR}/resume_small.p
21	click element	xpath=//*[@id="btnSave"]	
22	Sleep	3	

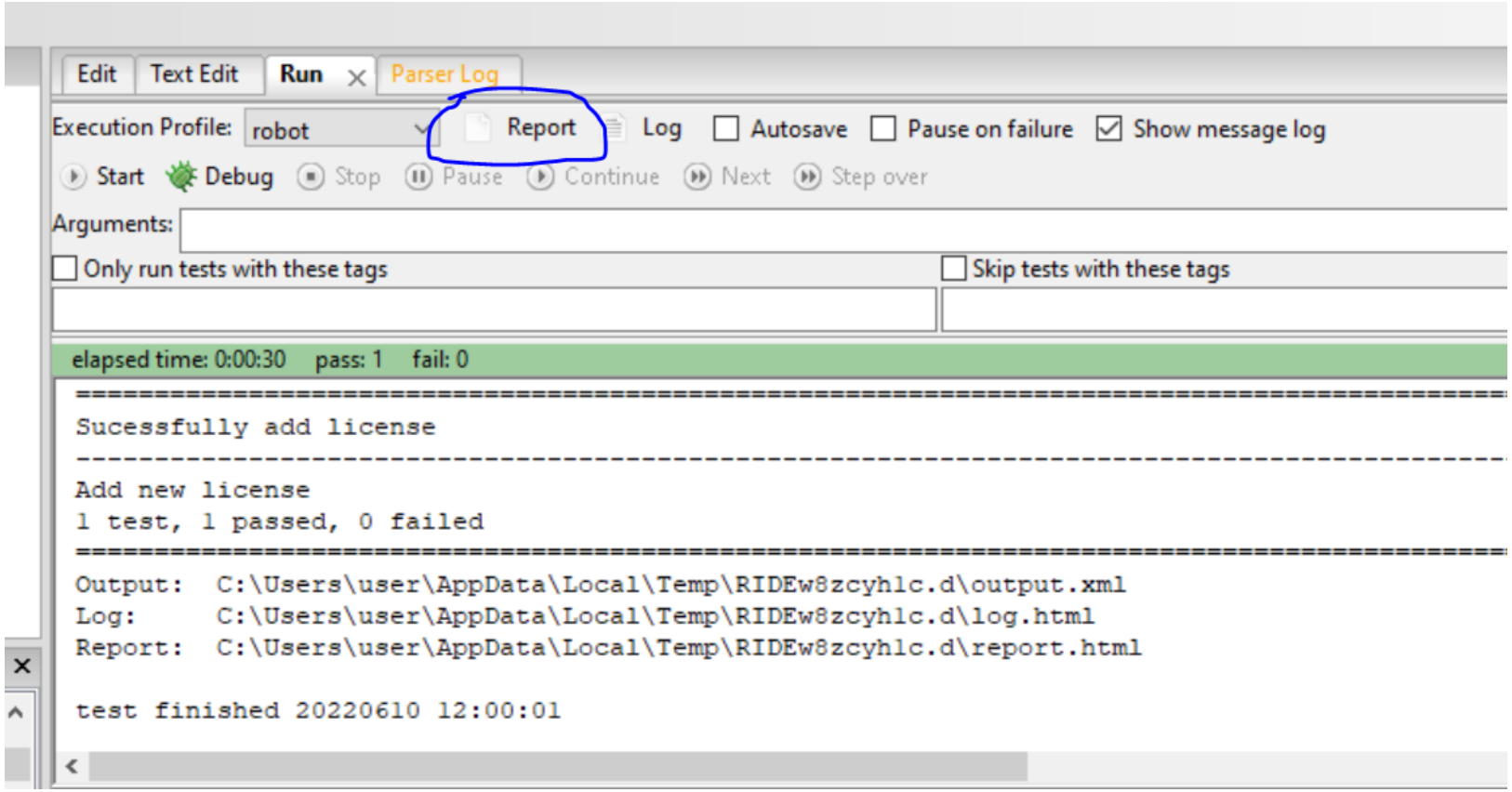
STEP 6: Run test case

i. Tick the test case you want to run.
ii. Go to ‘Run’ tab
iii. Click ‘Start’ robot button.

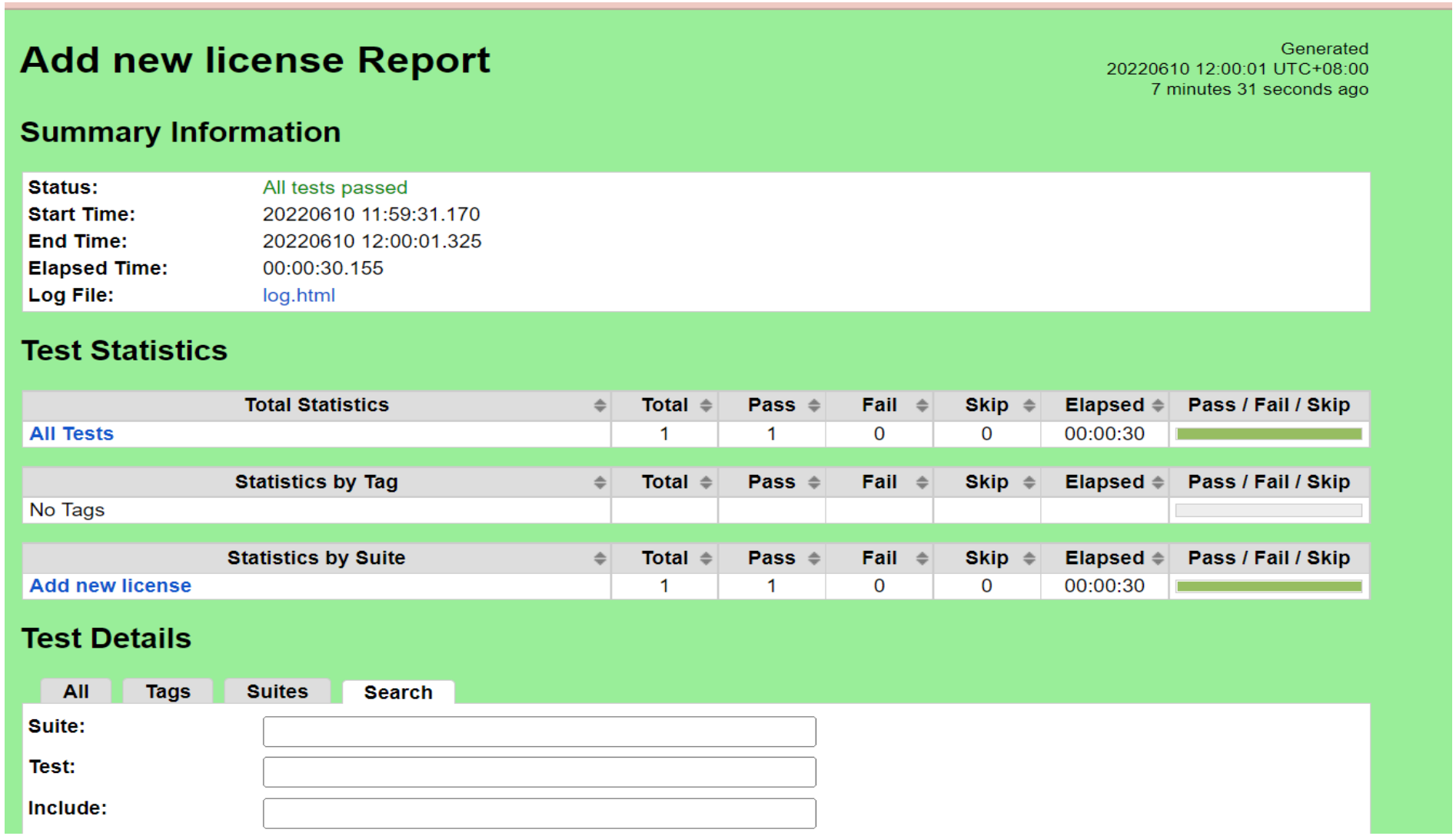


STEP 7: Test case report

- Click report button on ‘Run’ tab to check the report.



Example of test case report



Add new license Report

Generated
20220610 12:00:01 UTC+08:00
7 minutes 31 seconds ago

Summary Information

Status:	All tests passed
Start Time:	20220610 11:59:31.170
End Time:	20220610 12:00:01.325
Elapsed Time:	00:00:30.155
Log File:	log.html

Test Statistics

Total Statistics	Total	Pass	Fail	Skip	Elapsed	Pass / Fail / Skip
All Tests	1	1	0	0	00:00:30	

Statistics by Tag	Total	Pass	Fail	Skip	Elapsed	Pass / Fail / Skip
No Tags						

Statistics by Suite	Total	Pass	Fail	Skip	Elapsed	Pass / Fail / Skip
Add new license	1	1	0	0	00:00:30	

Test Details

All | Tags | Suites | Search

Suite:

Test:

Include:

To make testing process become proper, advance and easily, there are several features/setting that we will learn:

- Test Setup
- Test Teardown
- Variable
- Keywords File
- Resource File

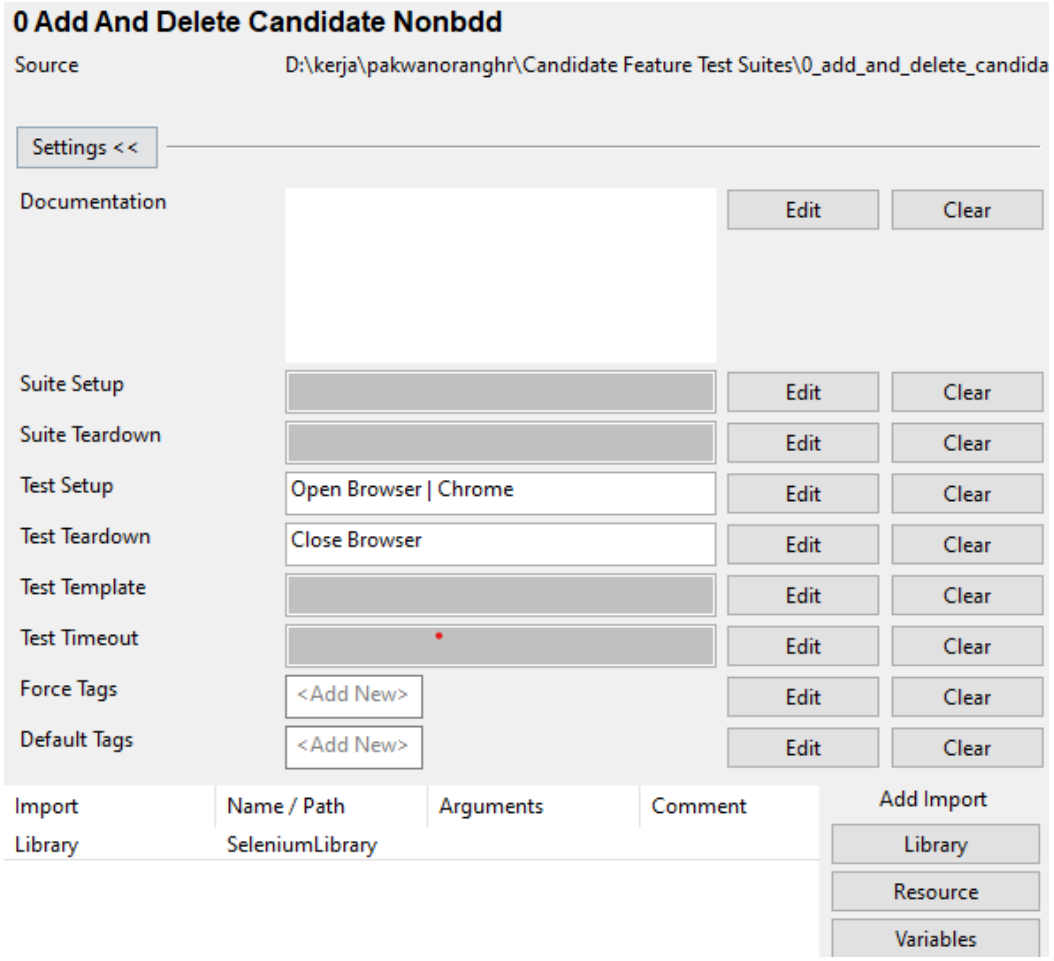
Test Setup and Teardown

Test Setup and Test Teardown

Test Setup: keyword/step that is executed before a test case(s)

Test Teardown: Keyword/step that is executed after a test case (s)

- Both can be set in Test Suite.
- Steps
  i. Go to test suite in Edit tab
  ii. Click Setting
  iii. Find Setup and Teardown and click 'Edit'
  iv. Put keyword/step



- But only one keyword/step can be set for both.
- To have keywords/steps in setup and teardown, keywords file should be created and set to both

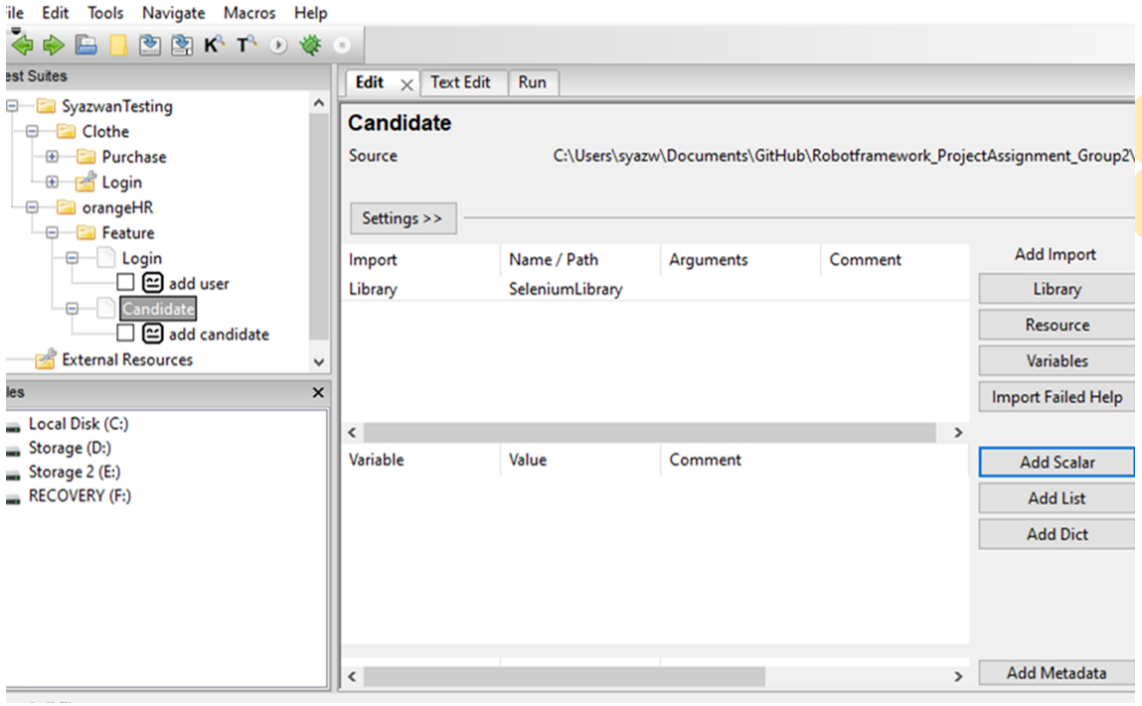
Variable, Keywords File and Resource File

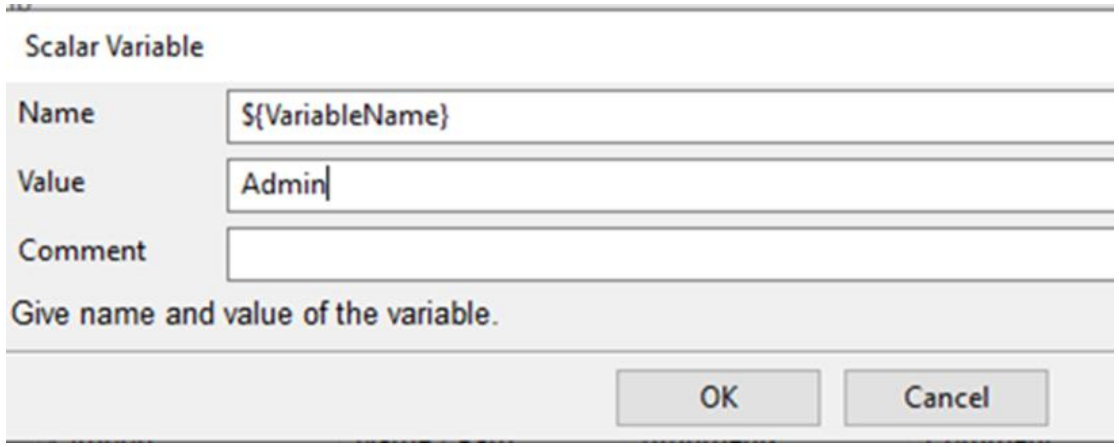
Steps (using edit tab)

i. Navigate to Test Suit

ii. Click on ‘Add Scalar’ on right bottom (1st picture)

iii. Add Scalar window is popup, write variable name inside {} and put value that you want (2nd picture)





iv. Now go to test case

v. To add variable, write ${Variablename} on third column as shown below:

3	input_text	xpath=//*[@id="txtUsernam	${VariableName}

*If colour of Variable is green, it means this variable is existing. But if its colour is light purple/pink, it means this variable is not existing.

Keywords File

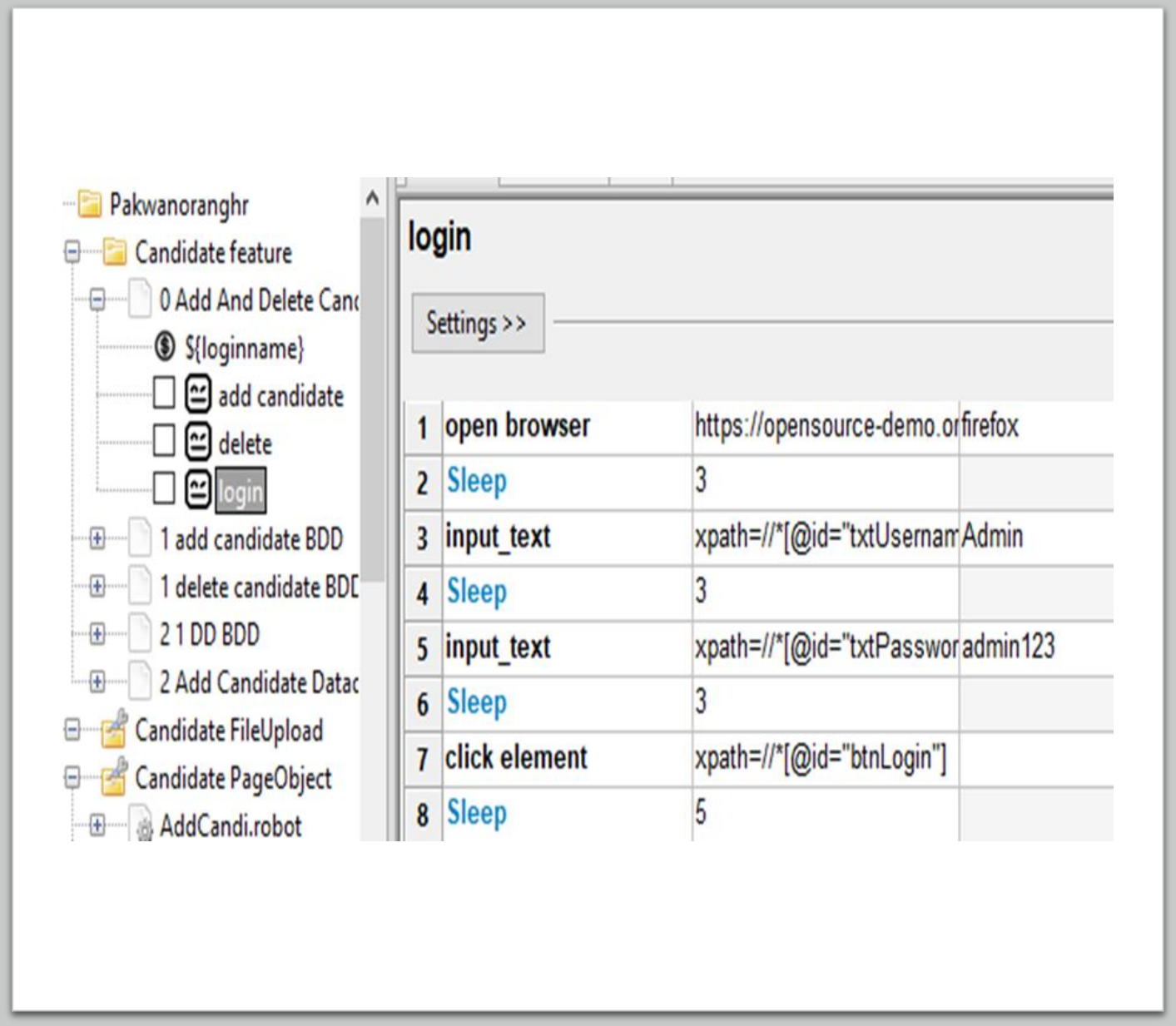
Combining existing keywords/test steps together

Steps:

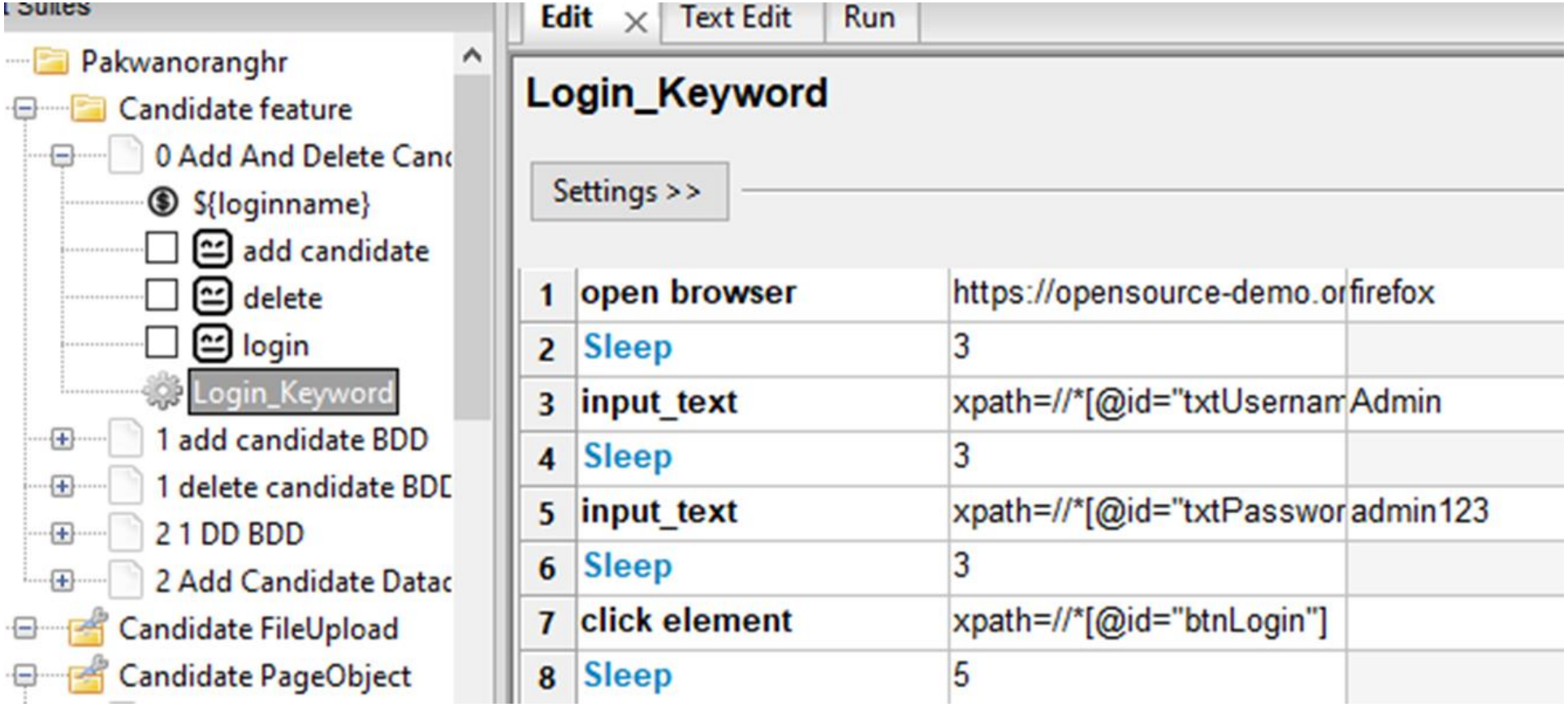
i. Select any test case inside test suite. Inside test case, there are many keywords/test steps.

ii. Main objective for this is creating keywords file so it can be set on Test Setup.

iii. Select on test suite and then right click-> New User Keywords to create keywords file

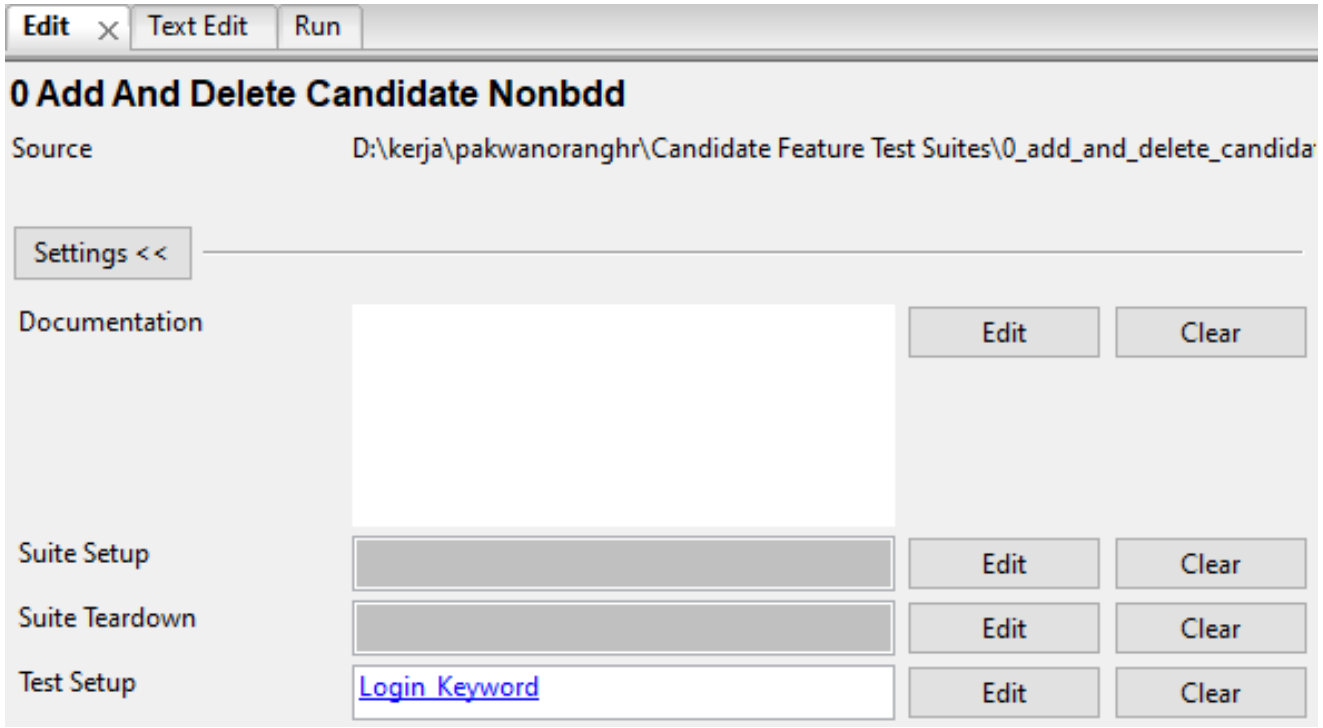


iv. Inside keywords file, copy/write keywords/test steps



v. After that, go to login test cases and delete (if you want).

vi. Go to Test Suite -> Setting. And then put keywords file name on Test Setup



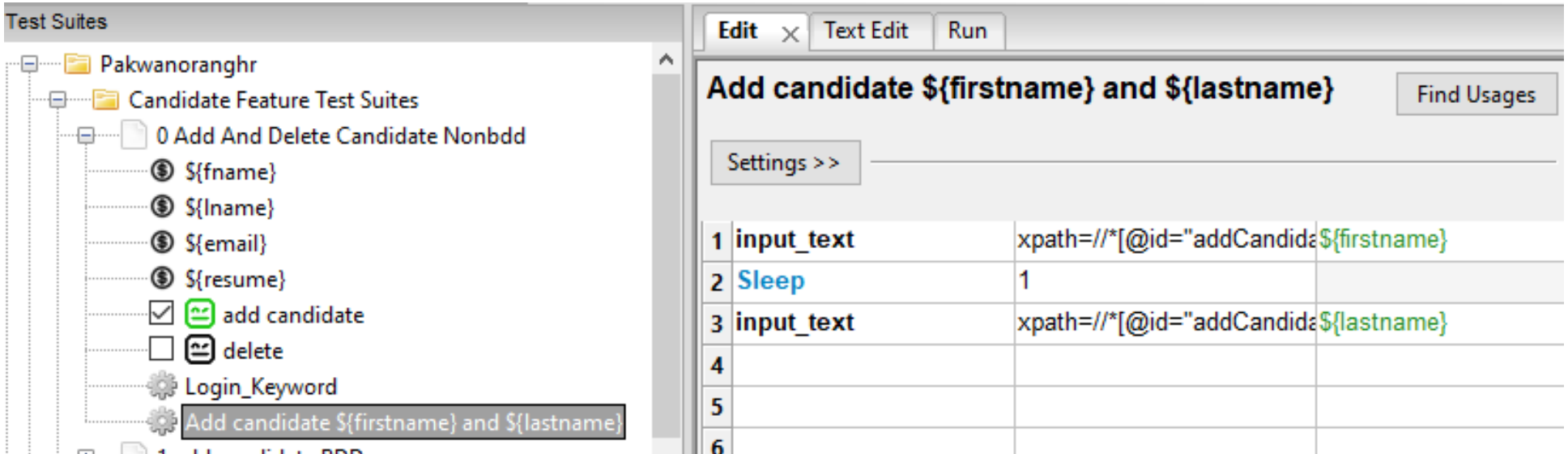
vii. This test case can be run

There is Keywords file that can link with variables.

i. Create keywords file and name it with any name include the variable

Example: Add candidate ${firstname} ${lastname}

ii. Put keywords/steps that related to those variable. After that, put variable names on third column and row that related



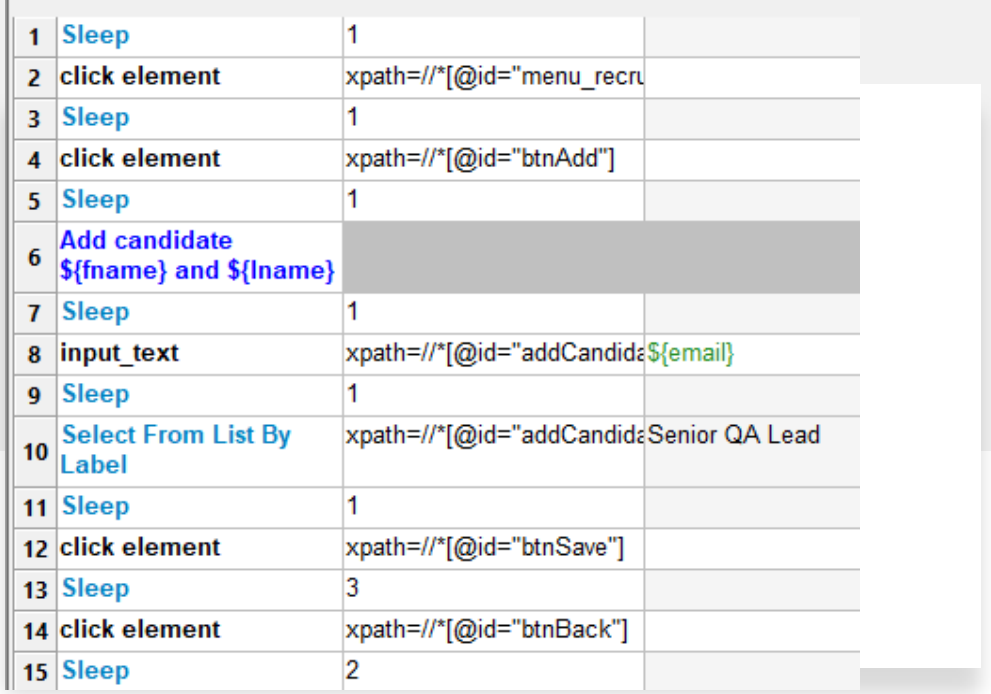
iii. Go to test case Add Candidate, replace those two input steps with:

Add candidate ${fname} ${lname}

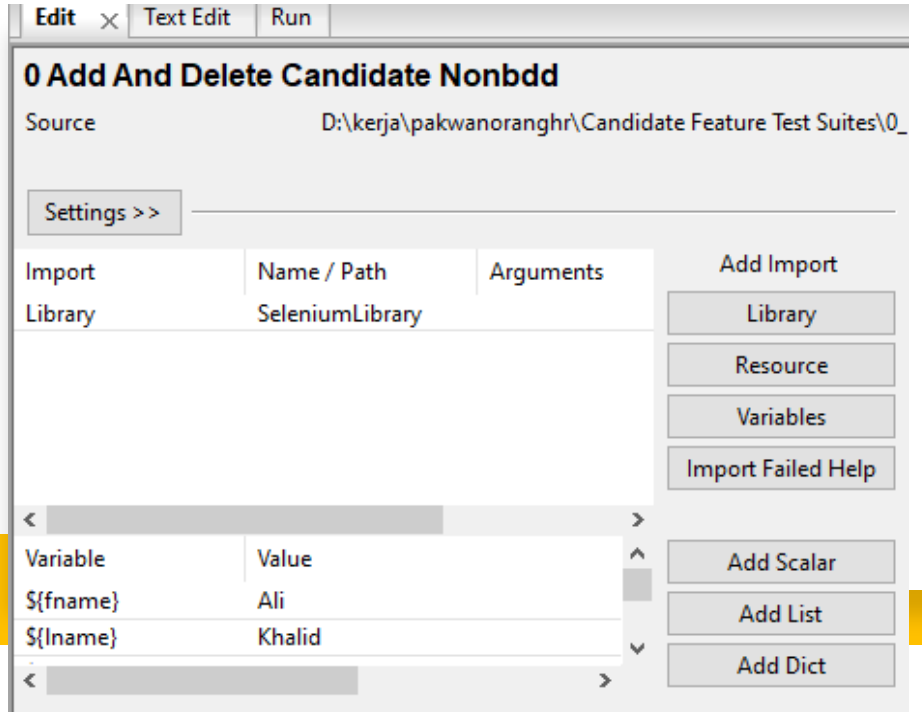
Refer 1st picture

Note: Make sure name of variables are same with variable in test suite, not with keywords file name (refer 2nd pivture)

iv. Test case can be run.



1	Sleep	1	
2	click element	xpath=//*[@id="menu_recru	
3	Sleep	1	
4	click element	xpath=//*[@id="btnAdd"]	
5	Sleep	1	
6	Add candidate ${fname} and ${lname}		
7	Sleep	1	
8	input_text	xpath=//*[@id="addCandida	${email}
9	Sleep	1	
10	Select From List By Label	xpath=//*[@id="addCandida	Senior QA Lead
11	Sleep	1	
12	click element	xpath=//*[@id="btnSave"]	
13	Sleep	3	
14	click element	xpath=//*[@id="btnBack"]	
15	Sleep	2	



For more detail by looking test suite that used setup, teardown, variable and keyword file, can refer to '1 Adding Candidate More Setting' test suite

Resource File

- *Keywords and variables from test suite A cannot be used on another test suits*
- *Resource files* provide a mechanism (keywords and variable) for sharing them

Steps:

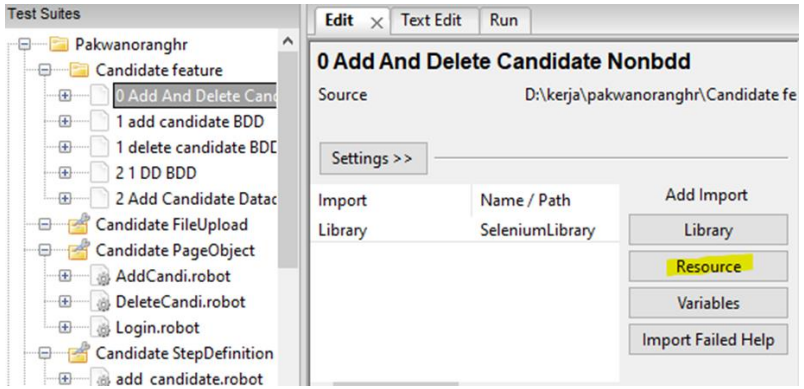
i. Create scenarios resource by right click on main folder (or other folder/directory) and click ‘New Resource’.

ii. ‘New resource file’ window will be popped up. Give a name and click ‘OK’.

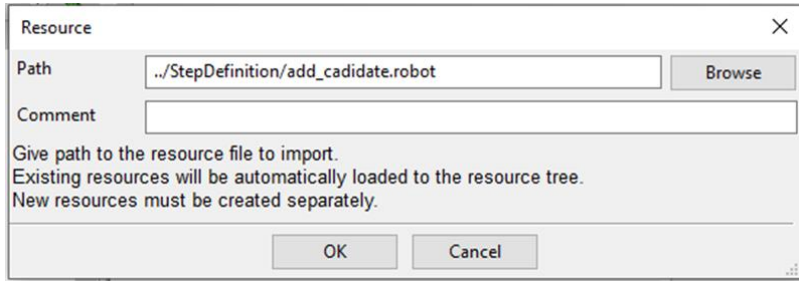
iii. Click on that scenarios resource file

iv. You can create variables or keywords inside resource file.

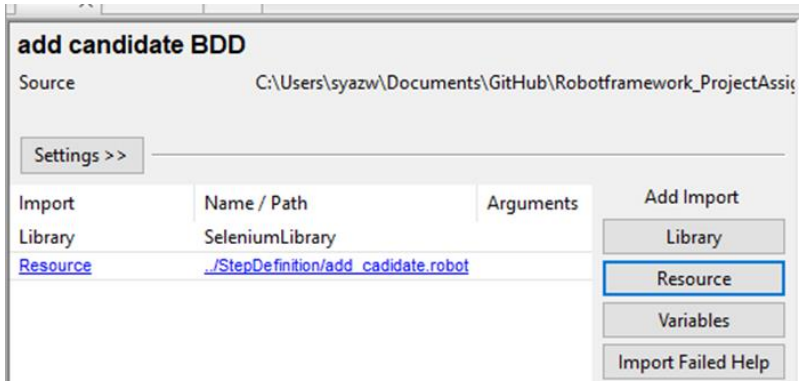
v. Go to any test suite. Then, click ‘Resource’ under Add Import



vi. Resource’ window will be popped up. Browse scenario resource file as shown in below and click OK.



vii. The list of added library and resource is shown. If library and resource are invalid, colour of library and resource word become red.



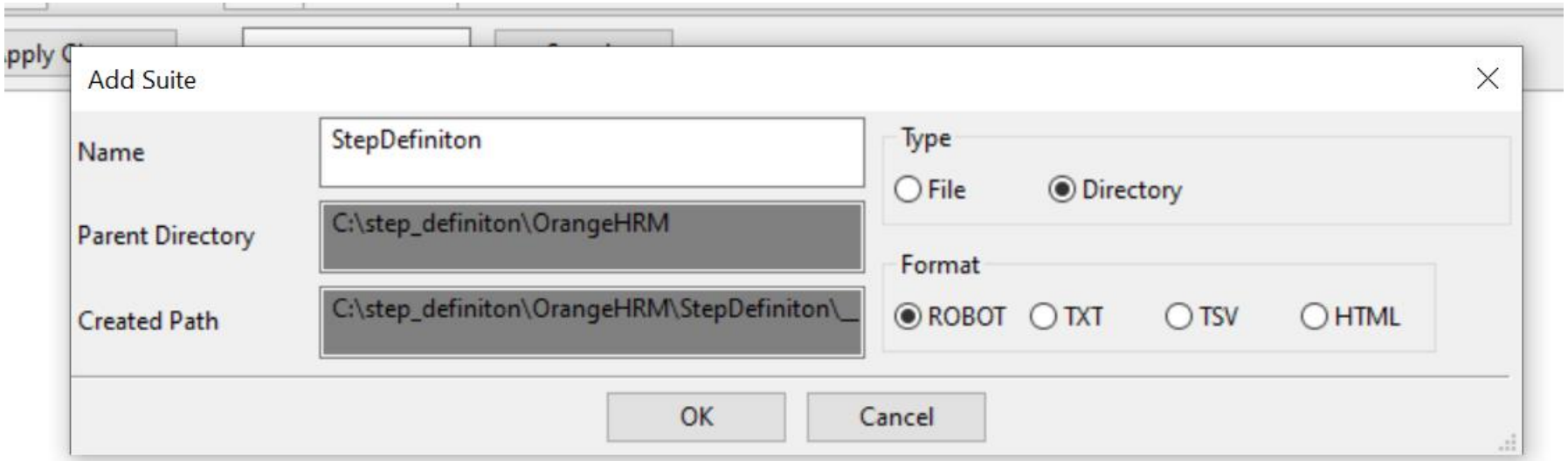
Behavior-driven development

Behavior-driven development

- BDD is method when an application is documented and designed around the behavior a user expects to experience when interacting with it.
- BDD helps to avoid bloat, excessive code, unnecessary features or lack of focus from developer and others.

STEP 1 : Create StepDefinition directory folder

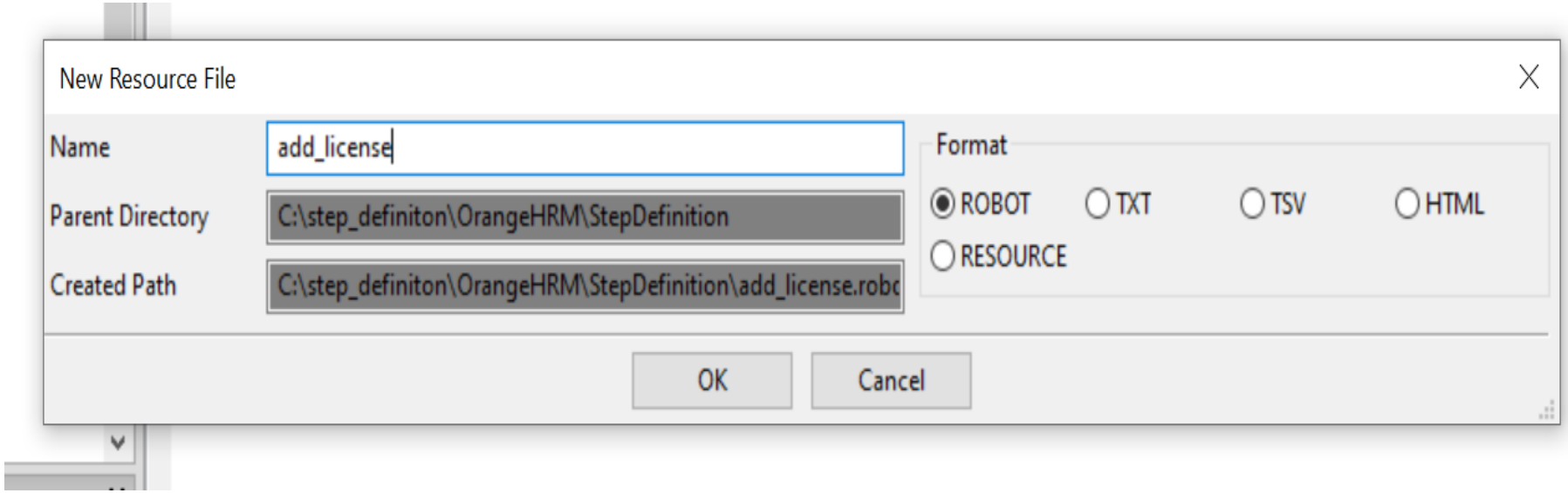
i. Create new project
ii. Right-click on the project and choose new suite. Select the type as ‘Directory’ and format ‘ROBOT’.
iii. Name the file as ‘StepDefinition’ then click OK.



STEP 2: Create Step Definition directory folder

i. Right-click on the StepDefiniton file and choose new resource. Name the file. Eg: Add_license.robot

ii. Choose format ‘ROBOT’. Then click ‘OK’



STEP 3: Import library & resources

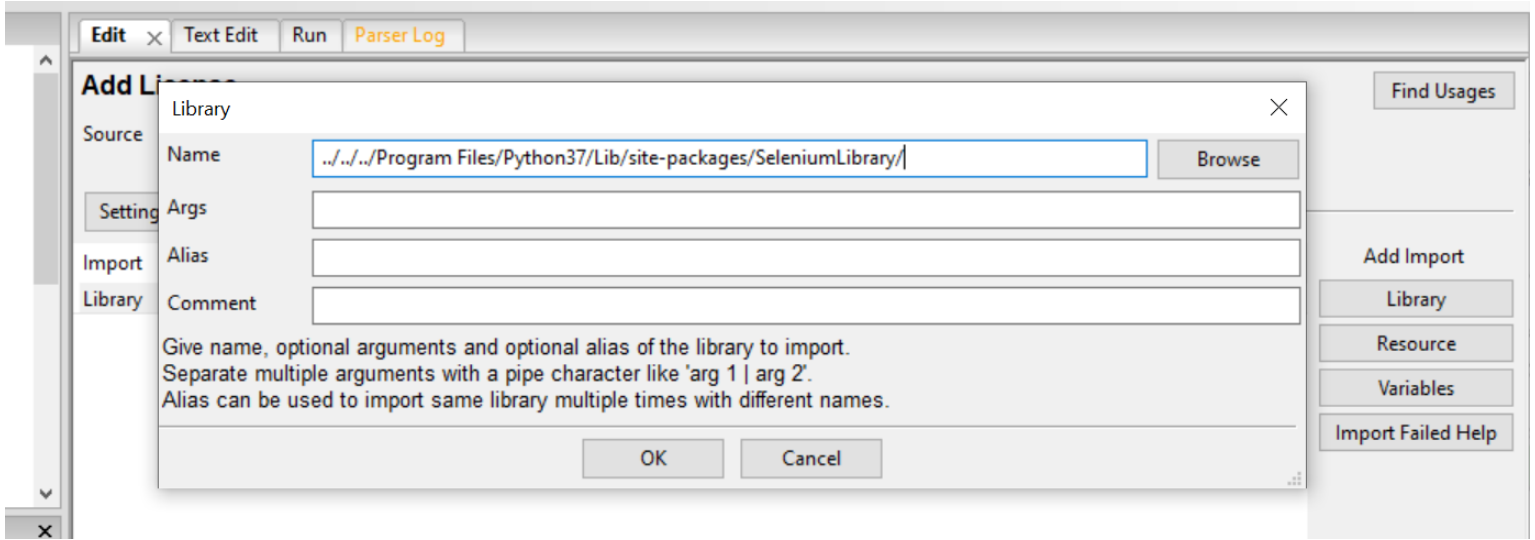
i. Click on the ‘add_license.robot’ resources file

ii. Click edit. Then click on ‘Library’ on the right-side.

iii. Browse and choose your Selenium library folder.

iv. Click ‘OK’

v. Click ‘Resources’ to add other resources file

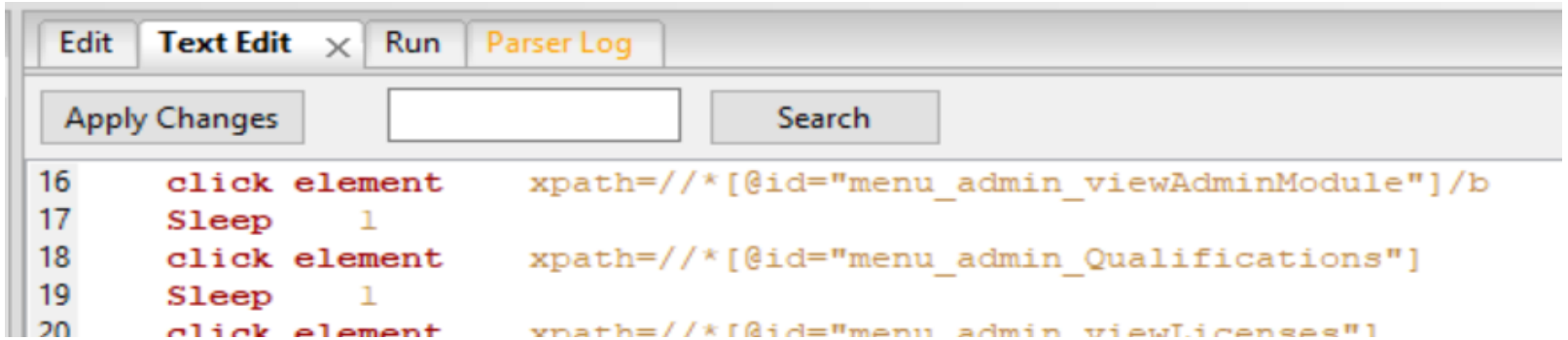


STEP 4 :Create user keyword

There is two ways two create user-keyword

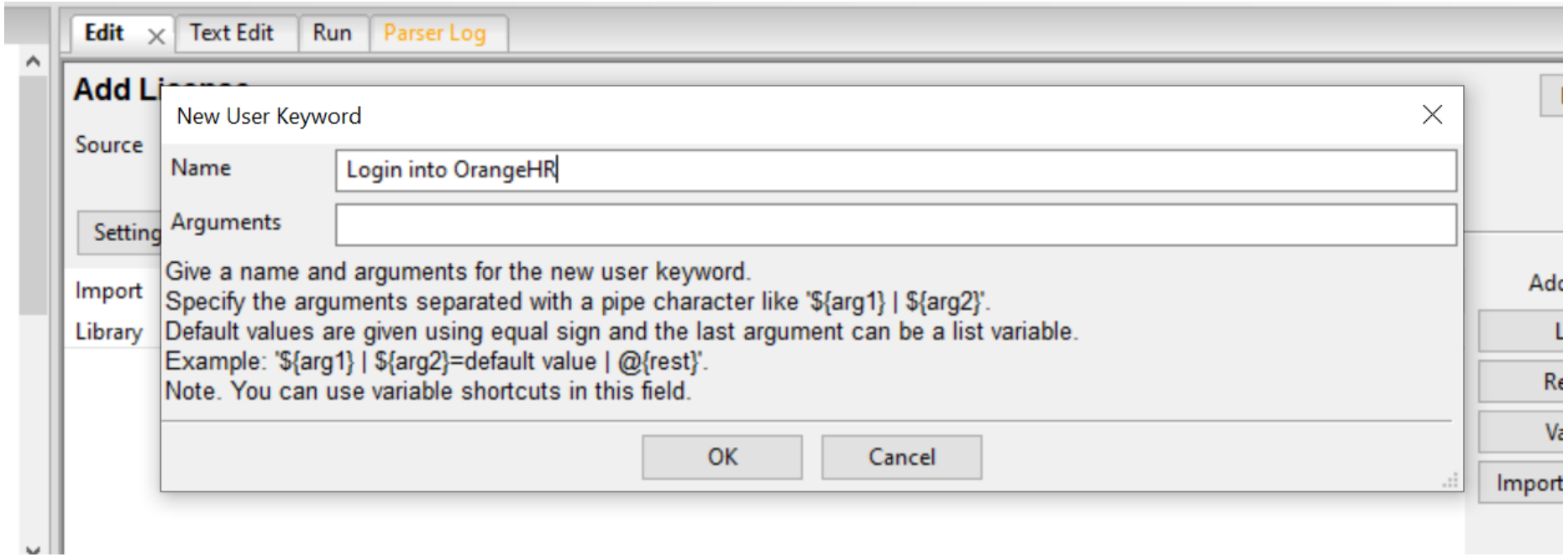
i. Tab ‘Edit’

ii. Tab ‘Text Edit’



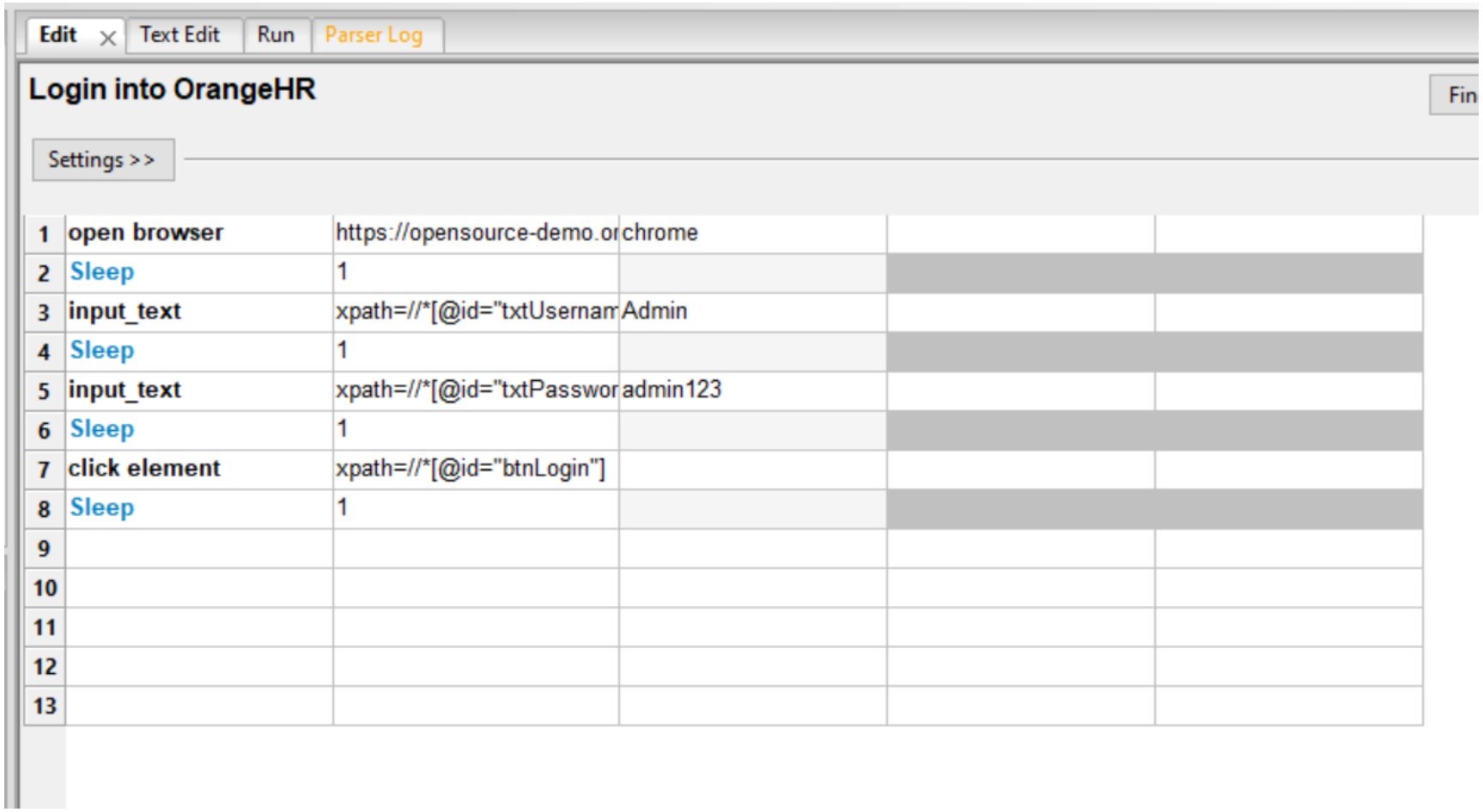
STEP 4.1: Create user keyword (Tab ‘edit’)

i. Right-click on resource file eg: add_license.robot
ii. Select new user keyword
iii. Enter new user keyword and click ‘OK’



Write steps, xpath and value into scenario file as shown in below:

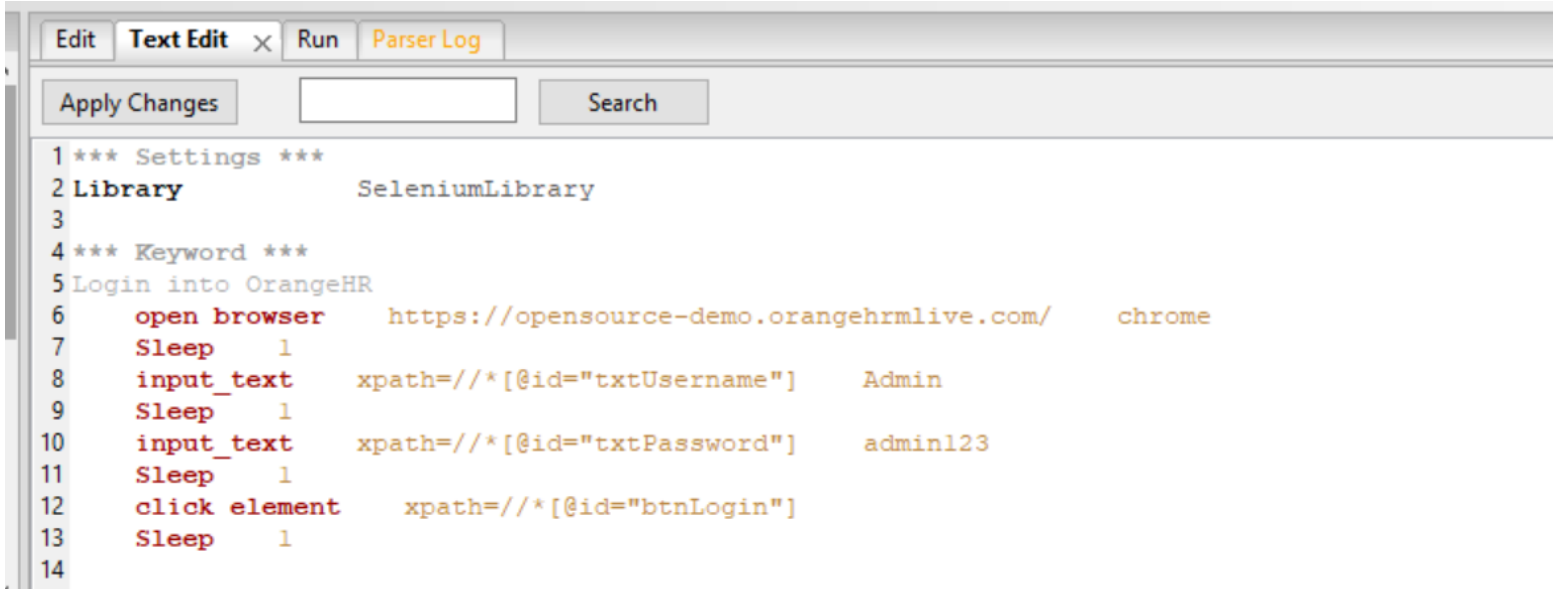
Then, save the file.



1	open browser	https://opensource-demo.or	chrome		
2	Sleep	1			
3	input_text	xpath=//*[@id="txtUsernam	Admin		
4	Sleep	1			
5	input_text	xpath=//*[@id="txtPasswor	admin123		
6	Sleep	1			
7	click element	xpath=//*[@id="btnLogin"]			
8	Sleep	1			
9					
10					
11					
12					
13					

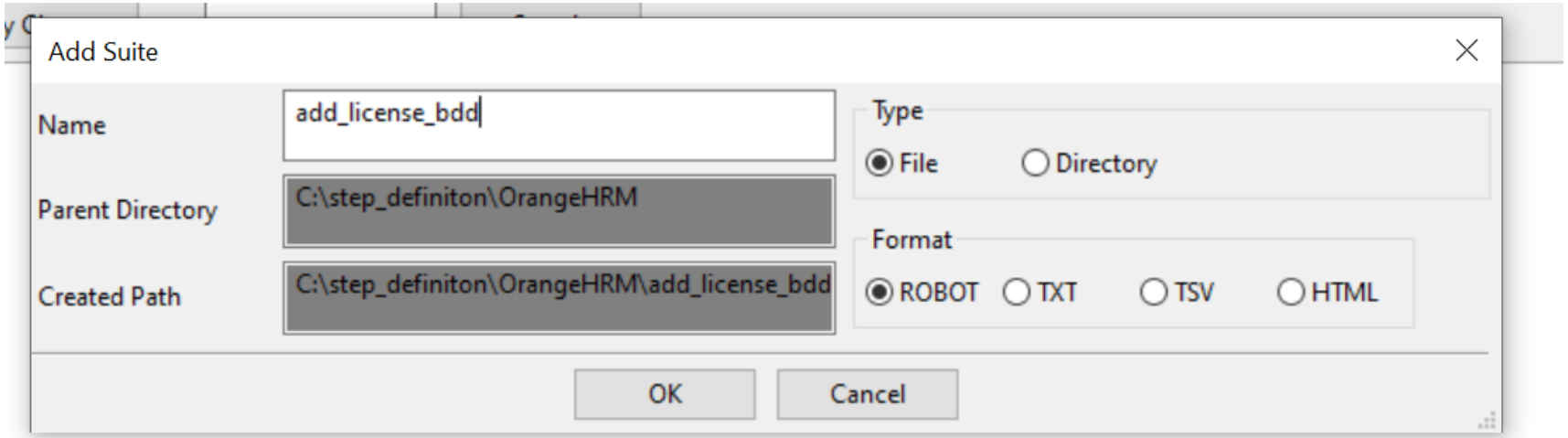
STEP 4.2 : Create user keyword (Tab ‘Text edit’)

i. Directly click on ‘Text Edit’ Tab
ii. Write steps, xpath and value into scenario file as shown in below:
iii. Then save the file



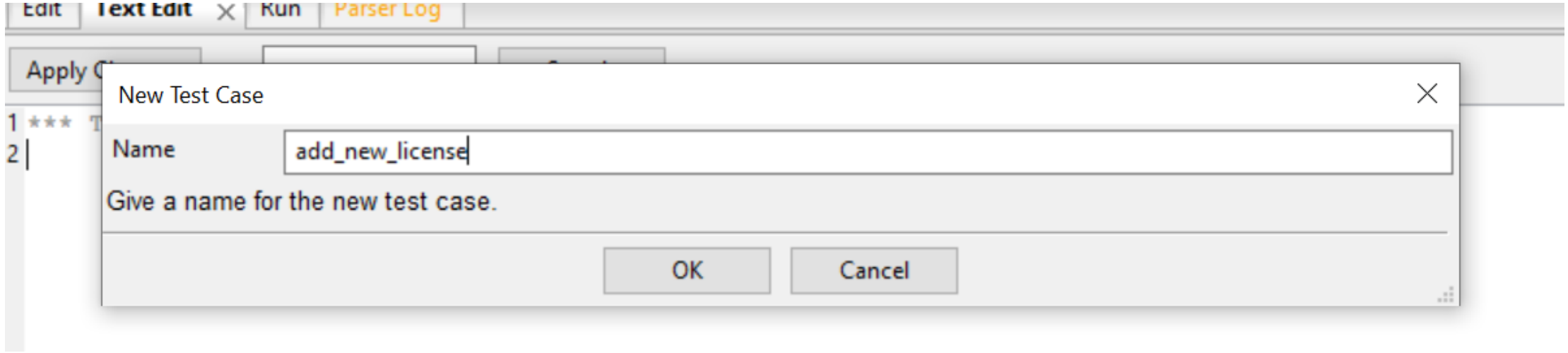
STEP 5 : Create new suite for BDD

i. Right-click on feature folder and choose new suite
ii. Name the BDD file eg: add_license_bdd
iii. Choose type ‘File’ and format ‘ROBOT’ then click ‘OK’



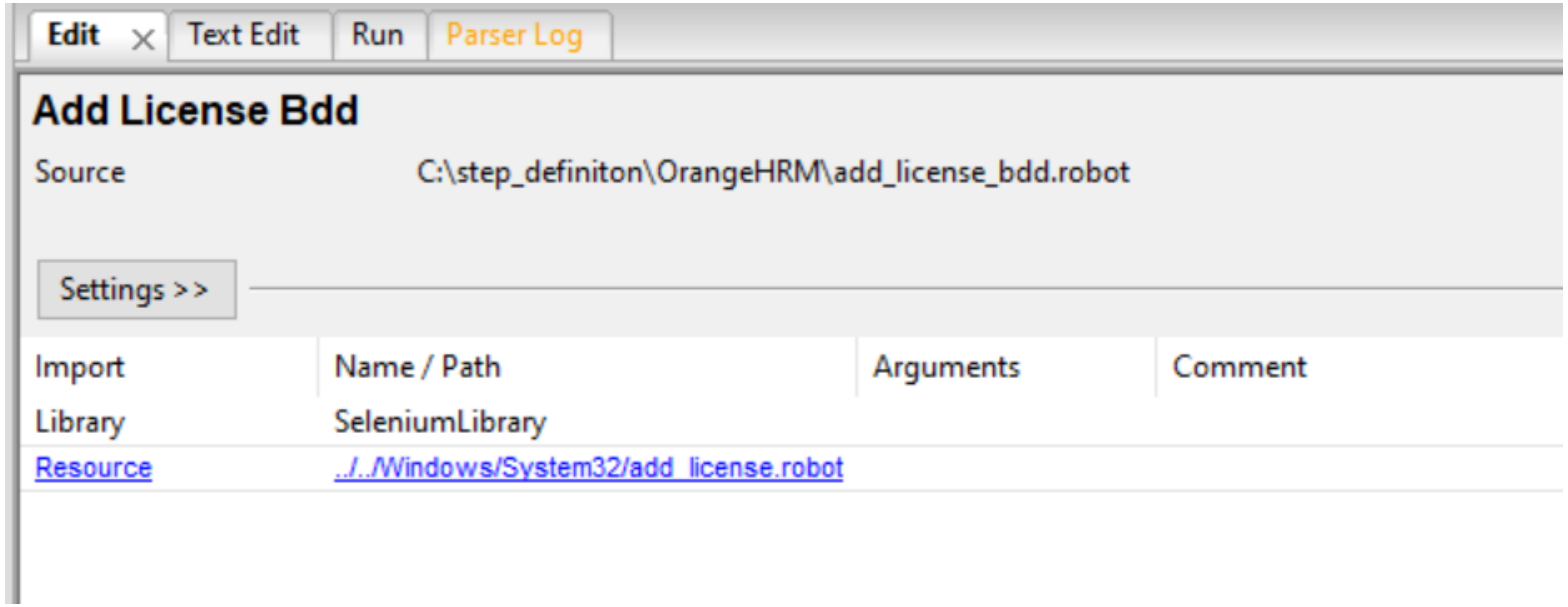
STEP 6 : Create new test case

i. Right-click on BDD test suite file and choose new test case.
ii. Name the tase case. Eg: add_new_license
iii. Click ‘OK’



STEP 7 : Import library and resources

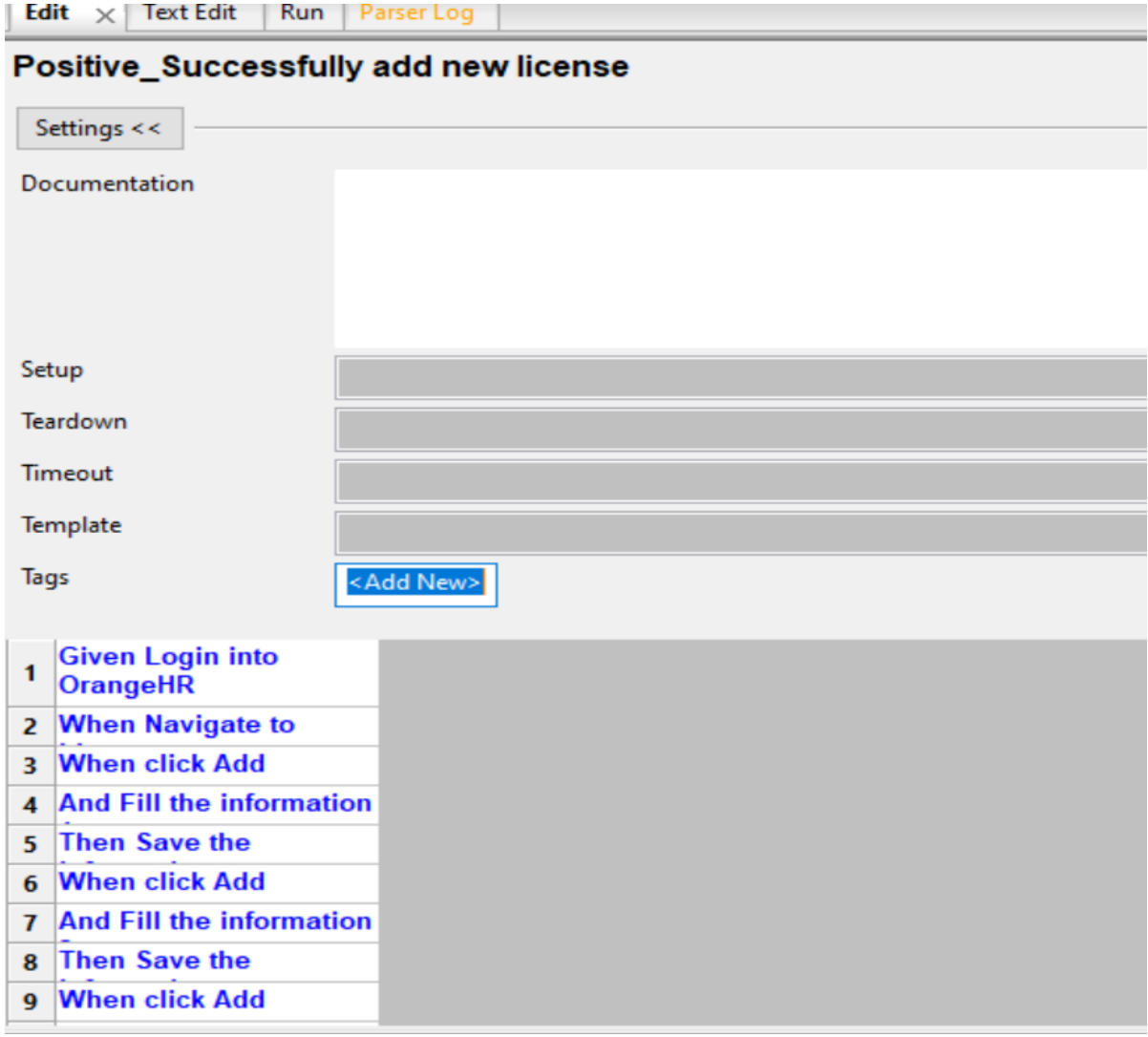
i. Click on library and import Selenium Library
ii. Click on resources and import your resources file
iii. Then, click ‘OK’



STEP 8 : Write scenarios

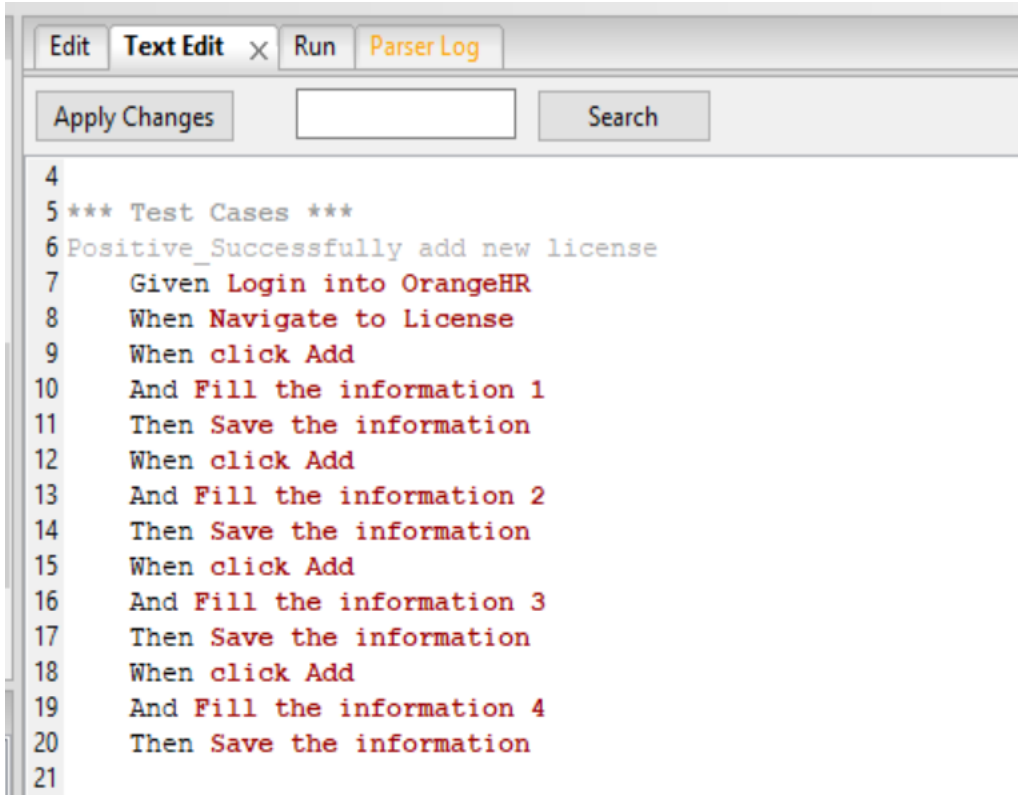
i. You can write and edit your scenarios through ‘Edit’ tab

ii. If the colour turn out ‘blue’ means the scenarios written are valid from your resources file.



STEP 9 : Write scenarios

i. You can also write and edit your scenarios through ‘Text Edit’ tab



STEP 10: Run test case

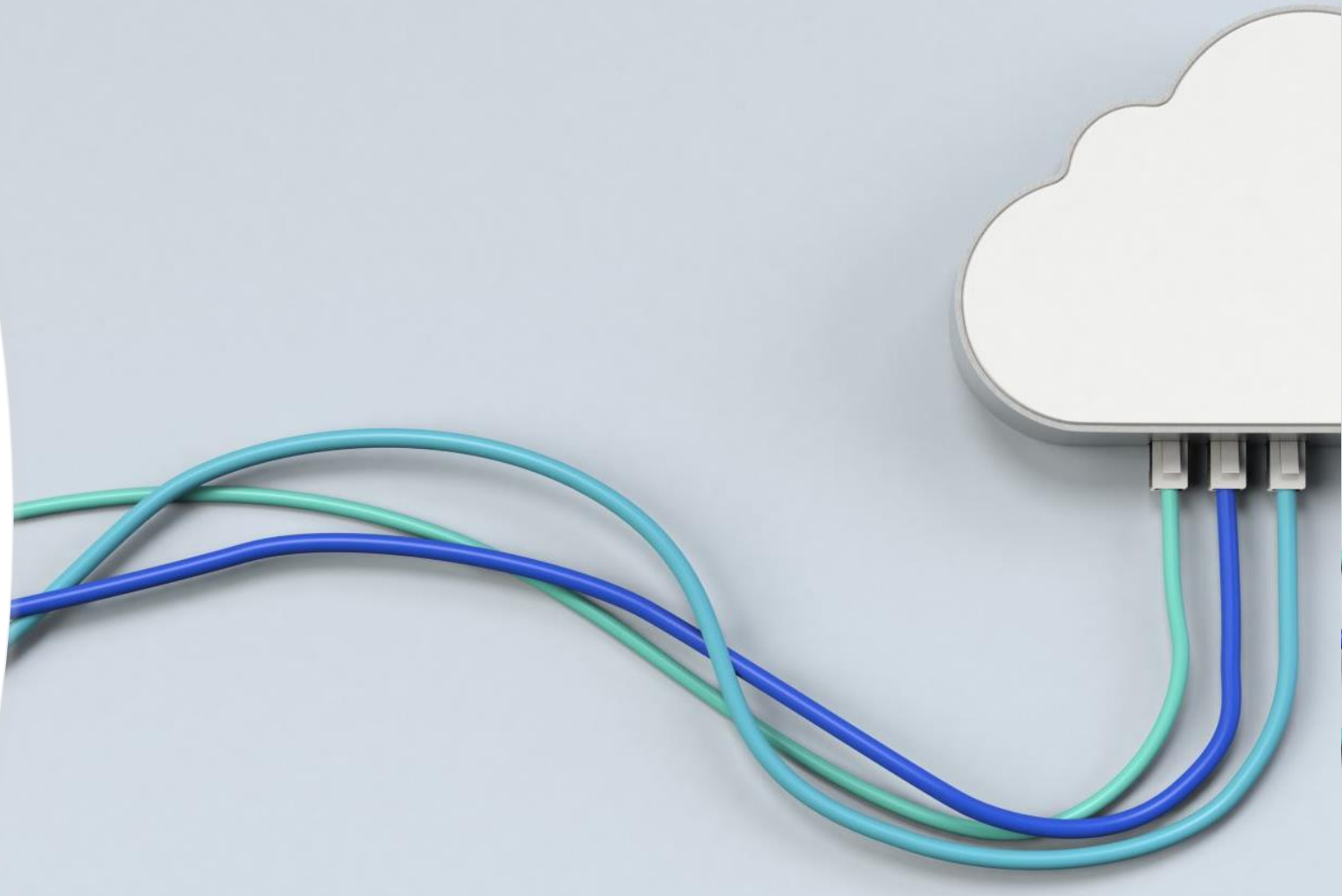
i. Tick the test case you want to run.
ii. Go to ‘Run’ tab
iii. Click ‘Start’ robot button.

STEP 11: Test case report

i. Click report button on ‘Run’ tab to check the report.

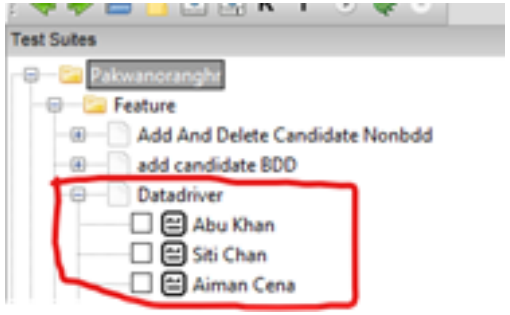
Data Driven (DD)

*Learn creating keywords and variable first

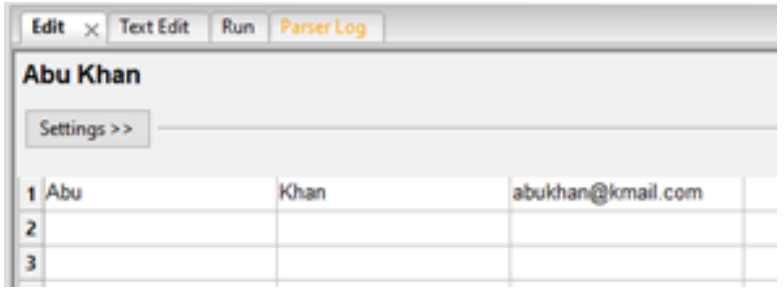


Steps:

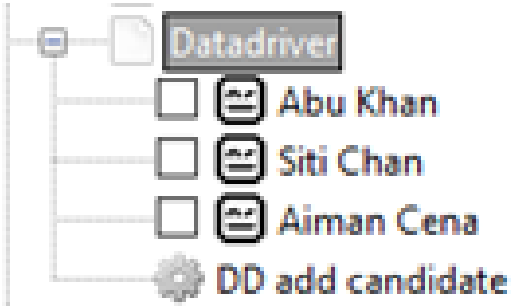
1. Create test suite for data driven testing (e.g: named as Data Driven)
2. Create test cases that represent data. For this example, create three test cases



3. Click on test case and click Edit tab. Inside test cases, put data value for testing. For example, each test cases have three data value such as first name, last name and email. Then, put data value to another test cases



4. On Data Driven test suite, create Keywords (exp: named as DD add candidate)



5. Click on Data Driven test suite and then click on Text Edit tab.

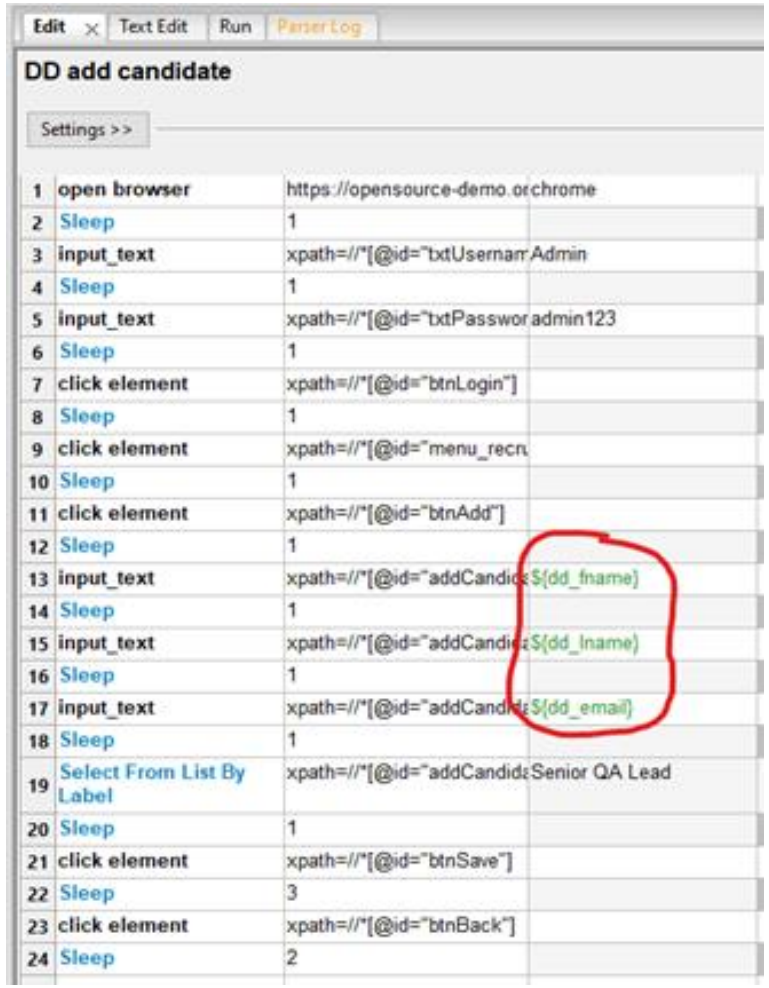
6. Under **Setting**, type *Test Template DD add candidate* (name for keyword)

```
*** Settings ***
Test Template     DD add candidate
Library           SeleniumLibrary

*** Test Cases ***
Abu Khan
    Abu    Khan    abukhan@kmail.com

Siti Chan
    Siti    Chan    sitichan@kmail.com

Aiman Cena
    Aiman    Cena    aimancena@kmail.com

*** Keywords ***
DD add candidate
```

7. Under '*DD add candidate*', type *[Arguments] name of variables* that will be used as following:

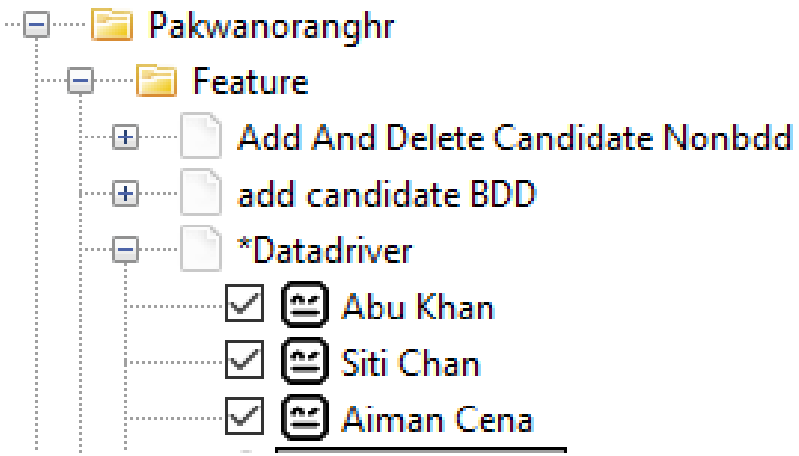
```
1  *** Settings ***
2  Test Template      DD add candidate
3  Library            SeleniumLibrary
4
5  *** Test Cases ***
6  Abu Khan
7      Abu     Khan     abukhan@kmail.com
8
9  Siti Chan
10     Siti     Chan     sitichan@kmail.com
11
12 Aiman Cena
13     Aiman     Cena     aimancena@kmail.com
14
15 *** Keywords ***
16 DD add candidate
17     [Arguments]     ${dd_fname}     ${dd_lname}     ${dd_email}
18
19
```

8. Then, type steps (either on Edit or Test Edit tab) in '*DD add candidate*' keywords. For value, put name of variables on third columns for some steps as shown below:




```
DD add candidate
    [Arguments]    ${dd_fname}    ${dd_lname}    ${dd_email}
    Sleep    1
    input_text    xpath=//*[@id="addCandidate_firstName"]    ${dd_fname}
    Sleep    1
    input_text    xpath=//*[@id="addCandidate_lastName"]    ${dd_lname}
    Sleep    1
    input_text    xpath=//*[@id="addCandidate_email"]    ${dd_email}
    Sleep    1
    Select From List By Label    xpath=//*[@id="addCandidate_vacancy"]    Senior QA Lead
    Sleep    1
    click element    xpath=//*[@id="btnSave"]
    Sleep    3
    click element    xpath=//*[@id="btnBack"]
    Sleep    2
```

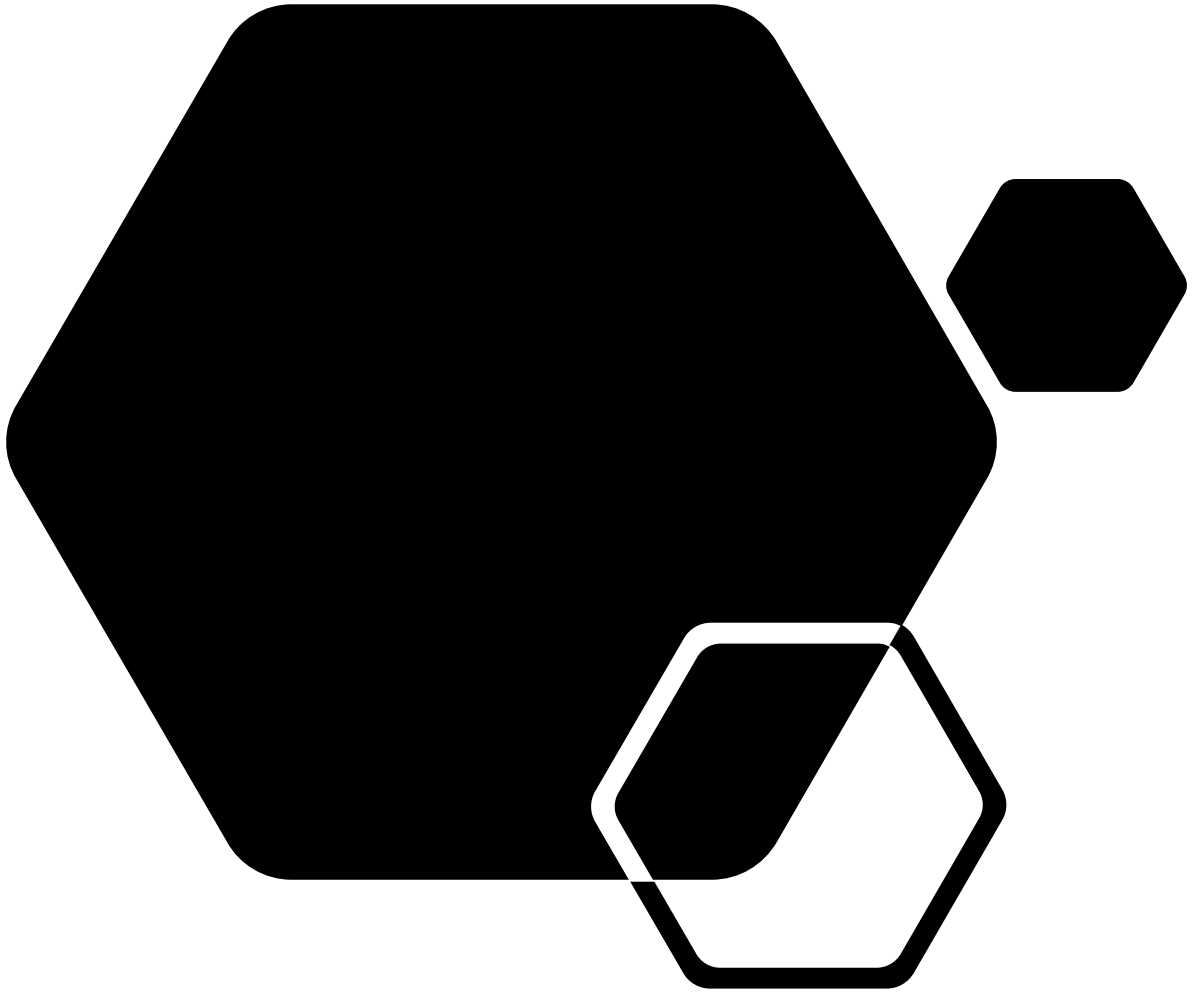
9. Tick test cases.



10. Go to *Run* tab, and then click *Start* . It runs ticked test cases.

Data Driven + BDD

*Learn creating keywords and variable first



Steps:

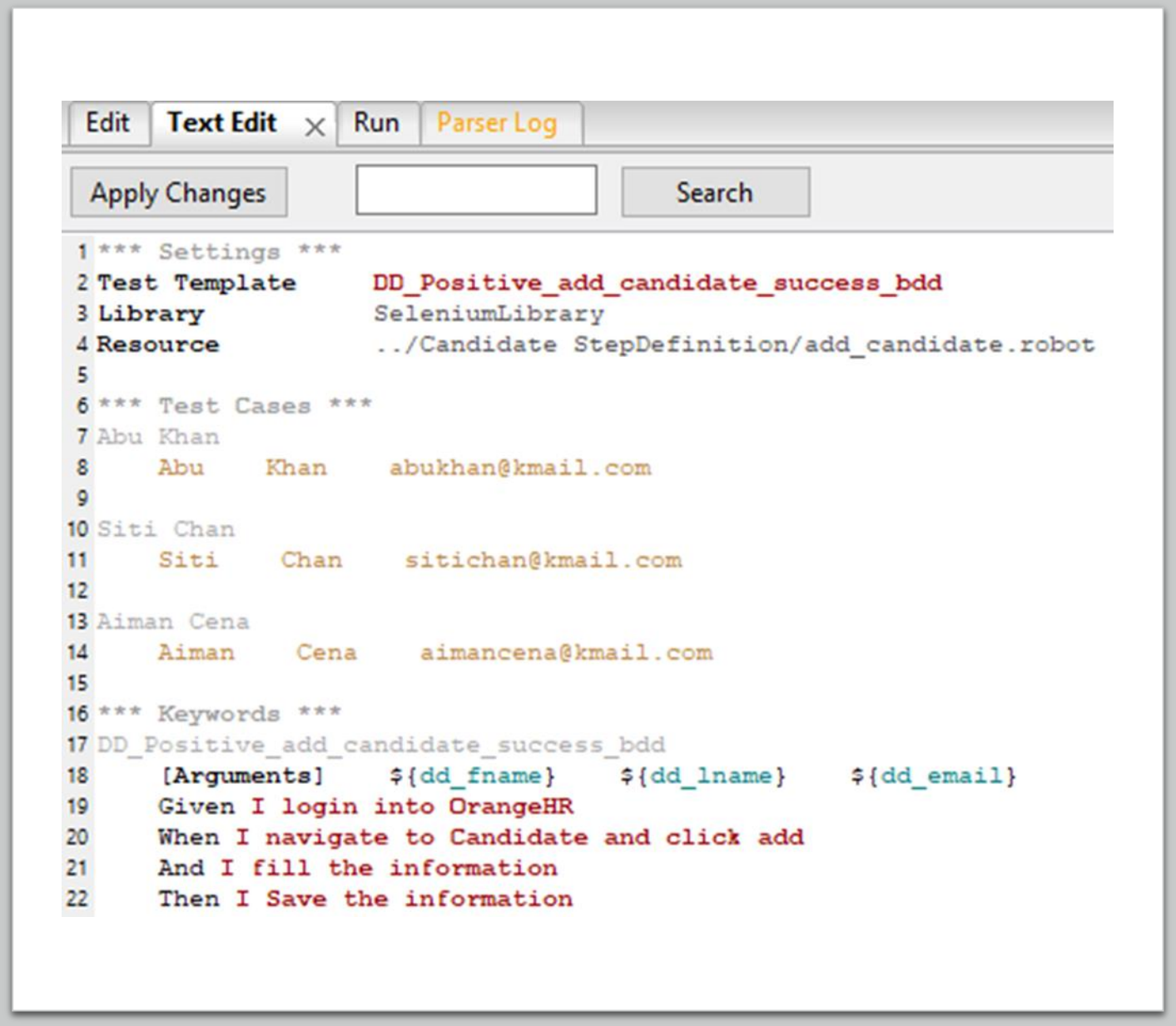
Take Success Add Candidate BDD for example

1. Create new Test Suite which import StepDefinition resources file.

2. Create test cases that represent data (refer to 4 fill information).

3. Create Keywords and put argument and BDD step (from previous BDD test case)

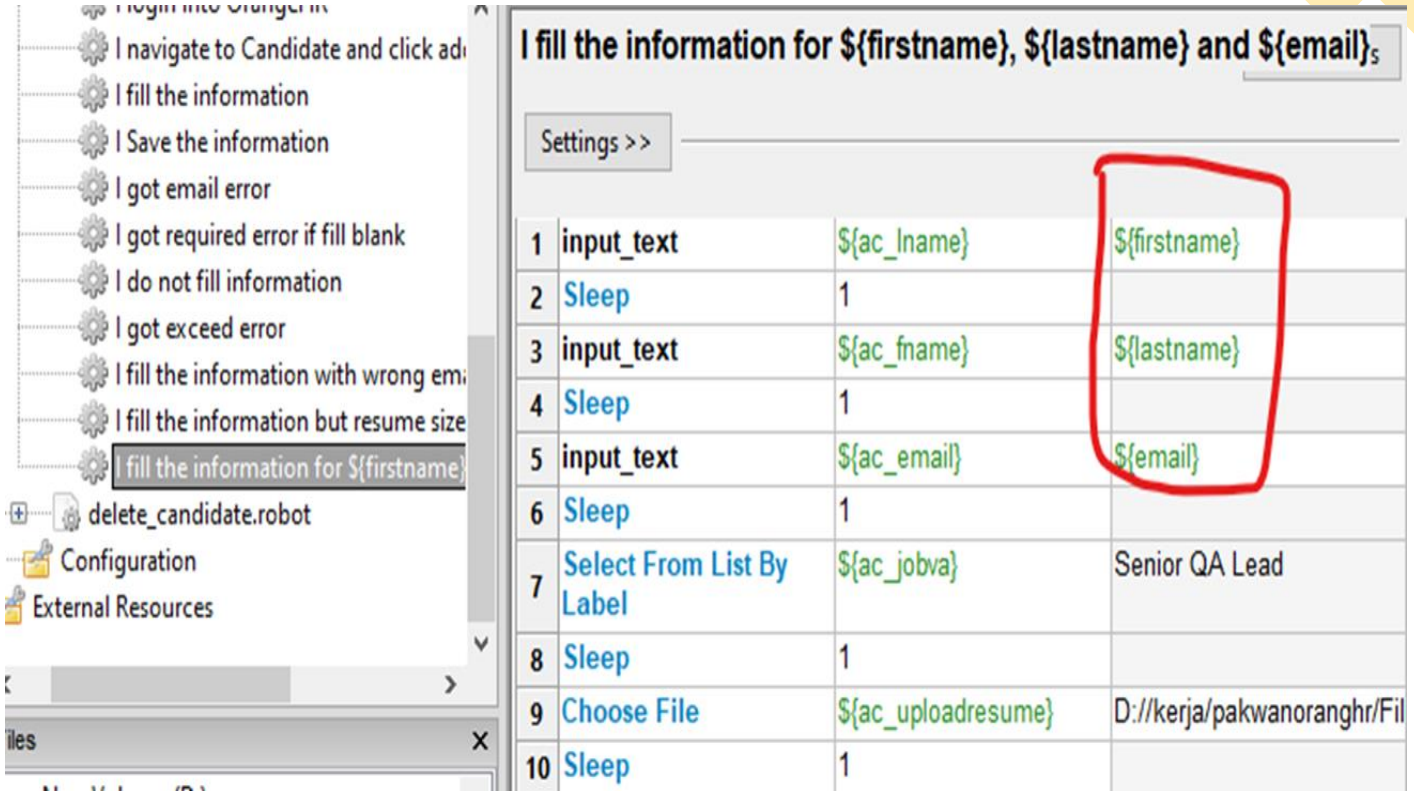
4. Set ‘Test Template’ with name of keywords



5. We want step 'I fill information' be used for data driven. So, recall create keywords file will variable and create keywords file and name it as:

   'I fill information ${firstname}, ${lastname} and ${email}‘

6. Inside Keywords file, change value (in third column and row that involve only) into name of variable



7. Go back to Test Suite. Change 'I fill information' into

'I fill information ${dd_fname}, ${dd_lname} and ${dd_email}'

*Note: name of variables must be same with argument variable

```
16 *** Keywords ***
17 DD_Positive_add_candidate_success_bdd
18     [Arguments]    ${dd_fname}    ${dd_lname}    ${dd_email}
19     Given I login into OrangeHR
20     When I navigate to Candidate and click add
21     And I fill the information for ${dd_fname}, ${dd_lname} and ${dd_email}
22     Then I Save the information
23
```

8. Go to *Run* tab, and then click *Start* . It runs ticked test cases.

Reference

- https://robotframework.org/robotframework/latest/RobotFrameworkUserGuide.html
- https://www.tutorialspoint.com/robot_framework/index.htm
- https://youtu.be/ErTN5rE6t8s
- https://youtube.com/playlist?list=PLhW3qG5bs-L9l2I8K8dEhw6HXy-Z-33w3