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About the Tutorial

Puppeteer is used for automation and streamlining of the frontend development and testing respectively. This tutorial shall give us a thorough insight on Puppeteer and its different terminologies. The tutorial contains practical examples on all main topics.

Audience

This tutorial is designed for professionals working in software testing who want to hone their skills on a robust automation testing tool like Puppeteer. It can be used to test applications developed in Angular and Angularjs.

Prerequisites

Prior going through this tutorial, you should have a fair knowledge on JavaScript and object oriented programming concepts. Besides, a good understanding of basics in testing is important to proceed with the tutorial.

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Table of Contents

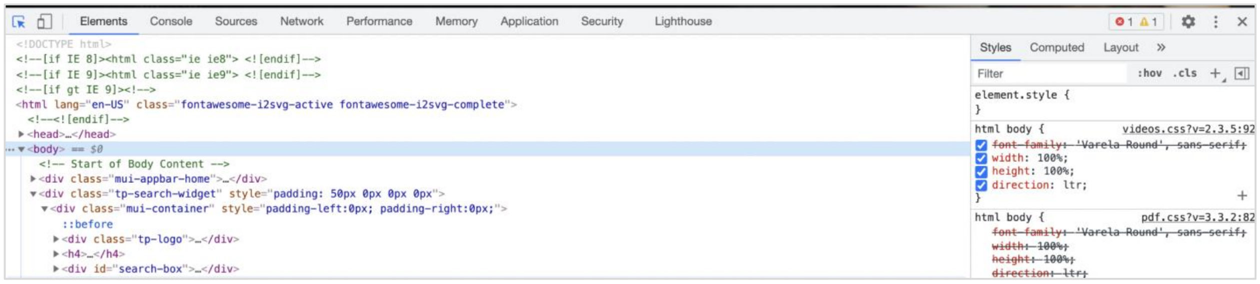
1. Puppeteer – Introduction

Puppeteer is used for automation and streamlining of the frontend development and testing respectively. It was introduced by Google. Puppeteer is based on the Node.js library and is open-source.

Puppeteer contains APIs to interact and manage Chrome browser in headless mode or Chromium (following the protocols in DevTools). However, it can also be used for non-headless execution on browsers like Chrome/Chromium/Edge/Firefox.

Puppeteer can be used for the automating majority of UI testing, keyboards, mouse movements, and so on. It can be used to test applications developed in Angular and Angularjs. The actions like web page crawling and scraping can be performed with Puppeteer.

Puppeteer is not considered as an automation tool like Selenium, Cypress, Protractor, and so on. It is mostly used to manage the internal features of the Chromium browser. We can open DevTools in the Chrome browser, by pressing F12 or Command+Option+C(in MacOS).



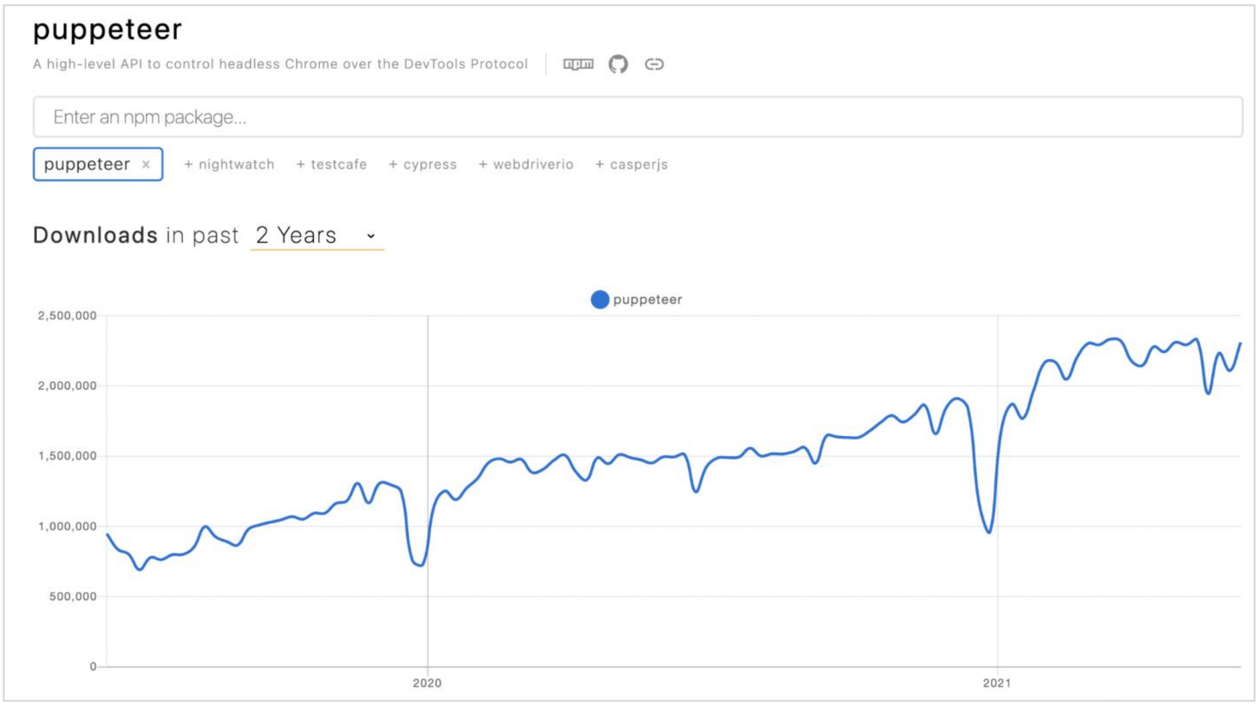
```
<!DOCTYPE html>
<!--[if IE 8]><html class="ie ie8"> <![endif]-->
<!--[if IE 9]><html class="ie ie9"> <![endif]-->
<!--[if gt IE 9]><!-->
<html lang="en-US" class="fontawesome-i2svg-active fontawesome-i2svg-complete">
  <!--<![endif]-->
 ▶<head>…</head>
…▼<body> == $0
    <!-- Start of Body Content -->
   ▶<div class="mui-appbar-home">…</div>
   ▼<div class="tp-search-widget" style="padding: 50px 0px 0px 0px">
     ▼<div class="mui-container" style="padding-left:0px; padding-right:0px;">
        ::before
       ▶<div class="tp-logo">…</div>
       ▶<h4>…</h4>
       ▶<div id="search-box">…</div>
```

```
element.style {
}
html body {                       videos.css?v=2.3.5:92
☑ ~~font-family: 'Varela Round', sans-serif;~~
☑ width: 100%;
☑ height: 100%;
☑ direction: ltr;
}
html body {                       pdf.css?v=3.3.2:82
   ~~font-family: 'Varela Round', sans-serif;~~
   ~~width: 100%;~~
   ~~height: 100%;~~
   ~~direction: ltr;~~
```

Puppeteer is like a development tool as it is capable of performing a majority of tasks performed by a developer like handling requests and responses, locating elements, network traffic and performance, and so on.

If we follow the npm trends for Puppeteer download for the last few years, we shall observe an upward trend towards the use of Puppeteer (available from the below link):

https://www.npmtrends.com/puppeteer



Puppeteer Architecture

Puppeteer utilises the Node library that gives a top-class API for managing Chromium or Chrome browsers. This is done by following the protocols of DevTools.

Puppeteer has the below hierarchy:

- **Browser(with/without headless mode)**: The browser performs the actions to be executed on the browser engine.
- **Chromium Development Project or CDP**: The Chromium is the real place where all the operations are executed. The browsers - Microsoft Edge and Chrome utilise Chromium as browser engine.
- **Puppeteer**: This is actually a package based on the node module.
- **Automation test code**: This is also known as the Nodejs level. Here, the actual automation code is developed by the end-user using JavaScript.

2. Puppeteer — Element Handling

We can handle elements on page with Puppeteer. Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. To get the property of an element uniquely we need to inspect it (right-click on the element then select the option Inspect). The ElementHandle objects are created by the methods - page.$, page.$$ and page.$x. These objects refer to an element or tag in a page.

Puppeteer Methods to Locate Elements

These methods are listed below:

page.$(locator value)

This method yields a Promise with the ElementHandle. The ElementHandle is an object of the identified element. If there are multiple elements having the same locator value, then only the first matching element from the top left corner of the page shall be returned.

page.$$(locator value)

This method yields a Promise with an array of ElementHandle. If there are multiple elements having the same locator value, then all matching elements shall be returned in the form of an array.

page.$x(xpath value)

This method yields a Promise with an array of ElementHandle. If there are multiple elements having the same xpath value, then all matching elements shall be returned in the form of an array. In case, there is one matching element, then the array returned shall have a single element.

The ElementHandle methods like elementHandle.$, elementHandle.$$ and elementHandle.$x can be applied to an element. In that case, an element shall be searched within the DOM of the present ElementHandle and not in the entire DOM.

In the below image, let us take the example of an element having the li tag (having a parent element ul) and class attribute value as heading. To identify it using the ElementHandle method on the page, the expression should be as follows:

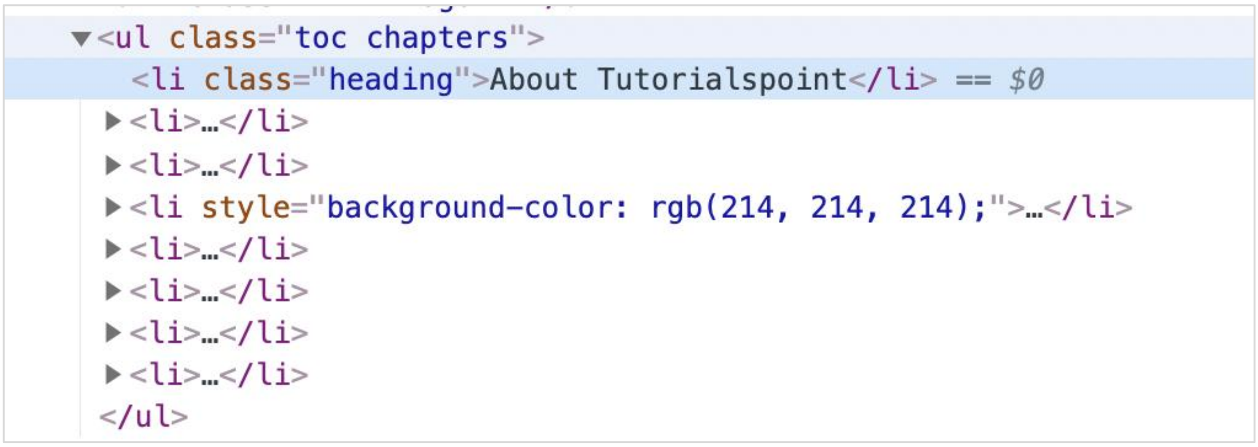
```
const n = await page.$(".heading")
```

To identify it using the ElementHandle method on an element, the expression should be as follows:

```
const m = await page.$("ul")

const p = await m.$(".heading")
```

Now, refer the image given below of an element having the li tag



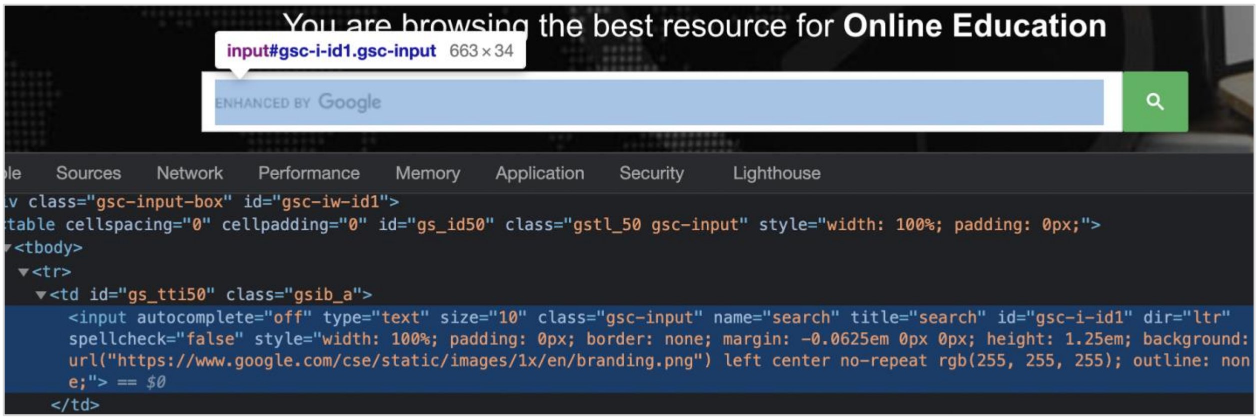
```
▼<ul class="toc chapters">
    <li class="heading">About Tutorialspoint</li> == $0
   ▶<li>…</li>
   ▶<li>…</li>
   ▶<li style="background-color: rgb(214, 214, 214);">…</li>
   ▶<li>…</li>
   ▶<li>…</li>
   ▶<li>…</li>
   ▶<li>…</li>
  </ul>
```

Types of Locators

The types of locators in Puppeteer are listed below:

- ID
- Class
- Type
- Xpath
- Attribute
- Type

To work with the above locators we should have the basic understanding of HTML code. Let us take an example of an edit box having the below mentioned properties:


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
le
Sources
Network
Performance
Memory
Application
Security
Lighthouse

```
v class="gsc-input-box" id="gsc-iw-id1">
table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
▼<tbody>
  ▼<tr>
    ▼<td id="gs_tti50" class="gsib_a">
       <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
       spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
       url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 255, 255); outline: non
       e;"> == $0
     </td>
```

Here, input is the tagname. A tag in HTML may or may not have attributes. The type, class, name, id and so on are the attributes of the element.

For example, in the expression class = "gsc-input", text to the left of = is the attribute name (class) and to the right of = is the attribute value (gsc-input).

An attribute may or may not have a value assigned. Also, if a value is assigned, then it should be enclosed in double or single quotes. The value of an attribute is set by a developer as per his choice.

3. Puppeteer — Usage of Google

Puppeteer usages are listed below:

- Puppeteer can be used for scrapping contents from a webpage. The scrapping means pulling out data from a particular website.
- Puppeteer can be used to capture screenshots. It can be used to export web pages in the form of a PDF.
- Puppeteer does not require an external driver or library. It can be run on the actual browser in a headless mode.
- It can be used as a good alternative to other browser automation tools like Selenium or Cypress. Sometimes, puppeteer features are even better than both of them.
- It is super-fast in execution and can be used to execute tests in headless and headed modes.
- Puppeteer has a very agile community support having more than 60,000 starts in GitHub. Refer the link given herewith: https://github.com/puppeteer/puppeteer
- Puppeteer supports headless execution and hence it can be used in platforms like Unix, Linux, Cloud, AWS, and so on.
- It can be used to crawl a SPA (Single Page Application) and produce pre-rendered content. The crawling means saving a local static object of a webpage and utilising it offline in the absence of the real webpage obtained from the internet.
- It can be used for the automating majority of UI testing, keyboards, mouse movements, form submissions etc.
- Puppeteer can be used to construct a recent, automated test environment. It can run tests on the latest version Chrome by utilising the most recent features of JavaScript and browser.
- Puppeteer can be used to obtain the timeline trace of a web application to determine its performance. Moreover, it can be used to check the Chrome Extensions and to obtain the coverage of HTML and CSS utilized by a webpage.

4. Puppeteer — Installation of NodeJS

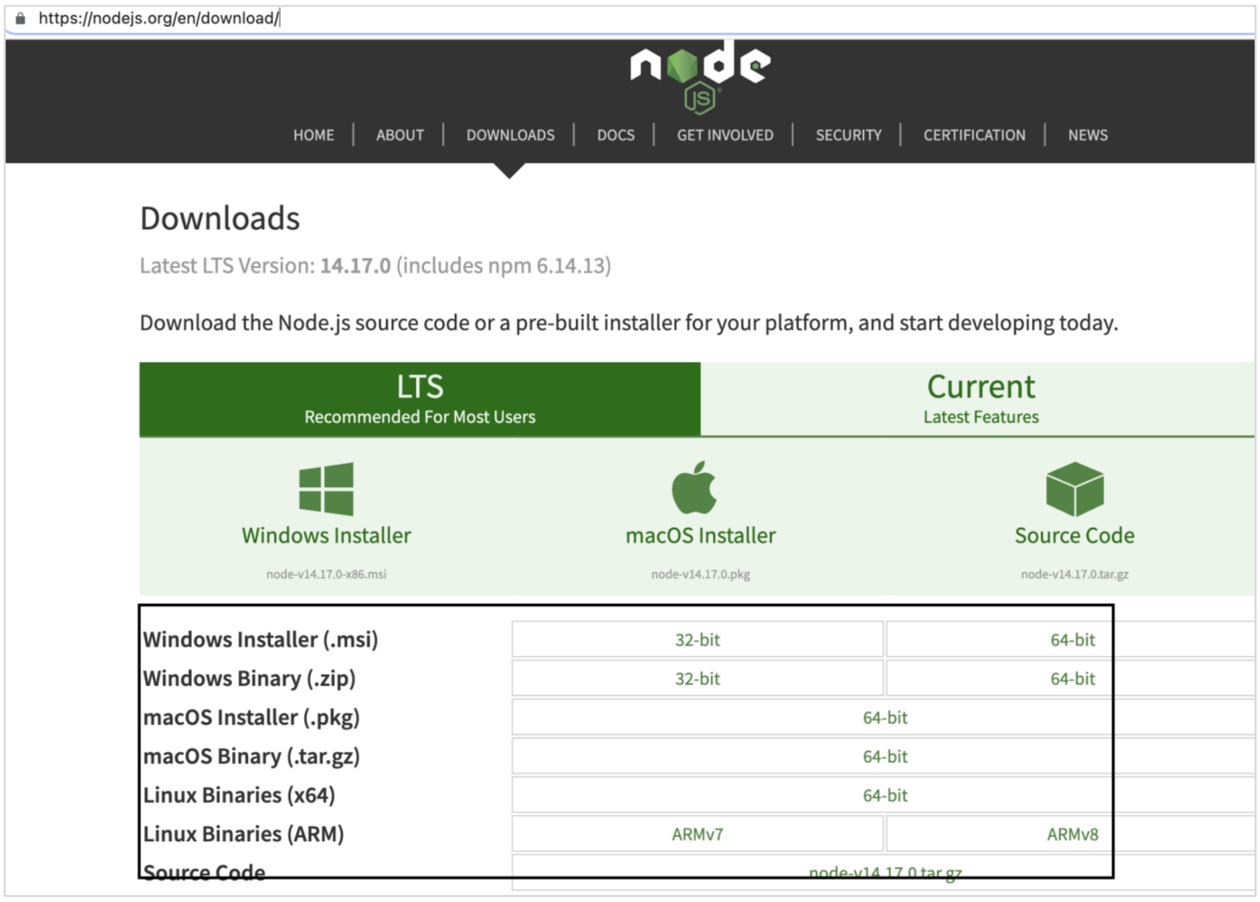
Puppeteer code implementation is done using JavaScript. For this, NodeJS has to be installed since it is a JavaScript engine. Only after its installation, we can execute Puppeteer tests.

The steps to configure NodeJS are listed below:

Step 1: Launch the application having the below link:

https://nodejs.org/en/download/

Step 2: As per the local operating system (Windows, Mac or Linux) we are using, click on the link to download the Installer.


https://nodejs.org/en/download/
HOME | ABOUT | DOWNLOADS | DOCS | GET INVOLVED | SECURITY | CERTIFICATION | NEWS
LTS Recommended For Most Users
Current Latest Features
Windows Installer node-v14.17.0-x86.msi
macOS Installer node-v14.17.0.pkg
Source Code node-v14.17.0.tar.gz

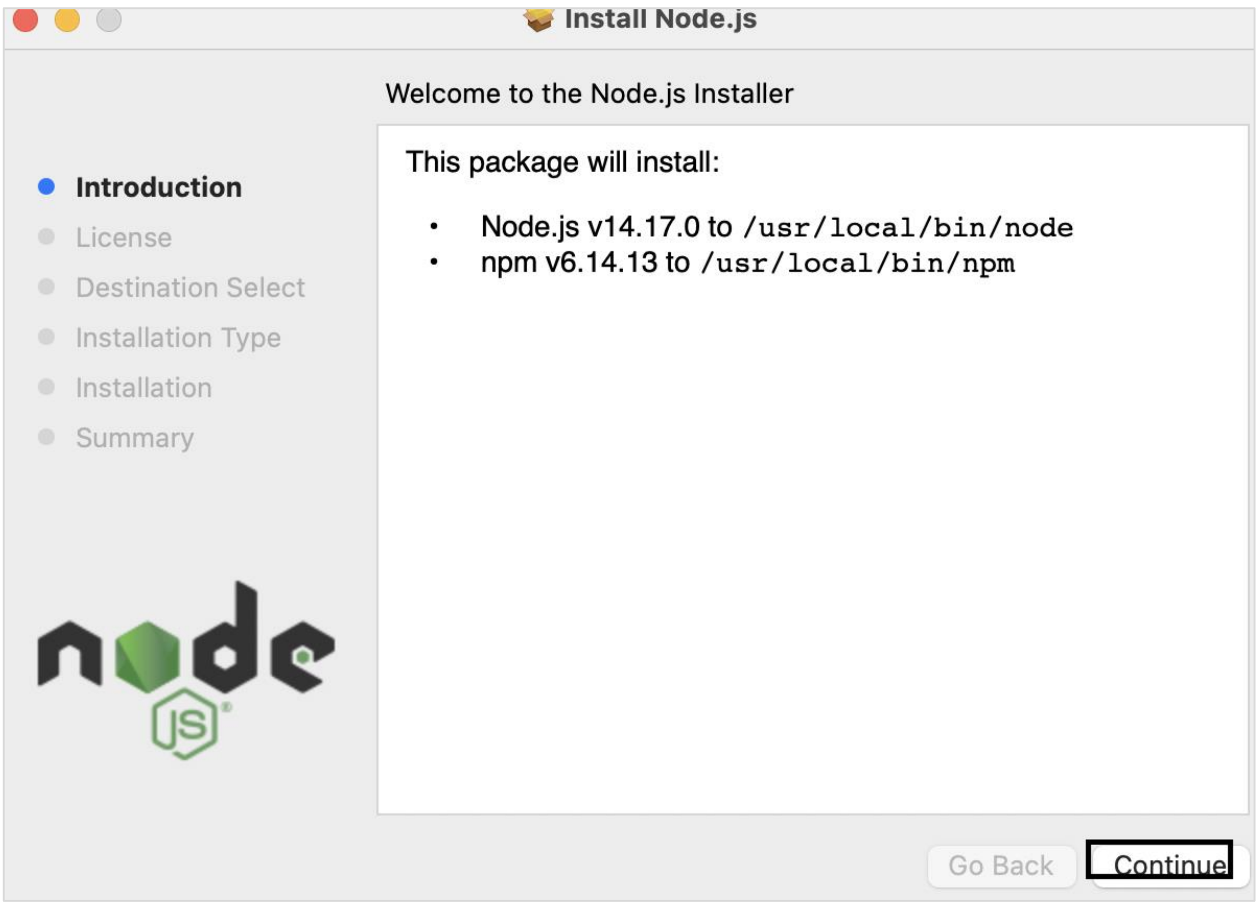
Downloads

Latest LTS Version: **14.17.0** (includes npm 6.14.13)

Download the Node.js source code or a pre-built installer for your platform, and start developing today.

Windows Installer (.msi)	32-bit	64-bit
Windows Binary (.zip)	32-bit	64-bit
macOS Installer (.pkg)	64-bit	
macOS Binary (.tar.gz)	64-bit	
Linux Binaries (x64)	64-bit	
Linux Binaries (ARM)	ARMv7	ARMv8
Source Code	node-v14.17.0.tar.gz	

Step 3: Once the installer is downloaded, click on it. We shall be navigated to the Node.js Installer welcome screen. Click on Continue.

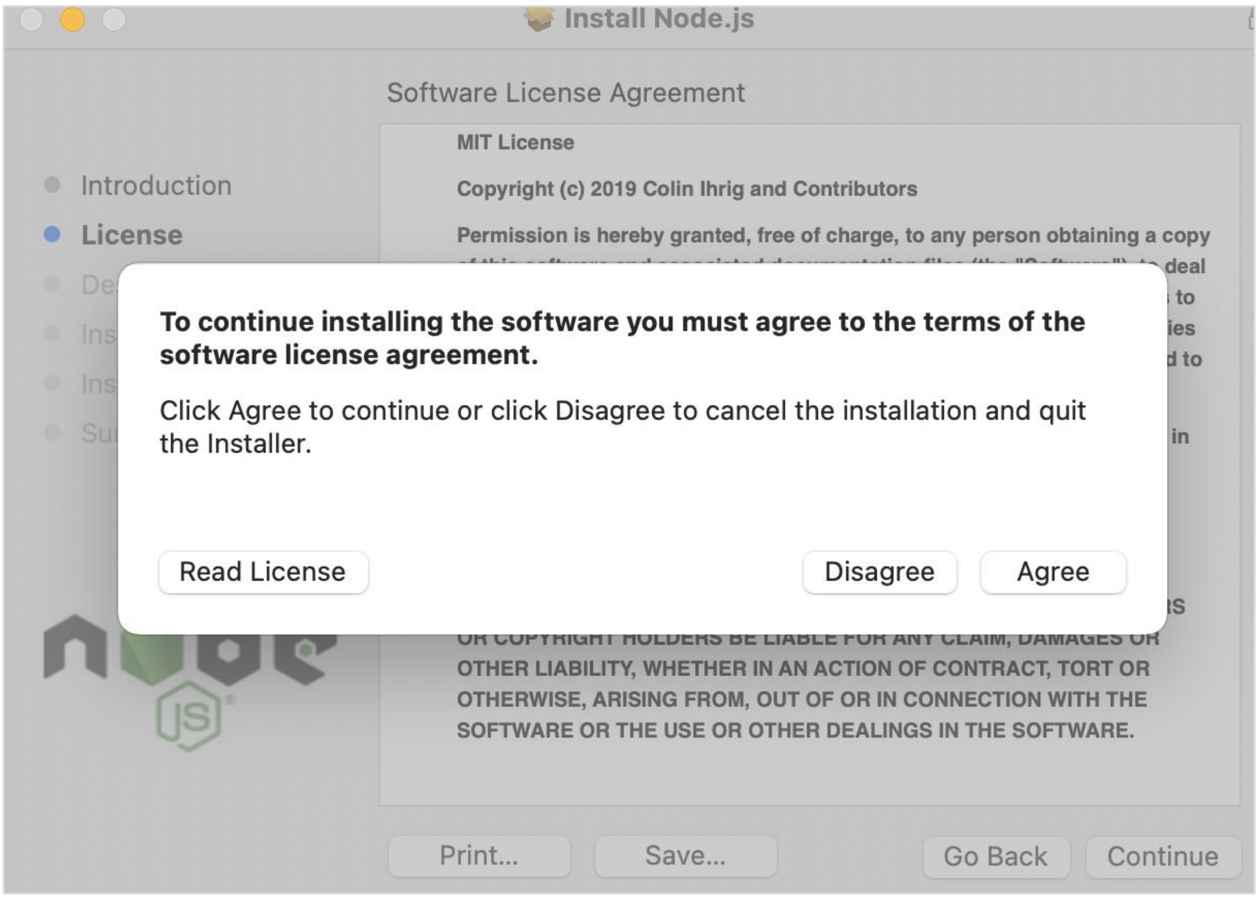


Welcome to the Node.js Installer

This package will install:

- Node.js v14.17.0 to `/usr/local/bin/node`
- npm v6.14.13 to `/usr/local/bin/npm`

Step 4: Agree to the terms of agreement of Nodejs.



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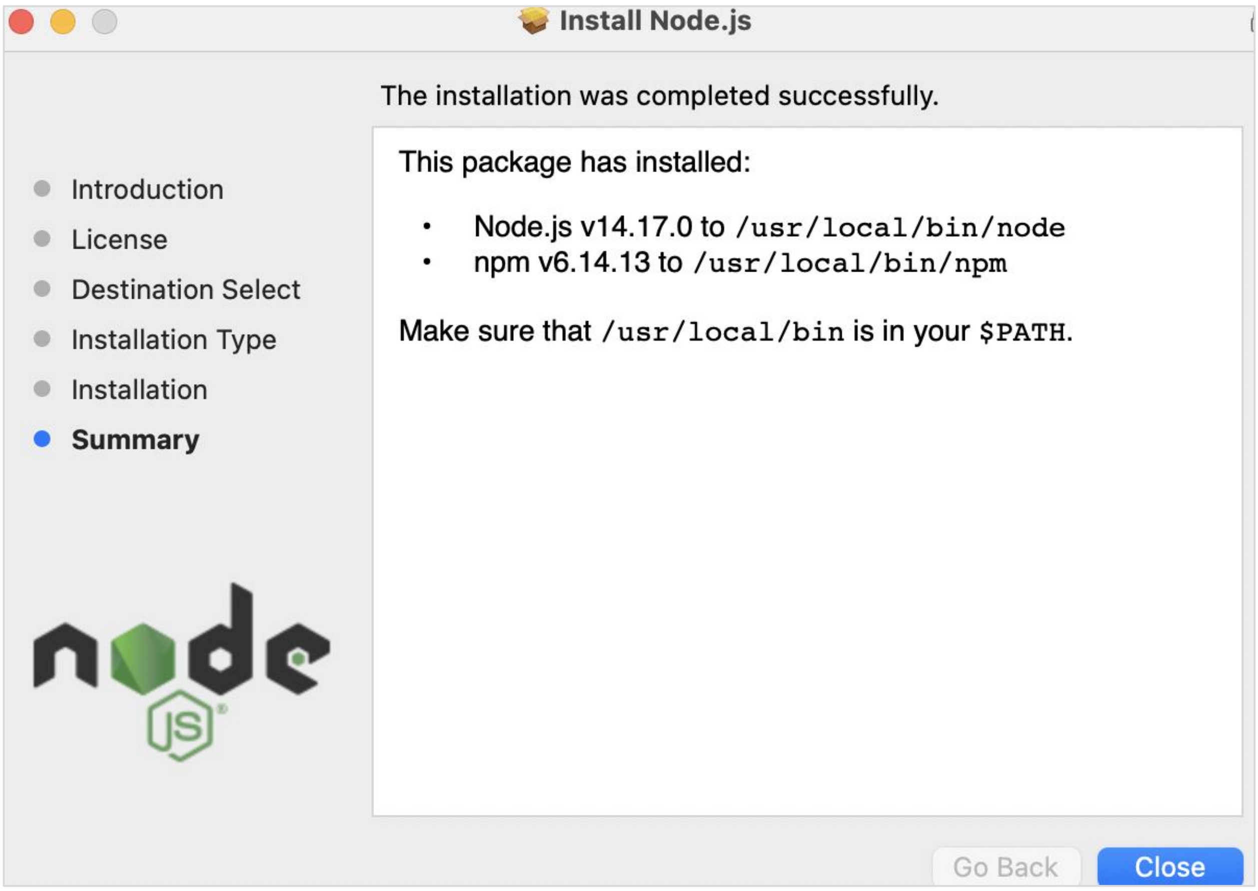
To continue installing the software you must agree to the terms of the software license agreement.

Click Agree to continue or click Disagree to cancel the installation and quit the Installer.

OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Step 5: Click on Install.

Step 6: Once the success message of Nodejs installation is displayed, click on Close.



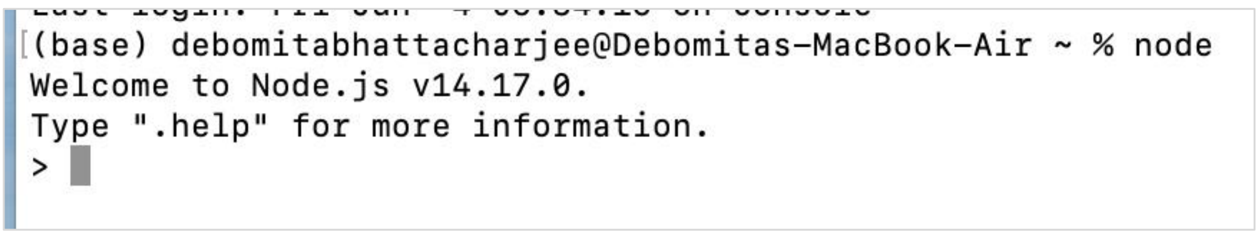
The installation was completed successfully.

This package has installed:

- Node.js v14.17.0 to /usr/local/bin/node
- npm v6.14.13 to /usr/local/bin/npm

Make sure that /usr/local/bin is in your $PATH.

Step 7: To check if Nodejs is installed successfully, open the terminal and run the command: node.



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air ~ % node
Welcome to Node.js v14.17.0.
Type ".help" for more information.
>
```

The version of the Nodejs installed in the machine should get displayed.

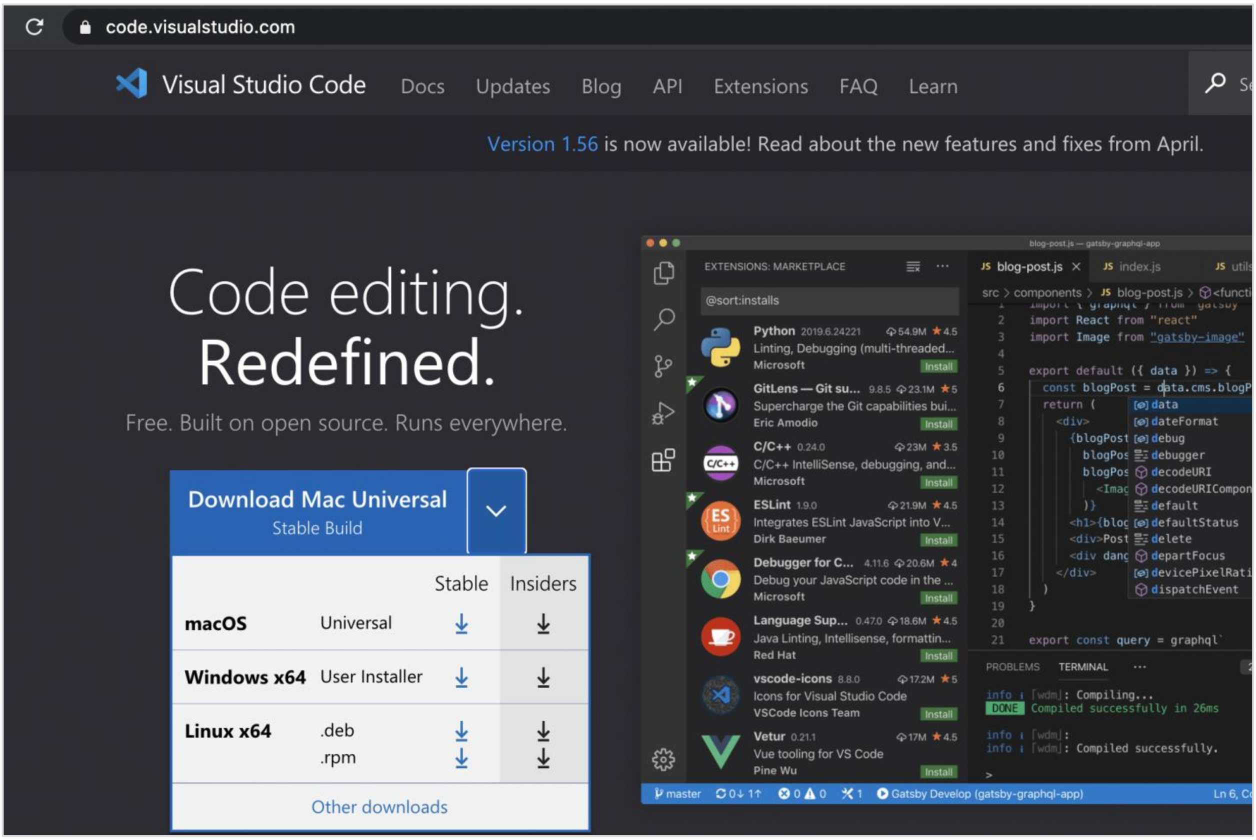
5. Puppeteer — VS Code Configuration

The steps to install the Visual Studio (VS) Code are listed below:

Step 1: Navigate to the below link:

https://code.visualstudio.com/

Step 2: Depending on the local operating system we have for example - macOS, Linux or Windows, we need to choose the link for download.



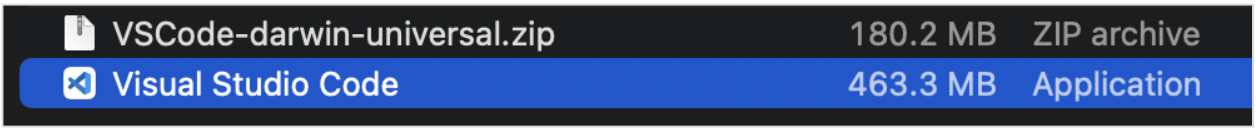
Version 1.56 is now available! Read about the new features and fixes from April.

Code editing. Redefined.

Free. Built on open source. Runs everywhere.

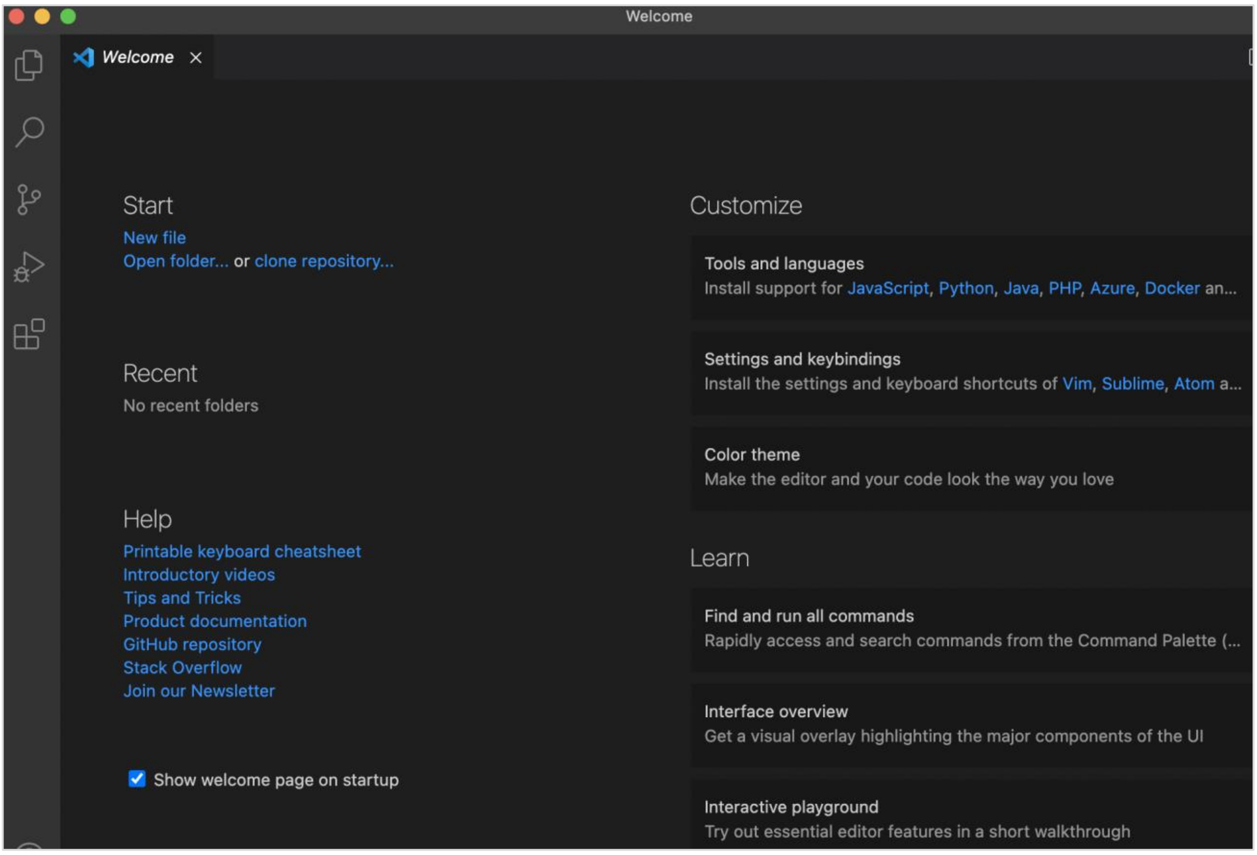
		Stable	Insiders
macOS	Universal	↓	↓
Windows x64	User Installer	↓	↓
Linux x64	.deb .rpm	↓ ↓	↓ ↓

Step 3: A zip file gets downloaded after clicking the Download button. After downloading this file has completed, click on it and the Visual Studio Code application should become available for use.



VSCode-darwin-universal.zip	180.2 MB	ZIP archive
Visual Studio Code	463.3 MB	Application

Step 4: Double-click it and the Visual Studio Code application should launch along with the welcome page.


Welcome

Start
New file
Open folder... or clone repository...

Recent
No recent folders

Help
Printable keyboard cheatsheet
Introductory videos
Tips and Tricks
Product documentation
GitHub repository
Stack Overflow
Join our Newsletter

✓ Show welcome page on startup

Customize

Tools and languages
Install support for JavaScript, Python, Java, PHP, Azure, Docker an...

Settings and keybindings
Install the settings and keyboard shortcuts of Vim, Sublime, Atom a...

Color theme
Make the editor and your code look the way you love

Learn

Find and run all commands
Rapidly access and search commands from the Command Palette (...

Interface overview
Get a visual overlay highlighting the major components of the UI

Interactive playground
Try out essential editor features in a short walkthrough

6. Puppeteer — Installation

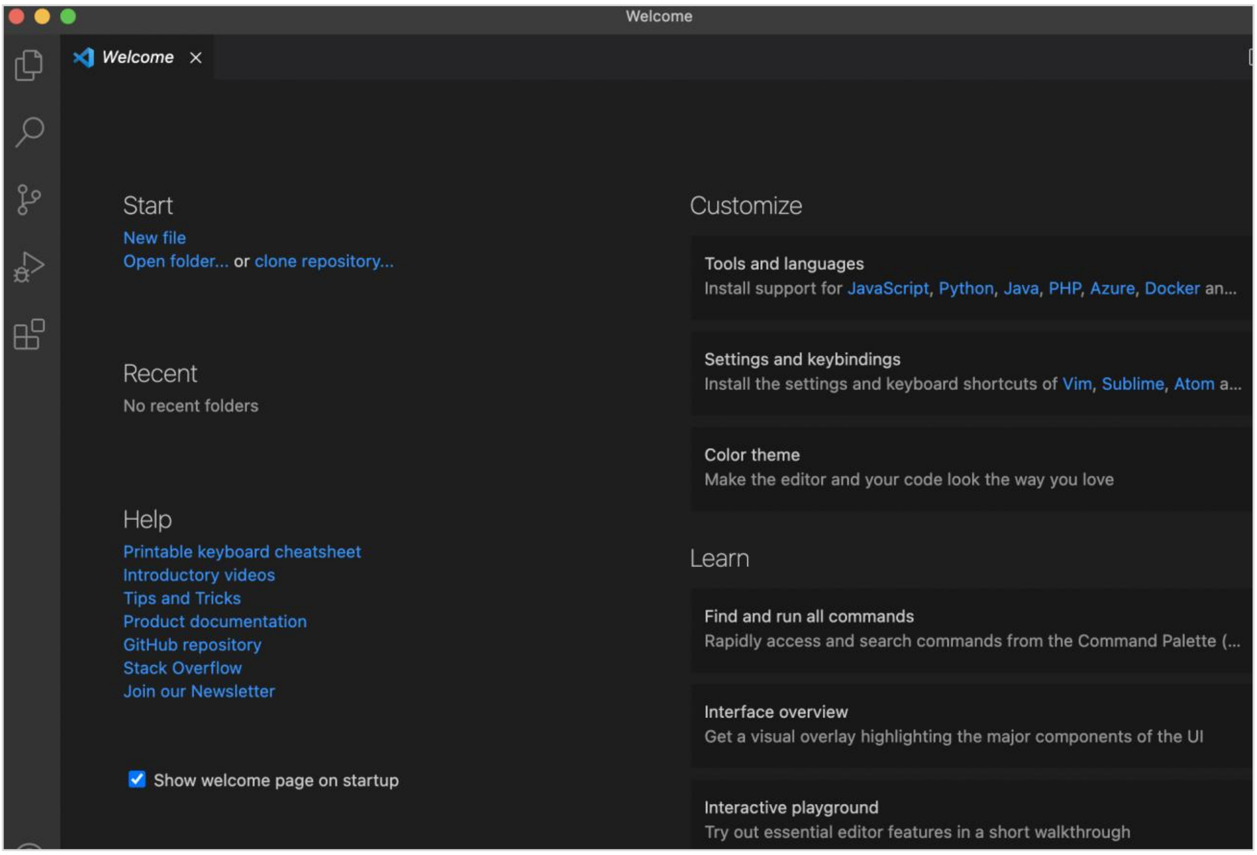
The steps for installation of Puppeteer are listed below:

Step 1: Install NodeJS.

The details on how to install NodeJs is discussed in detail in the Chapter of Installation of NodeJS.

Step 2: Create an empty folder, say puppeteer in a location.

Step 3: Launch the Visual Studio Code application and click on the Open folder link and import the folder we have created in Step2.


Welcome
Welcome
Start
New file
Open folder... or clone repository...
Recent
No recent folders
Help
Printable keyboard cheatsheet
Introductory videos
Tips and Tricks
Product documentation
GitHub repository
Stack Overflow
Join our Newsletter
Show welcome page on startup
Customize
Tools and languages
Install support for JavaScript, Python, Java, PHP, Azure, Docker an...
Settings and keybindings
Install the settings and keyboard shortcuts of Vim, Sublime, Atom a...
Color theme
Make the editor and your code look the way you love
Learn
Find and run all commands
Rapidly access and search commands from the Command Palette (...
Interface overview
Get a visual overlay highlighting the major components of the UI
Interactive playground
Try out essential editor features in a short walkthrough

The details on how to install VS Code is discussed in detail in the Chapter of VS Code Configuration.

Step 4: Open the terminal and move from the current directory to the directory of the empty folder that we have created in Step 2. Then run the following command:

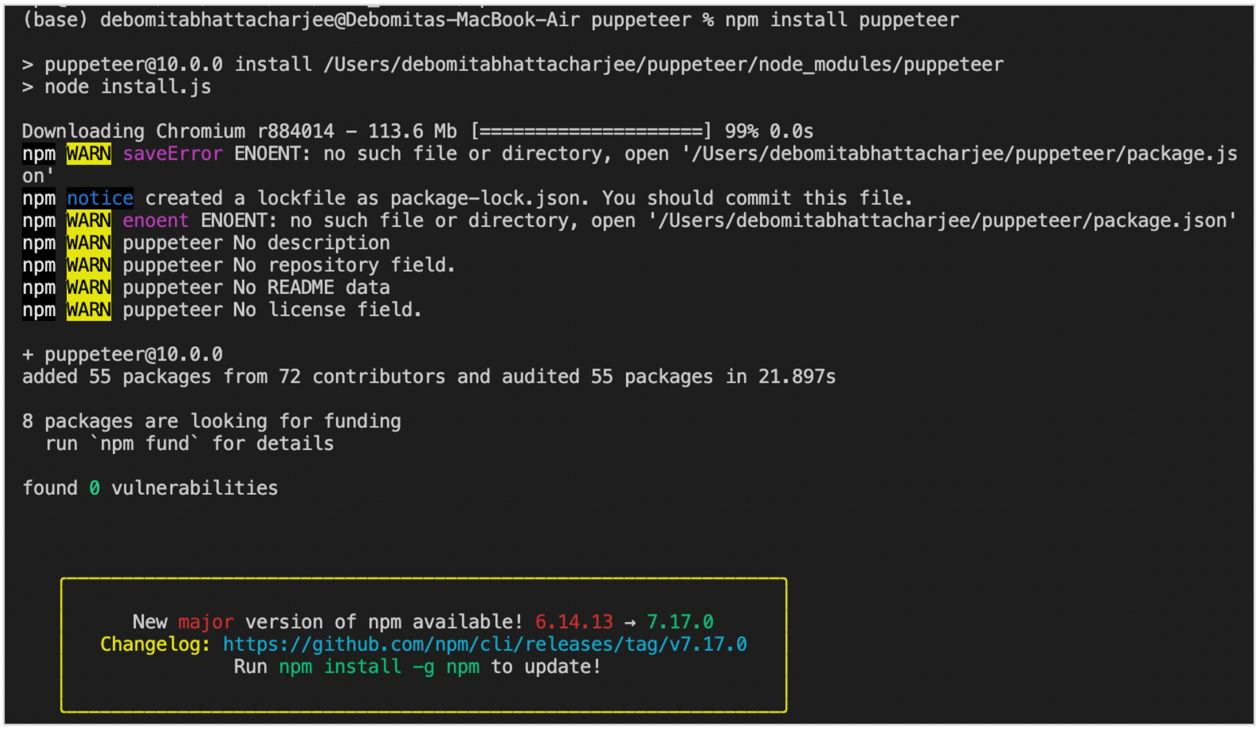
```
npm
```

Step 5: For Puppeteer installation, run the below mentioned command:

```
npm install puppeteer
```

Or,

```
npm i puppeteer
```

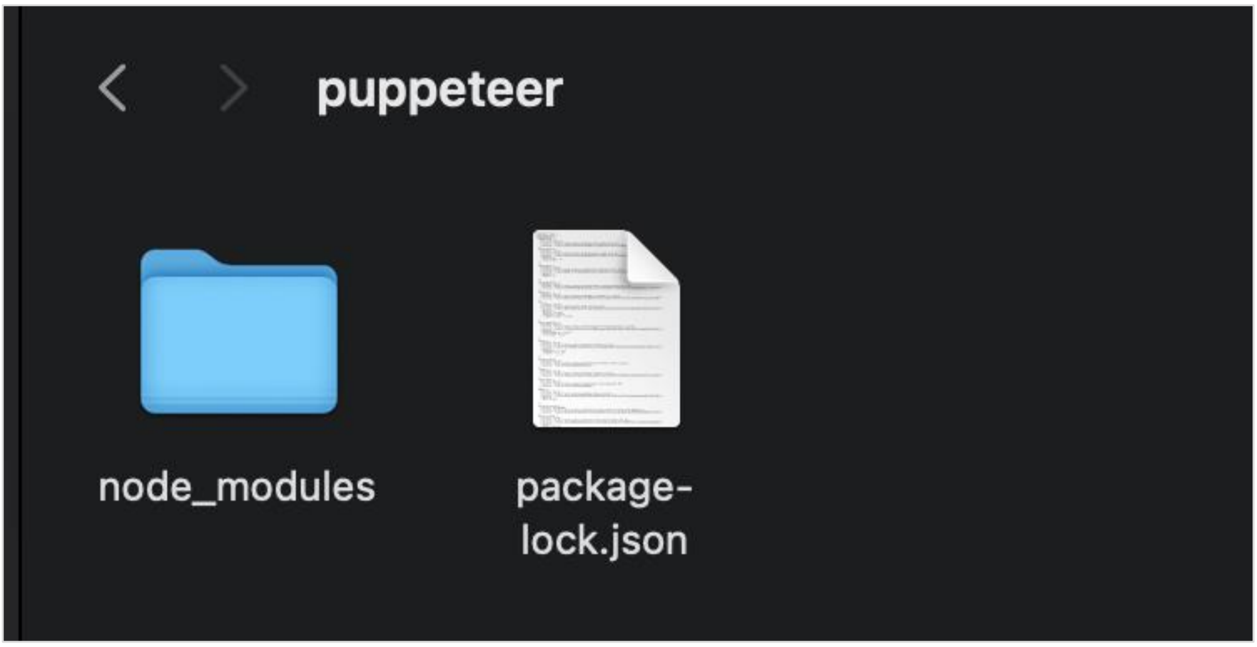


```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % npm install puppeteer

> puppeteer@10.0.0 install /Users/debomitabhattacharjee/puppeteer/node_modules/puppeteer
> node install.js

Downloading Chromium r884014 - 113.6 Mb [====================] 99% 0.0s
npm WARN saveError ENOENT: no such file or directory, open '/Users/debomitabhattacharjee/puppeteer/package.js
on'
npm notice created a lockfile as package-lock.json. You should commit this file.
npm WARN enoent ENOENT: no such file or directory, open '/Users/debomitabhattacharjee/puppeteer/package.json'
npm WARN puppeteer No description
npm WARN puppeteer No repository field.
npm WARN puppeteer No README data
npm WARN puppeteer No license field.

+ puppeteer@10.0.0
added 55 packages from 72 contributors and audited 55 packages in 21.897s

8 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities


      New major version of npm available! 6.14.13 → 7.17.0
   Changelog: https://github.com/npm/cli/releases/tag/v7.17.0
               Run npm install -g npm to update!
```

Step 6: For installation of Puppeteer core, run the below mentioned command:

```
npm i puppeteer-core
```

Step 7: After the installation of Puppeteer and Puppeteer core, we shall find the node_modules folder and package.json file generated within the empty folder we created in Step 2.



Step 8: While working on a test, we have to add the below Puppeteer library in the code.

```
const pt = require('puppeteer')
```

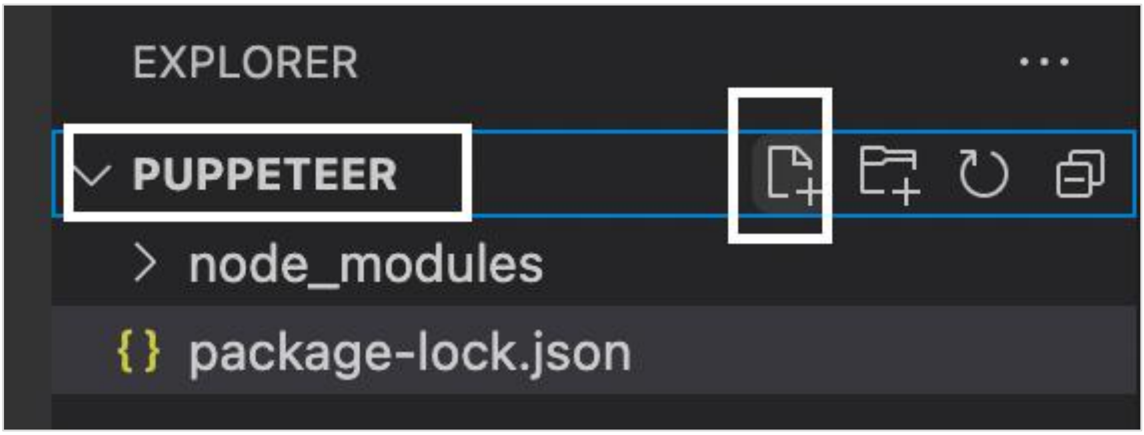
7. Puppeteer — Basic Test on Puppeteer

To start with a basic test on Puppeteer, we have to follow the below mentioned steps:

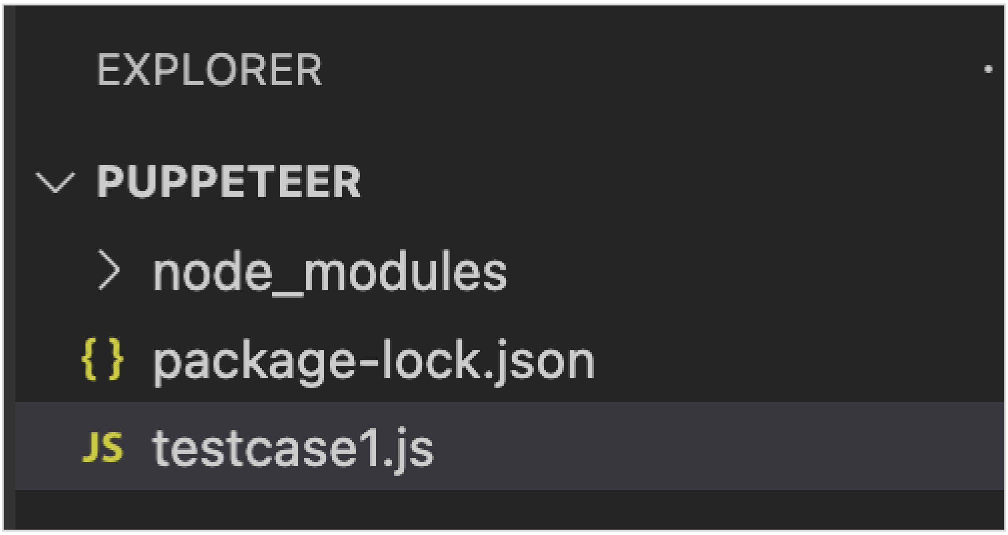
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code in this file:

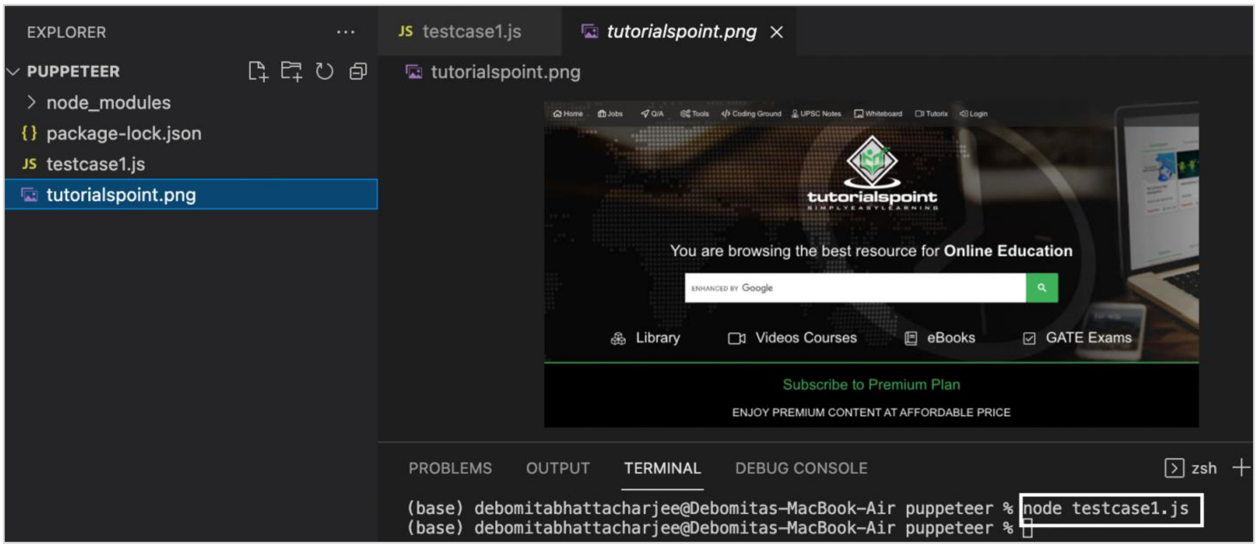
```
//adding Puppeteer library
const pt = require('puppeteer');
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/index.htm')
    //capture screenshot
    await p.screenshot({
        path: 'tutorialspoint.png'
    });
    //browser close
    await browser.close()
})
```

Step 4: Execute the code with the following command:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer %
```

After the command has been successfully executed, a new file called the tutorialspoint.png gets created within the page directory. It contains the captured screenshot of the page launched in the browser in a headless mode.

8. Puppeteer — Non Headless Execution

By default, Puppeteer executes the test in headless Chromium. This means if we are running a test using Puppeteer, then we won't be able to view the execution in the browser.

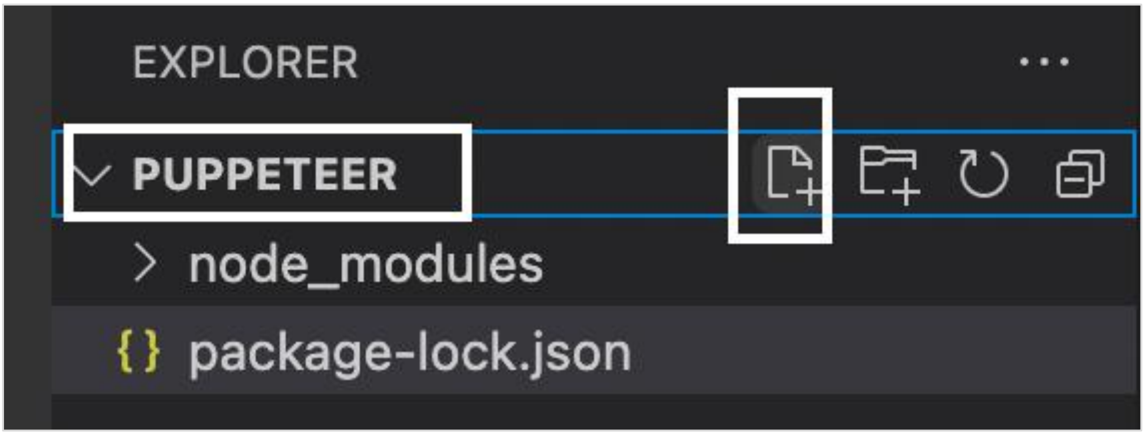
To enable execution in the headed mode, we have to add the parameter: headless:false in the code.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer, which are as follows:

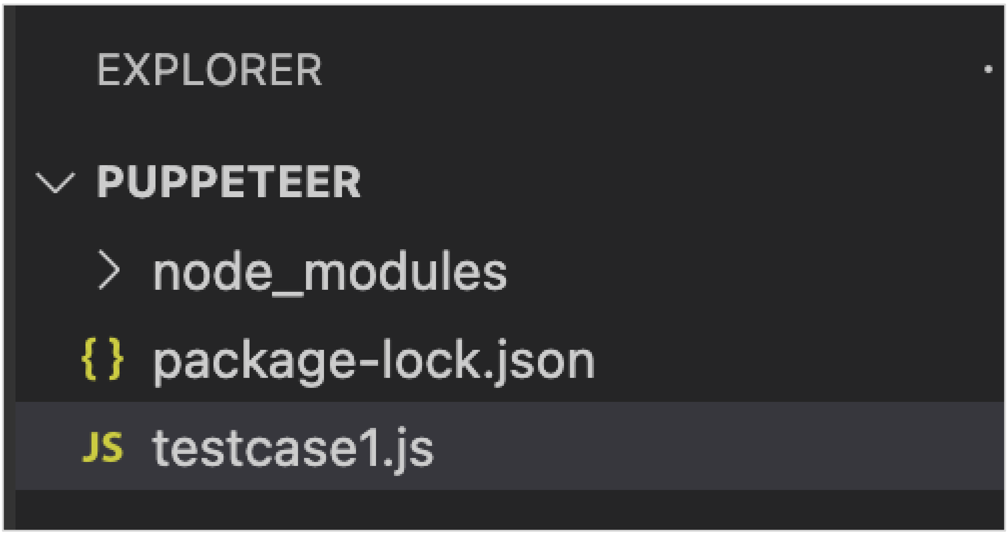
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

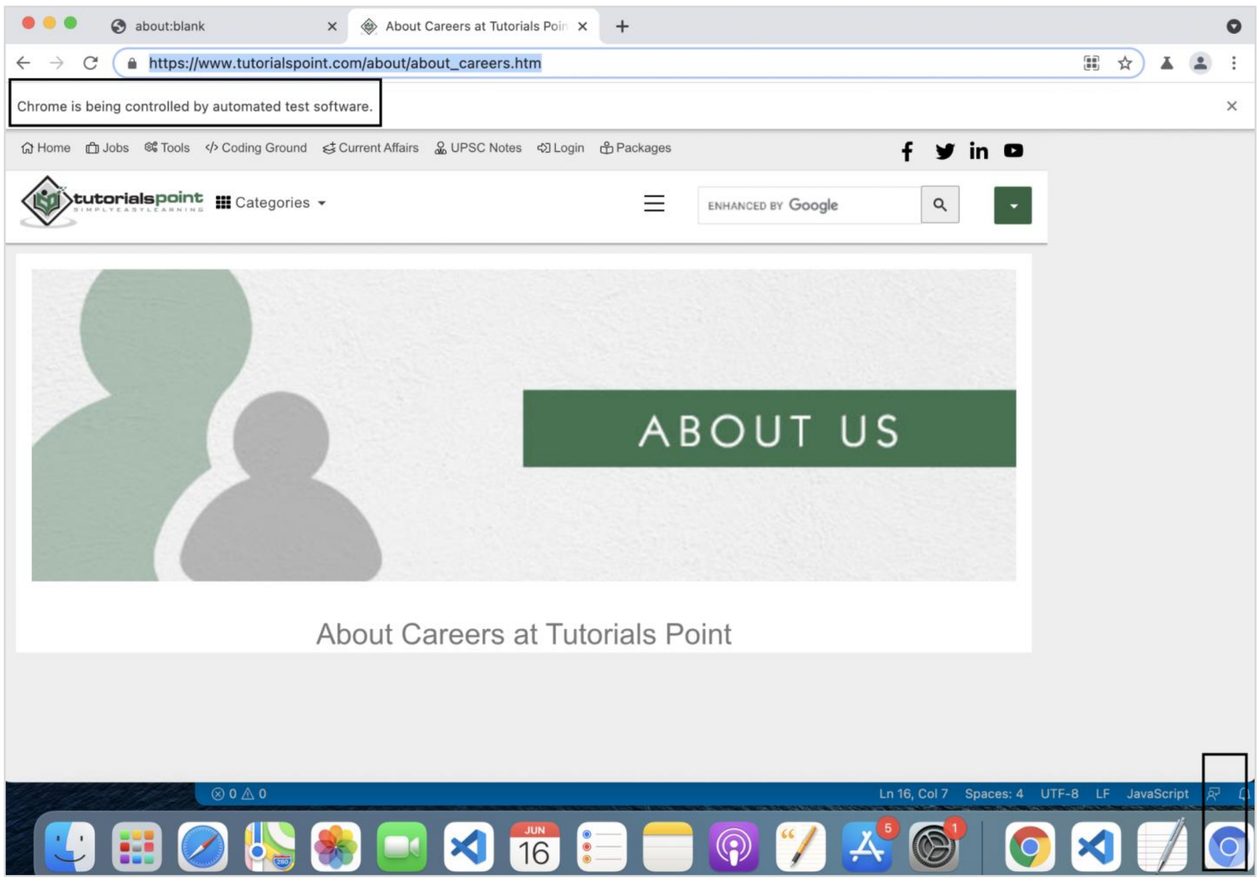
```
//adding Puppeteer library
const pt = require('puppeteer');
//adding headless flag to false
pt.launch({headless:false}).then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/about/about_careers.htm');
})
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the below mentioned command:

```
node testcase1.js
```


about:blank
About Careers at Tutorials Poin
https://www.tutorialspoint.com/about/about_careers.htm
Chrome is being controlled by automated test software.
Home
Jobs
Tools
Coding Ground
Current Affairs
UPSC Notes
Login
Packages
tutorialspoint
Categories
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JavaScript

After the command has been successfully executed, we shall see the execution getting triggered in a headed mode.

9. Puppeteer — Comparison between Puppeteer and Selenium

The major differences between Puppeteer and Selenium are given below:

Sr. No.	Puppeteer	Selenium
1.	Puppeteer is developed mainly for Chromium so the tests developed are mainly executed in Chrome.	Selenium can be used to execute tests on multiple browsers like Chrome, Firefox, IE, Safari, and so on.
2.	Puppeteer code can be implemented only in JavaScript.	Selenium code can be implemented on multiple languages like Java, Python, JavaScript, C#, and so on.
3.	Puppeteer provides APIs to manage headless execution in Chrome by using the DevTools protocol.	Selenium requires additional external browser drivers that trigger tests as per the user commands.
4.	Puppeteer manages the Chrome browser.	Selenium is primarily used to execute tests to automate the actions performed on the browser.
5.	Puppeteer is faster in executing tests than Selenium.	Selenium is slower in executing tests than Puppeteer.
6.	Puppeteer is a module in node developed for Chromium engine.	Selenium is a dedicated test automation tool.
7.	Puppeteer can be used for API testing by utilising the requests and the responses.	API testing with Selenium is difficult.
8.	Puppeteer can be used to verify the count of CSS and JavaScript files utilised for loading a webpage.	Selenium cannot be used to verify the count of CSS and JavaScript files utilised for loading a webpage.
9.	Puppeteer can be used to work on the majority of features in the DevTools in the Chrome browser.	Selenium cannot be used to work on the majority of features in the DevTools in the Chrome browser.
10.	Puppeteer can be used to execute tests on various devices with the help of the emulators.	Using an emulator with Selenium is not easy.

11.	Puppeteer can be used to obtain the time needed for a page to load.	Selenium cannot be used to obtain the time needed for a page to load.
12.	Puppeteer can be used to save a screenshot in both image and PDF formats.	Selenium can be used to save a screenshot in both image and PDF formats only in the Selenium 4 version.
13.	Puppeteer was first introduced in the year 2017.	Selenium was first introduced in the year 2004.
14.	In Puppeteer, we can verify an application without image loading.	In Selenium, we can verify an application without image loading.

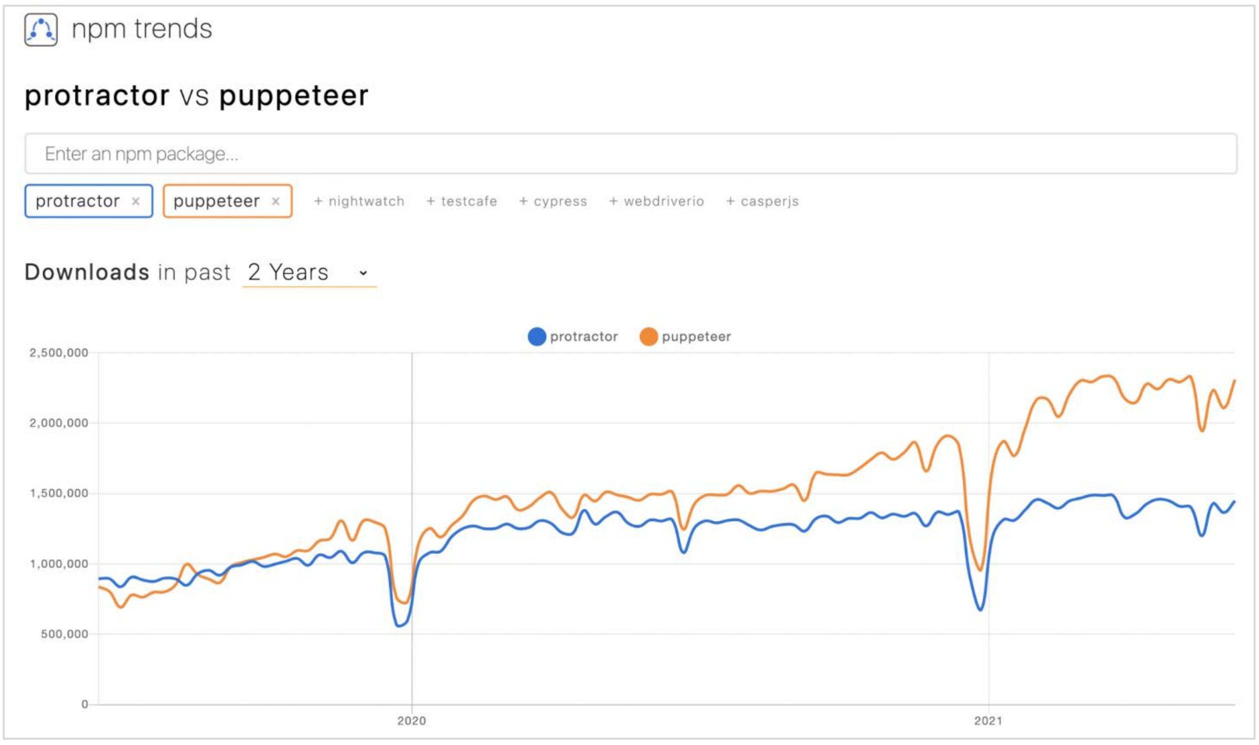
10. Puppeteer — Comparison between Puppeteer and Protractor

The major differences between Puppeteer and Protractor are given below:

Sr. No.	Puppeteer	Protractor
1.	Puppeteer is a module in node developed for Chromium engine.	Protractor is a dedicated test automation tool.
2.	Puppeteer is faster in executing tests than Protractor.	Protractor is slower in executing tests than Puppeteer.
3.	Puppeteer is developed mainly for Chromium so the tests developed are mainly executed in Chrome.	Protractor can be used to execute tests on multiple browsers like Chrome, Firefox, IE, Safari, and so on.
4.	Puppeteer can be used for API testing by utilising the requests and the responses.	API testing with Protractor is difficult.
5.	Puppeteer can be used to verify the count of CSS and JavaScript files utilised for loading a webpage.	Protractor cannot be used to verify the count of CSS and JavaScript files utilised for loading a webpage.
6.	Puppeteer can be used to work on the majority of features in the DevTools in the Chrome browser.	Protractor cannot be used to work on the majority of features in the DevTools in the Chrome browser.
7.	Puppeteer can be used to execute tests on various devices with the help of the emulators.	Using an emulator with Protractor is not easy.
8.	Puppeteer can be used to save a screenshot in both image and PDF formats.	Protractor can be used to save a screenshot in only image format.
9.	Puppeteer can be used to obtain the time needed for a page to load.	Protractor cannot be used to obtain the time needed for a page to load.
10.	In Puppeteer, we can verify an application without image loading.	In Protractor, we can verify an application without image loading.

Let us observe the npm trends of Puppeteer and Protractor for the last two years. We shall observe an upward trend towards the use of Puppeteer than Protractor (available from the below link):

https://www.npmtrends.com/protractor-vs-puppeteer



11. Puppeteer — Comparison between Puppeteer and Cypress

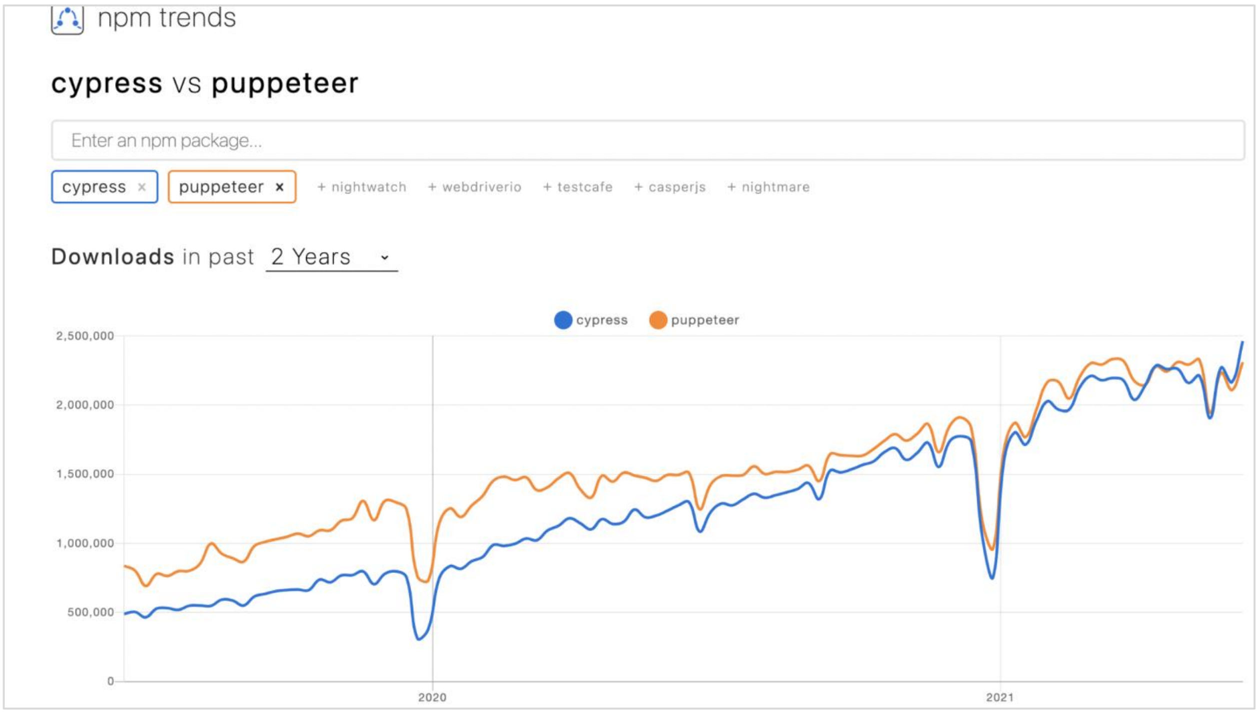
The major differences between Puppeteer and Cypress are as follows:

Sr. No.	Puppeteer	Cypress
1.	Puppeteer is a module in node developed for Chromium engine.	Cypress is a dedicated test automation framework developed in JavaScript.
2.	Puppeteer is mainly used for web page scraping and crawling SPA(Single Page Application).	Cypress is mainly used to automate test cases for a complete application.
3.	Assertions in Puppeteer are based on the Mocha, Jasmine or Jest frameworks.	Cypress has its individual assertions.
4.	VS Code and Webstorm are mostly used as an IDE for Puppeteer.	Cypress has its individual IDE.
5	Puppeteer is developed mainly for Chromium so the tests developed are mainly executed in Chrome.	Cypress can be used to execute tests on multiple browsers like Chrome, Firefox, Electron and so on.
6.	Puppeteer has no dashboard.	Cypress has its dashboard to see the recorded tests and gives us detail on the events that took place during execution.
7.	Puppeteer is faster in executing tests than Cypress.	Cypress is slower in executing tests than Puppeteer.
8.	Puppeteer APIs are not easier to use than Cypress.	Cypress APIs are easier to use than Puppeteer.
9.	Puppeteer comes free of cost.	Cypress has both free and paid versions.
10.	Puppeteer has no features of fixtures and group fixtures in tests.	Cypress has the features of fixtures and group fixtures applied in tests.

11.	Grouping of tests for execution cannot be done in Puppeteer.	Grouping of tests for execution can be done in Cypress.
12.	Puppeteer has no mocking capabilities.	Cypress has the mocking capabilities.

Let us observe the npm trends of Puppeteer and Cypress for the last two years. We shall observe an upward trend towards the use of both Puppeteer and Cypress (available from the below link):

https://www.npmtrends.com/cypress-vs-puppeteer



12. Puppeteer — Browser Operations

The browser operations can be done by Puppeteer with the help of below given methods:

launch()

It is used to open new browsers and connect with an instance of Chromium. It has some optional parameters which are as follows:

Product: This is of String type and is used to point to the browser to be launched. The syntax is as follows:

```
let l = await puppeteer.launch({product : "chrome" })
```

headless: This is of Boolean type(default value is true) and it has to be set with false value inorder to execute the tests in headed mode. The syntax is as follows:

```
let l = await puppeteer.launch({headless : false})
```

devtools: This is of Boolean type. If it is set to true, then DevTools shall open automatically in each browser tab. Also, the headless parameter should be set to false, if devtools is set to true. The syntax is as follows:

```
let l = await puppeteer.launch({devtools: true})
```

defaultViewport: This is of type object. It provides a persistent viewport for a page(default value of viewport is 800*600). We can modify the size of the viewport by mentioning integer values in width and height for pixels. The syntax is as follows:

```
let l = await puppeteer.launch({defaultViewport: { width: 500, height: 459}})
```

slowMo: This is of type number. This parameter is used to slow down the Puppeteer execution for some time, provided in milliseconds. The syntax is as follows:

```
let l = await puppeteer.launch({slowMo: 500})
```

goTo()

It is used to navigate to a webpage. The URL of the page to be navigated is passed as a parameter. The syntax is as follows:

```
await page.goto('https://www.tutorialspoint.com/index.htm')
```

close()

It is used to close an opened browser. The syntax is as follows:

```
await browser.close()
```

browserContexts()

This yields an array of all opened browser contexts.

createIncognitoBrowserContext()

It opens a new browser in incognito context.

defaultBrowserContext()

It yields a default browser context.

disconnect()

It is used to disconnect Puppeteer from the browser instance.

isConnected()

It is used to verify whether a browser is connected.

newPage()

It yields a Promise with a new page object.

pages()

It yields a Promise with an array of all open page objects.

process()

It yields a browser process if the instance is created with the launch method. Furthermore, it yields a null value if the instance is created with the connect method.

target()

It yields the target for a browser.

targets()

It yields a Promise containing the array of all targets which are active.

13. Puppeteer — Handling Tabs

We can handle tabs in Puppeteer using the below methods:

newPage()

We can open a new tab using this method available in the browser object. The syntax is as follows:

```
const p = await browser.newPage()
```

close()

We can close the tab opened using this method. The syntax is as follows:

```
await p.close()
```

close()

We can close all the tabs opened using this method available in the browser object. The syntax is as follows:

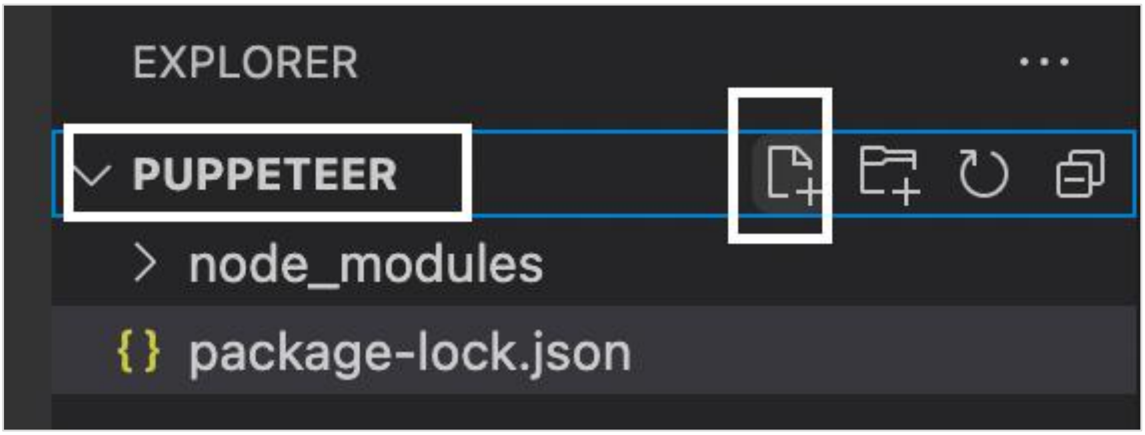
```
await browser.close()
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

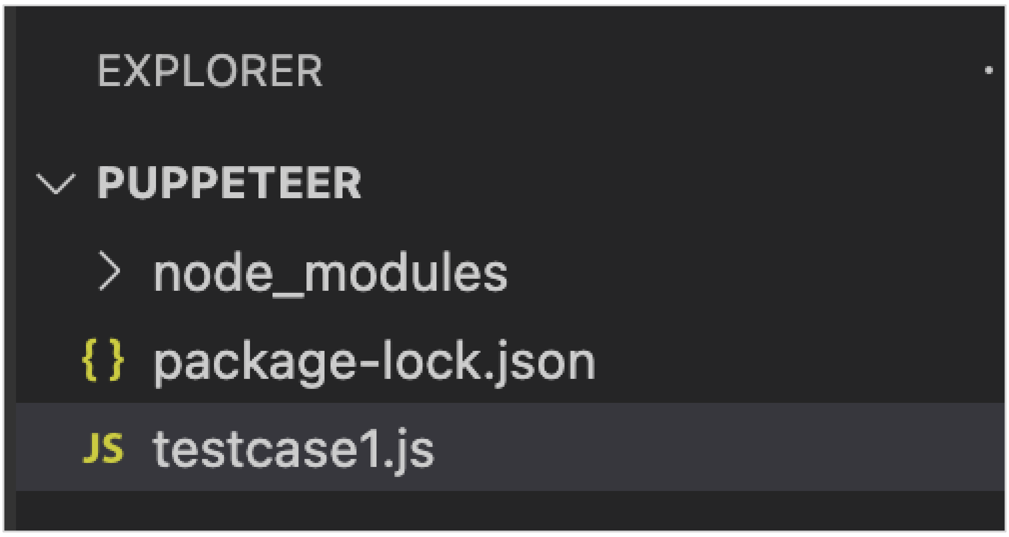
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

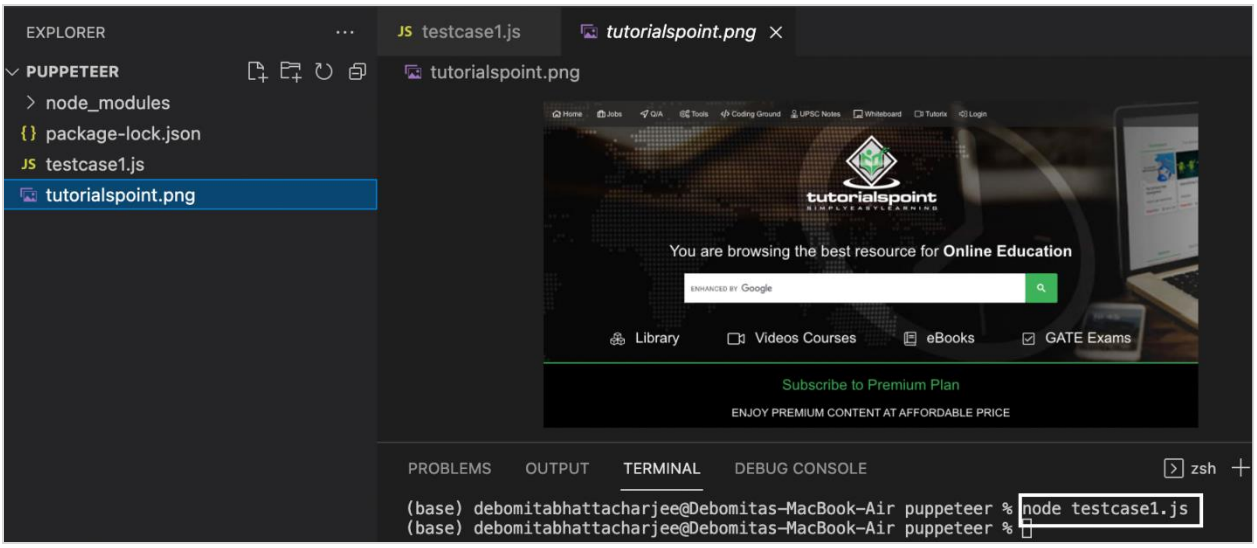
```
//adding Puppeteer library
const pt = require('puppeteer')
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/index.htm')
    //capture screenshot
    await p.screenshot({
        path: 'tutorialspoint.png'
    });
    //browser close
    await browser.close()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer %
```

After the command has been successfully executed, a new file called the tutorialspoint.png gets created within the page directory. It contains the captured screenshot of the page launched in the browser.

14. Puppeteer — Basic Commands

Some of the basic commands of Puppeteer are listed below:

title()

This command is used to obtain the title of the present page. The syntax is as follows:

```
await page.title()
```

url()

This command is used to obtain the URL of the application currently launched in the browser. The syntax is as follows:

```
await page.url()
```

content()

This command is used to obtain the page source code The syntax is as follows:

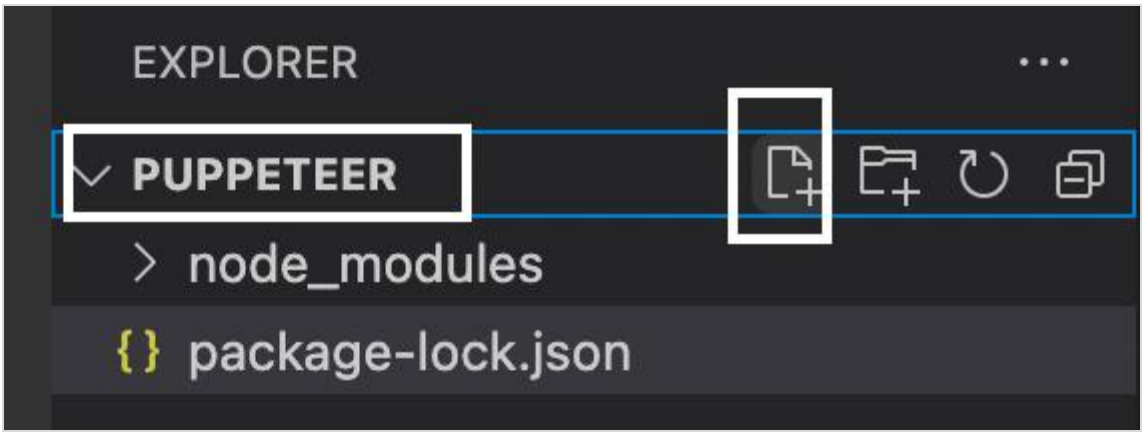
```
await page.content()
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

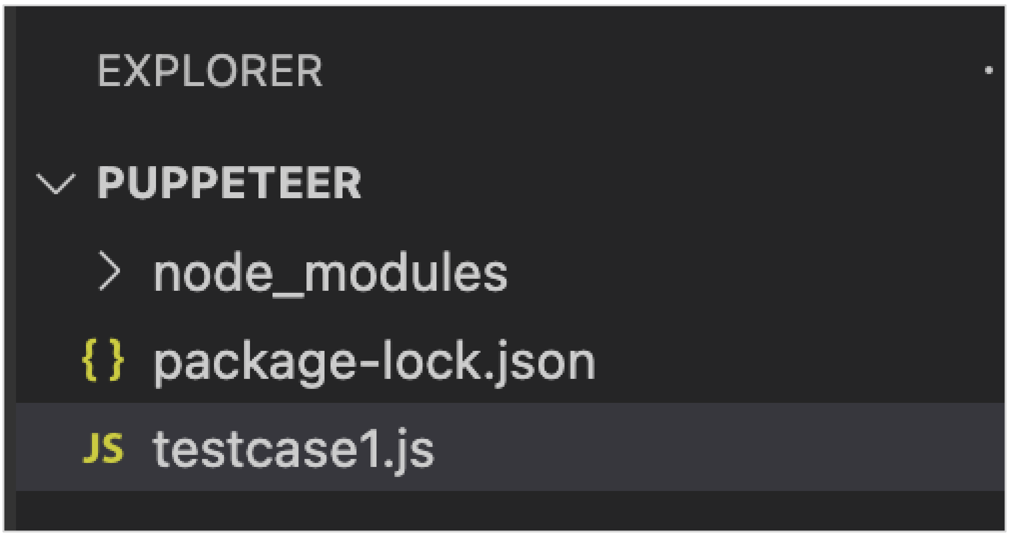
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

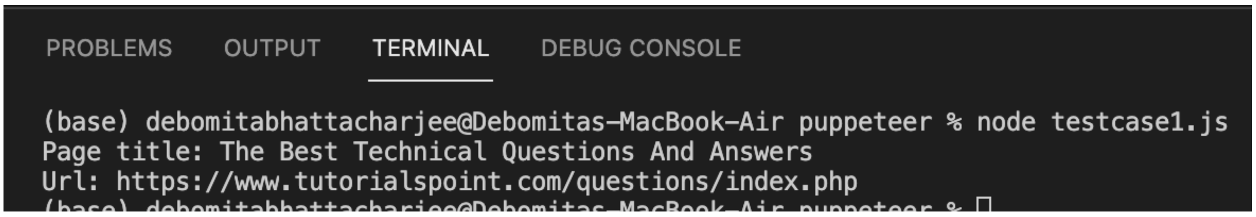
```
//adding Puppeteer library
const pt = require('puppeteer');
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/questions/index.php')
    //obtain page title
    console.log("Page title: " + await p.title())
    //obtain URL
     console.log("Url: " + await p.url())
    //browser close
    await browser.close()
})
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Page title: The Best Technical Questions And Answers
Url: https://www.tutorialspoint.com/questions/index.php
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % 
```

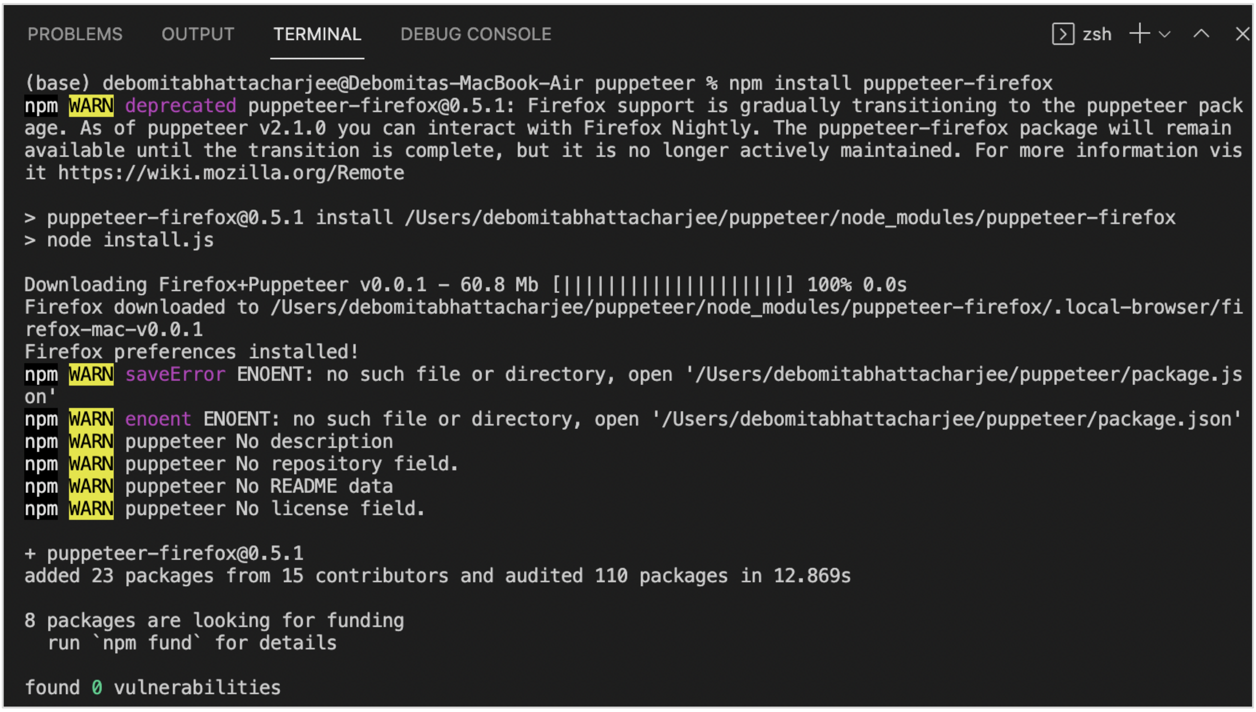
After the command has been successfully executed, the page title - The Best Technical Questions and Answers gets printed in the console. Also, the URL - https://www.tutorialspoint.com/questions/index.php gets printed in the console. The execution has happened in the headless mode.

15. Puppeteer with Firefox

We can run the tests developed in Puppeteer in Firefox. It must be remembered that while executing the test in Firefox, Puppeteer uses its internal Firefox browser and not the Firefox browser installed in the local system.

Step 1: We have to first install Puppeteer for the Firefox browser by executing the below command:

```
npm install puppeteer-firefox
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % npm install puppeteer-firefox
npm WARN deprecated puppeteer-firefox@0.5.1: Firefox support is gradually transitioning to the puppeteer pack
age. As of puppeteer v2.1.0 you can interact with Firefox Nightly. The puppeteer-firefox package will remain
available until the transition is complete, but it is no longer actively maintained. For more information vis
it https://wiki.mozilla.org/Remote

> puppeteer-firefox@0.5.1 install /Users/debomitabhattacharjee/puppeteer/node_modules/puppeteer-firefox
> node install.js

Downloading Firefox+Puppeteer v0.0.1 - 60.8 Mb [||||||||||||||||||||] 100% 0.0s
Firefox downloaded to /Users/debomitabhattacharjee/puppeteer/node_modules/puppeteer-firefox/.local-browser/fi
refox-mac-v0.0.1
Firefox preferences installed!
npm WARN saveError ENOENT: no such file or directory, open '/Users/debomitabhattacharjee/puppeteer/package.js
on'
npm WARN enoent ENOENT: no such file or directory, open '/Users/debomitabhattacharjee/puppeteer/package.json'
npm WARN puppeteer No description
npm WARN puppeteer No repository field.
npm WARN puppeteer No README data
npm WARN puppeteer No license field.

+ puppeteer-firefox@0.5.1
added 23 packages from 15 contributors and audited 110 packages in 12.869s

8 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```

Also, we have to add the Firefox-Puppeteer library in the code.

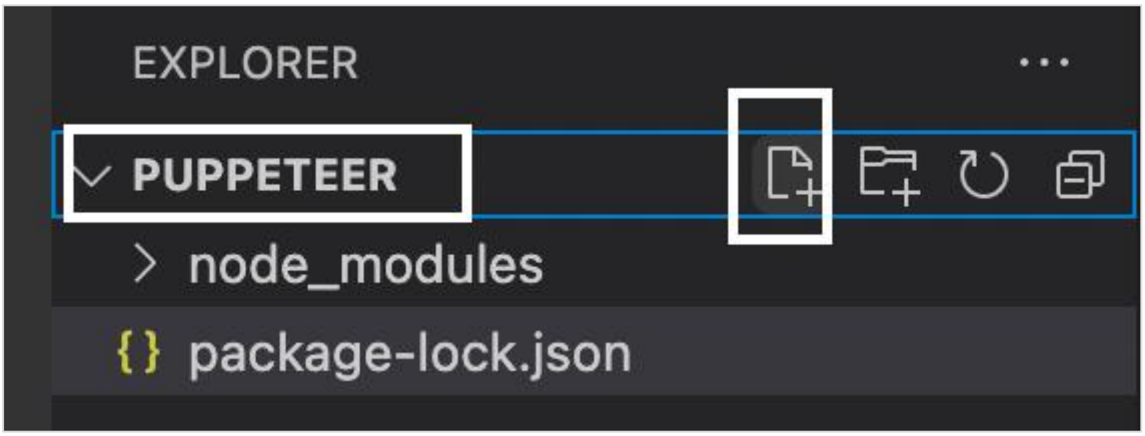
```
const f = require('puppeteer-firefox')
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

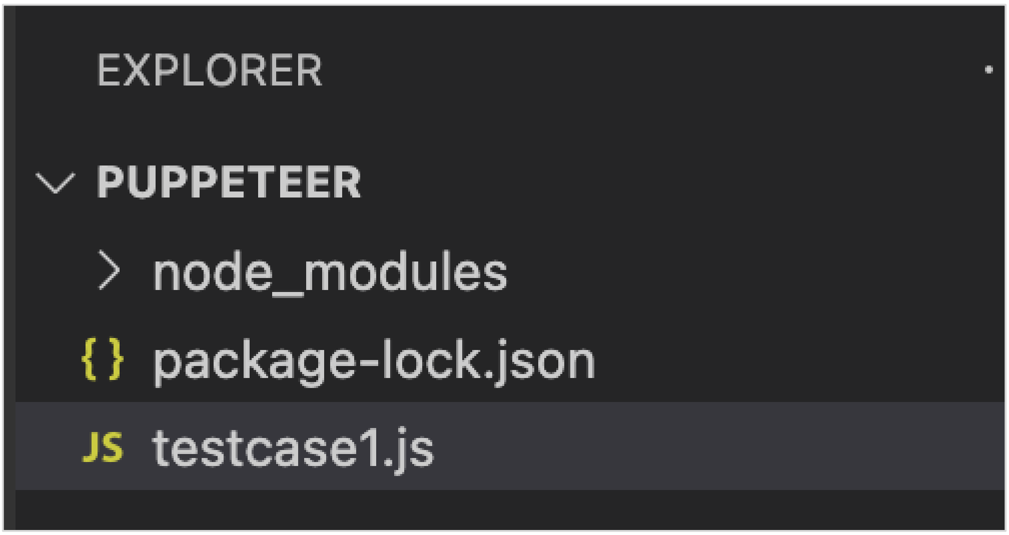
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

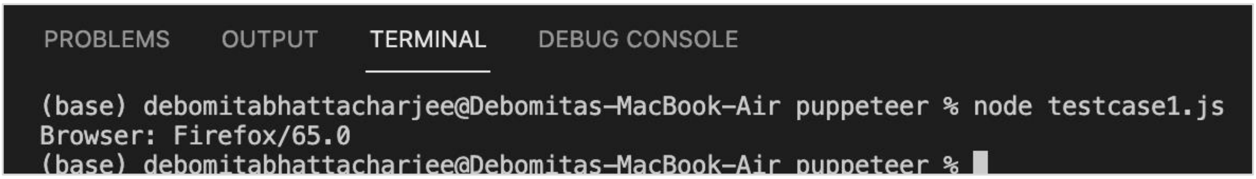
```
//adding Puppeteer- Firefox library
const pt = require('puppeteer-firefox');
//adding headless flag to false
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/about/about_careers.htm')
    //get browser
    const v = await p.browser().version();
    console.log("Browser: " + v)
    //browser close
    await browser.close()
})
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Browser: Firefox/65.0
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer %
```

After the command has been successfully executed, the browser in which the test is executed - Firefox/65.0 gets printed in the console.

16. Puppeteer with Chrome

The tests written in Puppeteer are executed in the Chrome or Chromium browser in a headless mode by default. Also, we have to add the below Puppeteer library in the code.

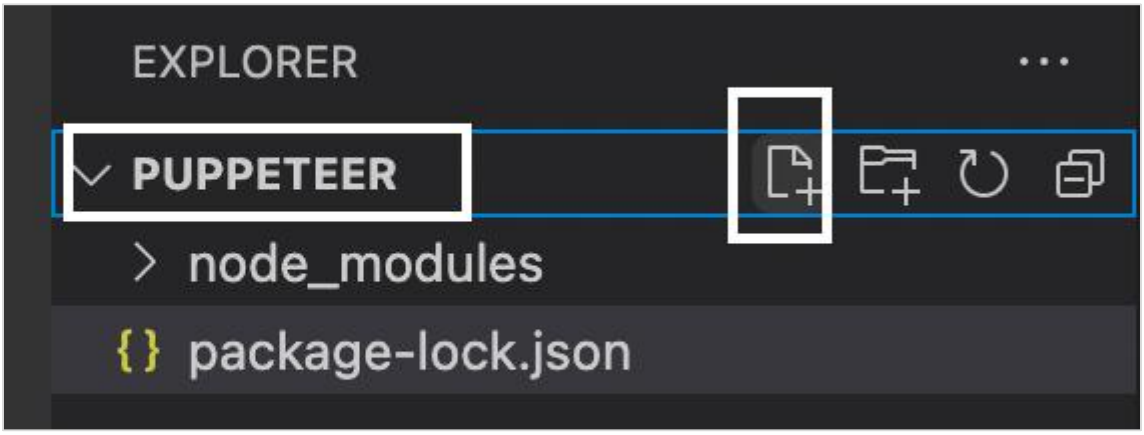
```
const pt = require('puppeteer')
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

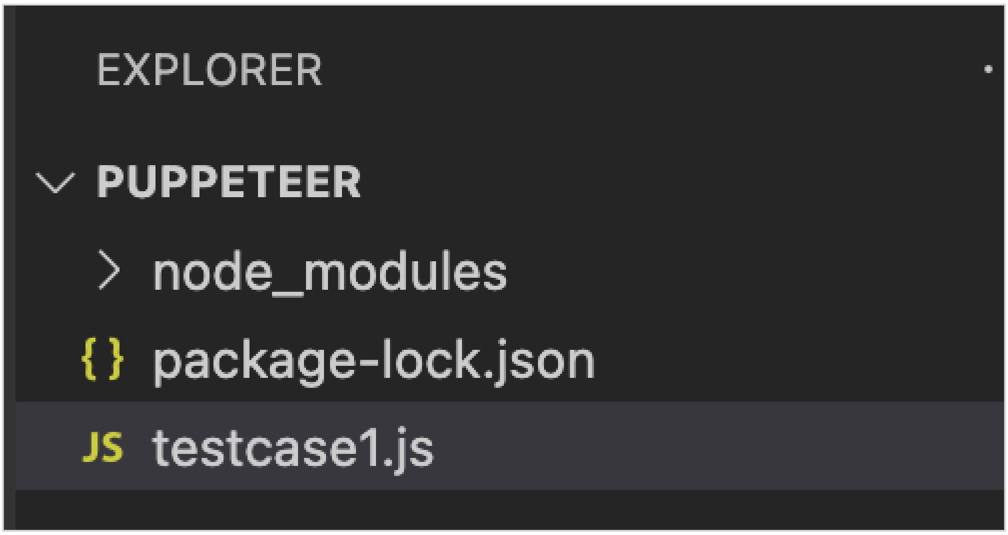
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

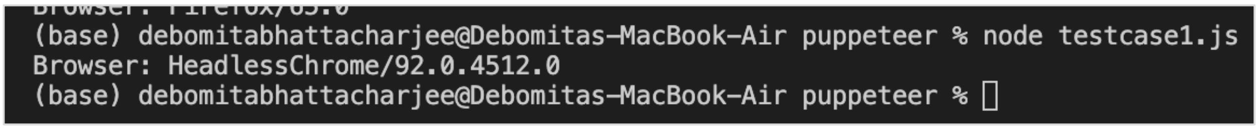
```
//adding Puppeteer library
const pt = require('puppeteer');
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/index.htm')
     //get browser
     const v = await p.browser().version();
     console.log("Browser: " + v)
     //browser close
     await browser.close()
 })
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Browser: HeadlessChrome/92.0.4512.0
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % 
```

After the command has been successfully executed, the browser in which the test is executed - HeadlessChrome/92.0.4512.0 gets printed in the console.

17. Puppeteer — Handling Confirm Alerts

Puppeteer is capable of handling Alerts. The automation tools like Selenium, WebdriverIO, and so on, accept or dismiss an alert after it has appeared on the page.

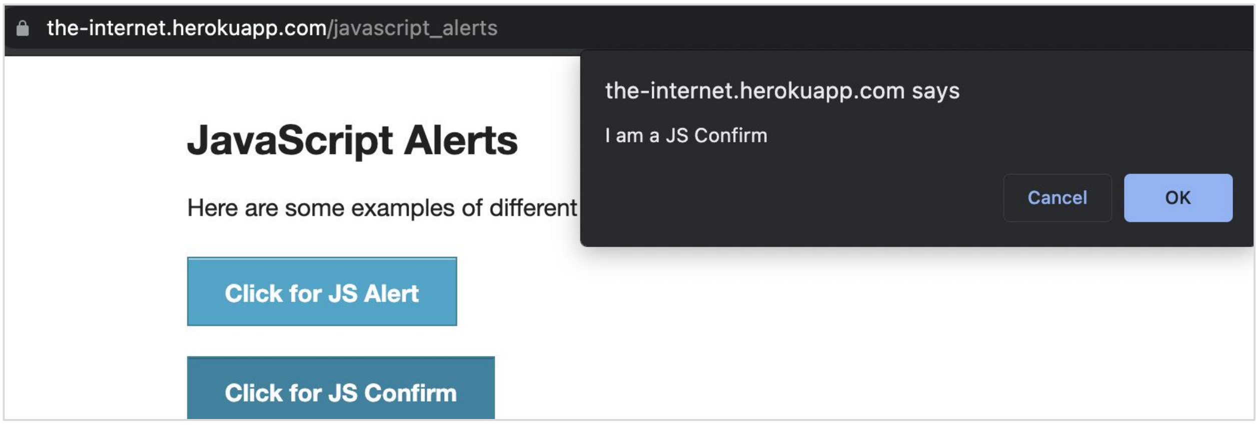
However in Puppeteer, the user has to give direction whether to accept or dismiss an alert before it appears on the page. For this, the on event listener has to be triggered using Puppeteer.

Methods for Handling Confirm Alerts

Some methods to work with Alerts are listed below:

- **accept(): Promise<void>** - This method is used to accept an alert.
- **message(): string** - This method is used to yield the message obtained in an alert.
- **type(): DialogType** - This method is used to obtain the Dialog type. A Dialog type can be a prompt, confirm or prompt.
- **dismiss(): Promise<void>** - This method is used to dismiss an alert.

In the below given image, on clicking Click for JS Confirm, a confirm alert is displayed. Let us obtain the text on the alert.


the-internet.herokuapp.com/javascript_alerts
JavaScript Alerts
Here are some examples of different
Click for JS Alert
Click for JS Confirm
Cancel
OK

the-internet.herokuapp.com says

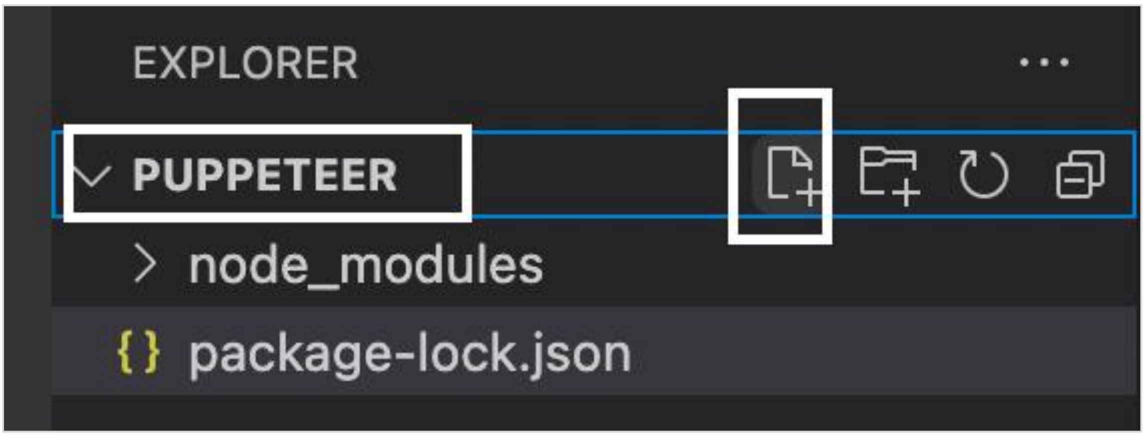
I am a JS Confirm

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

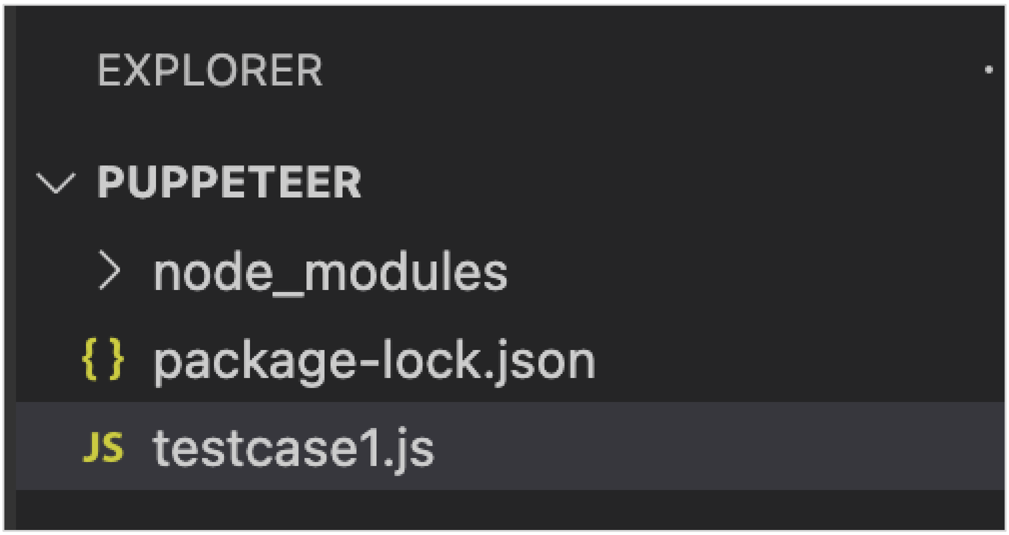
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

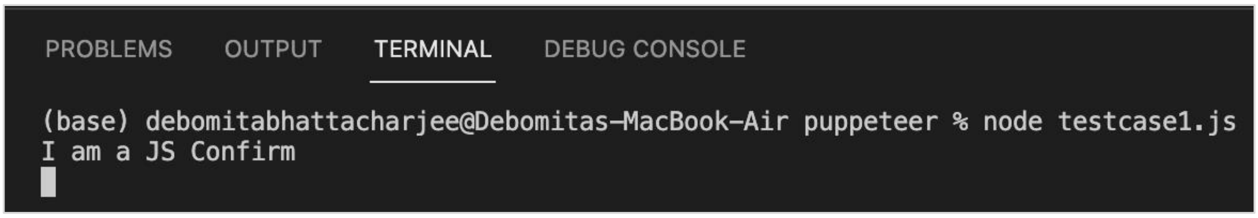
```
//Puppeteer library
const pt= require('puppeteer')
async function confirmAlert(){
    //launch browser in headless mode
    const browser = await pt.launch()
    //browser new page
    const page = await browser.newPage();
    //on event listener trigger
     page.on('dialog', async dialog => {
    //get alert message
    console.log(dialog.message());
    //accept alert
    await dialog.accept();
     })
    //launch URL
      await page.goto('https://the-internet.herokuapp.com/javascript_alerts')
    //identify element with xpath then click
    const b = (await page.$x("//button[text()='Click for JS Confirm']"))[0]
     b.click()
}
confirmAlert()
```

Step 4: Execute the code with the following command

```
node <filename>
```

So in our example, we shall run the command given below:

```
node testcase1.js
```

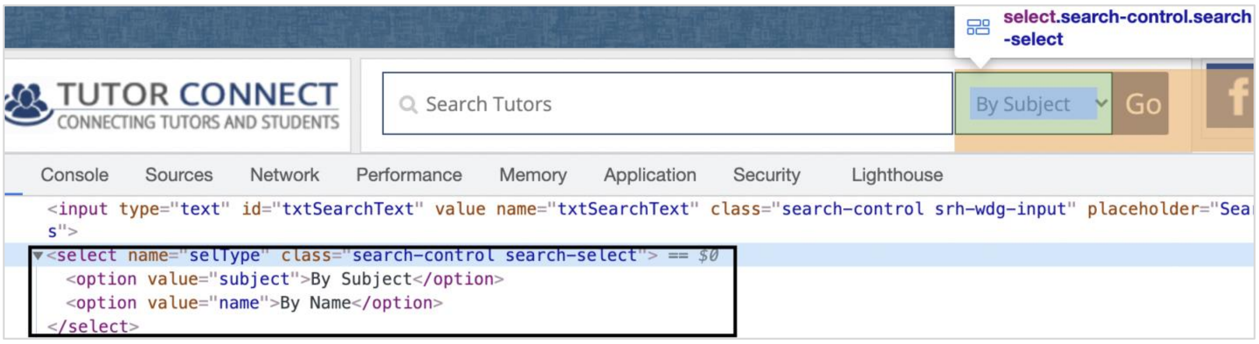


```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
I am a JS Confirm
```

After the command has been successfully executed, the confirm alert text - I am a JS Confirm gets printed in the console.

18. Puppeteer — Handling Drop-downs

We can handle drop downs in the UI while automating a test using Puppeteer. The static drop downs are identified in the html code with the tagname as select and its options have the tagname as option.



```
<input type="text" id="txtSearchText" value name="txtSearchText" class="search-control srh-wdg-input" placeholder="Sea
s">
▼<select name="selType" class="search-control search-select"> == $0
  <option value="subject">By Subject</option>
  <option value="name">By Name</option>
</select>
```

Methods to Handle Dropdown

Some methods to work with static dropdowns:

select()

This method is used to select an option from the dropdown. The value of the option to be selected is passed as a parameter to this method. The syntax is as follows:

```
const page = await browser.newPage()
 const f = await page.$('[name="selType"]')
await f.select("subject")
```

We can also select multiple options from a multi-select dropdown. The syntax is as follows:

```
await f.select("subject", "name")
```

To obtain select value from the dropdown, we have to use the getProperty method and pass value as a parameter to this field.

```
const v = await (await n.getProperty("value")).jsonValue()
console.log(v)
```

type()

This method is used to select an option from the dropdown. The value of the option to be selected is passed as a parameter to this method. The syntax is as follows:

```
const page = await browser.newPage()
```

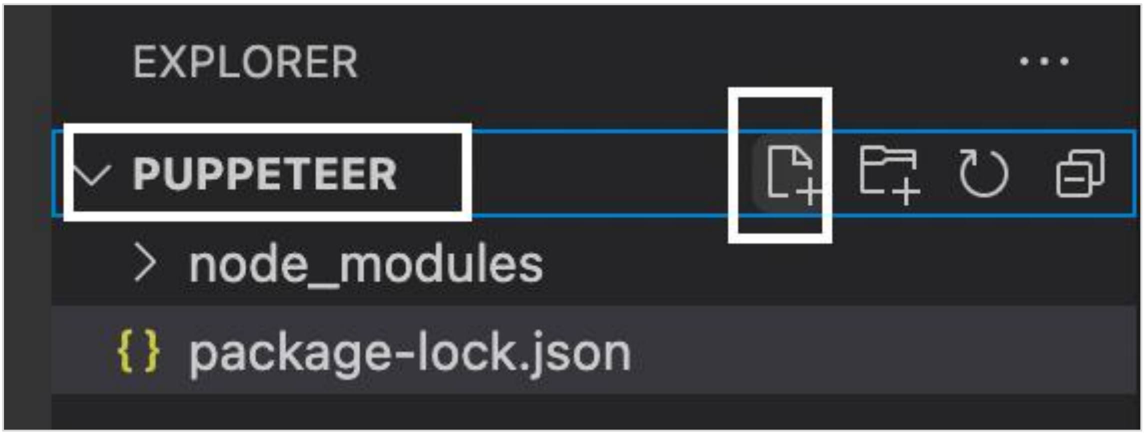
```
 const f = await page.$('[name="selType"]')
await f.type("subject")
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

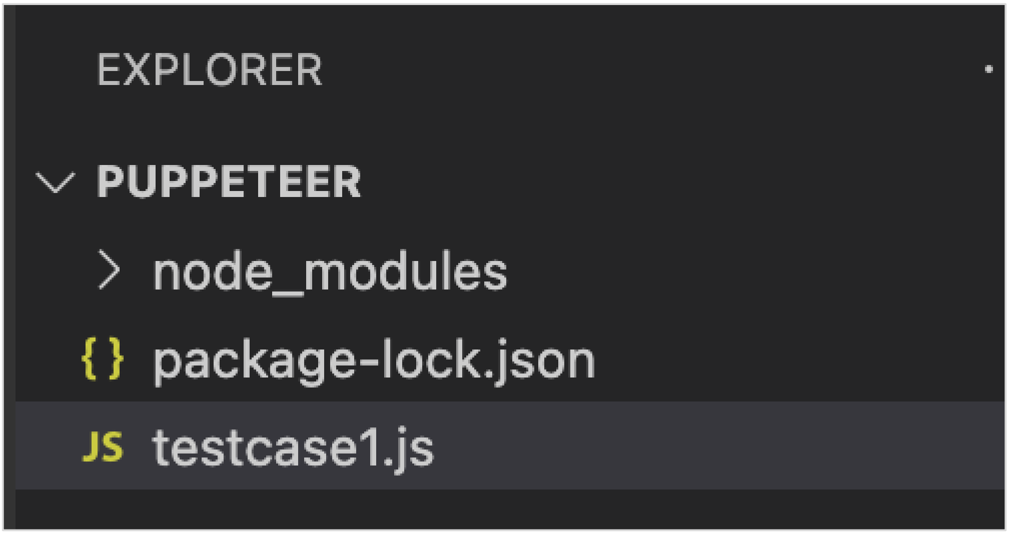
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function dropDownHandle(){
    //launch browser in headless mode
```

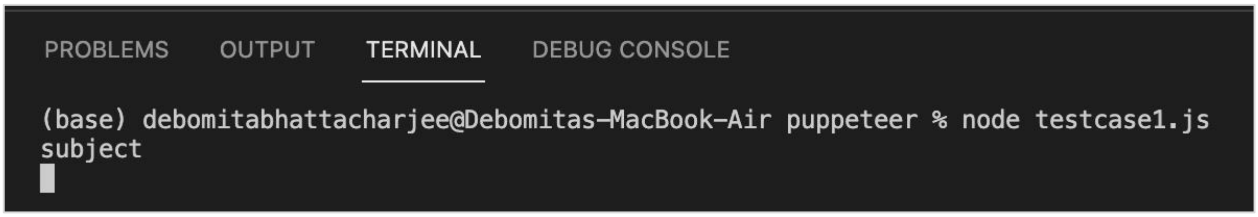
```
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/tutor_connect/index.php')
     //identify dropdown then select an option by value
     const f = await page.$('[name="selType"]')
     await f.select("subject")
     //wait for sometime
     await page.waitForTimeout(4000)
     //get value selected
     const v = await (await f.getProperty("value")).jsonValue()
     console.log(v)
}
dropDownHandle()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.j
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
subject
```

After the command has been executed successfully, the value of the option selected in the dropdown - subject is printed in the console.

19. Puppeteer — Locators

We can handle elements on page with Puppeteer. Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. To get the property of an element uniquely we need to inspect it (right-click on the element then select the option Inspect). The ElementHandle objects are created by the methods - page.$, page.$$ and page.$x. These objects refer to an element or tag in a page.

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, and class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element. For this, we have to use the xpath expression.

Methods to locate elements

These methods are listed below:

page.$(locator value)

This method yields a Promise with the ElementHandle. The ElementHandle is an object of the identified element. If there are multiple elements having the same locator value, then only the first matching element from the top left corner of the page shall be returned.

page.$$(locator value)

This method yields a Promise with an array of ElementHandle. If there are multiple elements having the same locator value, then all matching elements shall be returned in the form of an array.

page.$x(xpath value)

This method yields a Promise with an array of ElementHandle. If there are multiple elements having the same xpath value, then all matching elements shall be returned in the form of an array. In case, there is one matching element, then the array returned shall have a single element.

The ElementHandle methods like elementHandle.$, elementHandle.$$ and elementHandle.$x can be applied to an element. In that case, an element shall be searched within the DOM of the present ElementHandle and not in the entire DOM.

In the below given image, let us take the example of an element having the li tag(having a parent element ul) and class attribute value as heading.

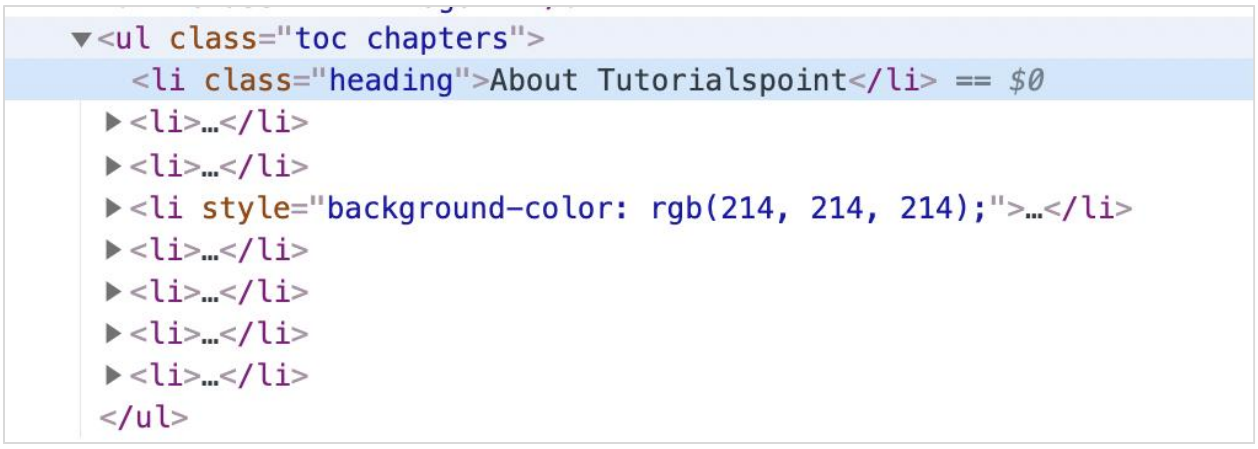
To identify it using the ElementHandle method on the page, the expression should be as follows:

```
const n = await page.$(".heading")
```

To identify it using the ElementHandle method on an element, the expression should be:

```
const m = await page.$("ul")

const p = await m.$(".heading")
```

Now, refer the image given below of an element having the li tag



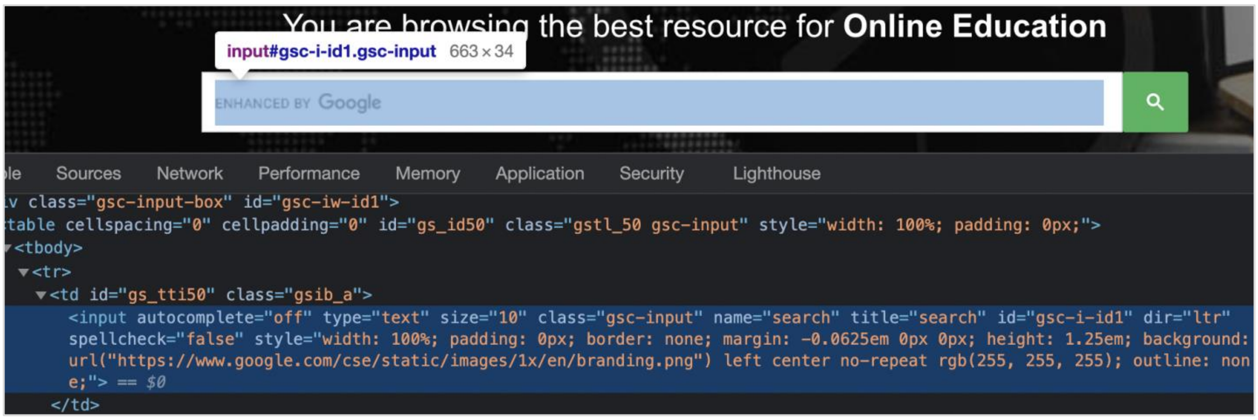
```
▼<ul class="toc chapters">
    <li class="heading">About Tutorialspoint</li> == $0
  ▶<li>…</li>
  ▶<li>…</li>
  ▶<li style="background-color: rgb(214, 214, 214);">…</li>
  ▶<li>…</li>
  ▶<li>…</li>
  ▶<li>…</li>
  ▶<li>…</li>
 </ul>
```

Types of Locators

The types of locators in Puppeteer are listed below:

- ID
- Class
- Type
- Xpath
- Attribute
- Type

To work with the above locators we should have the basic understanding of HTML code. Let us take an example of an edit box having the below properties:


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
le Sources Network Performance Memory Application Security Lighthouse

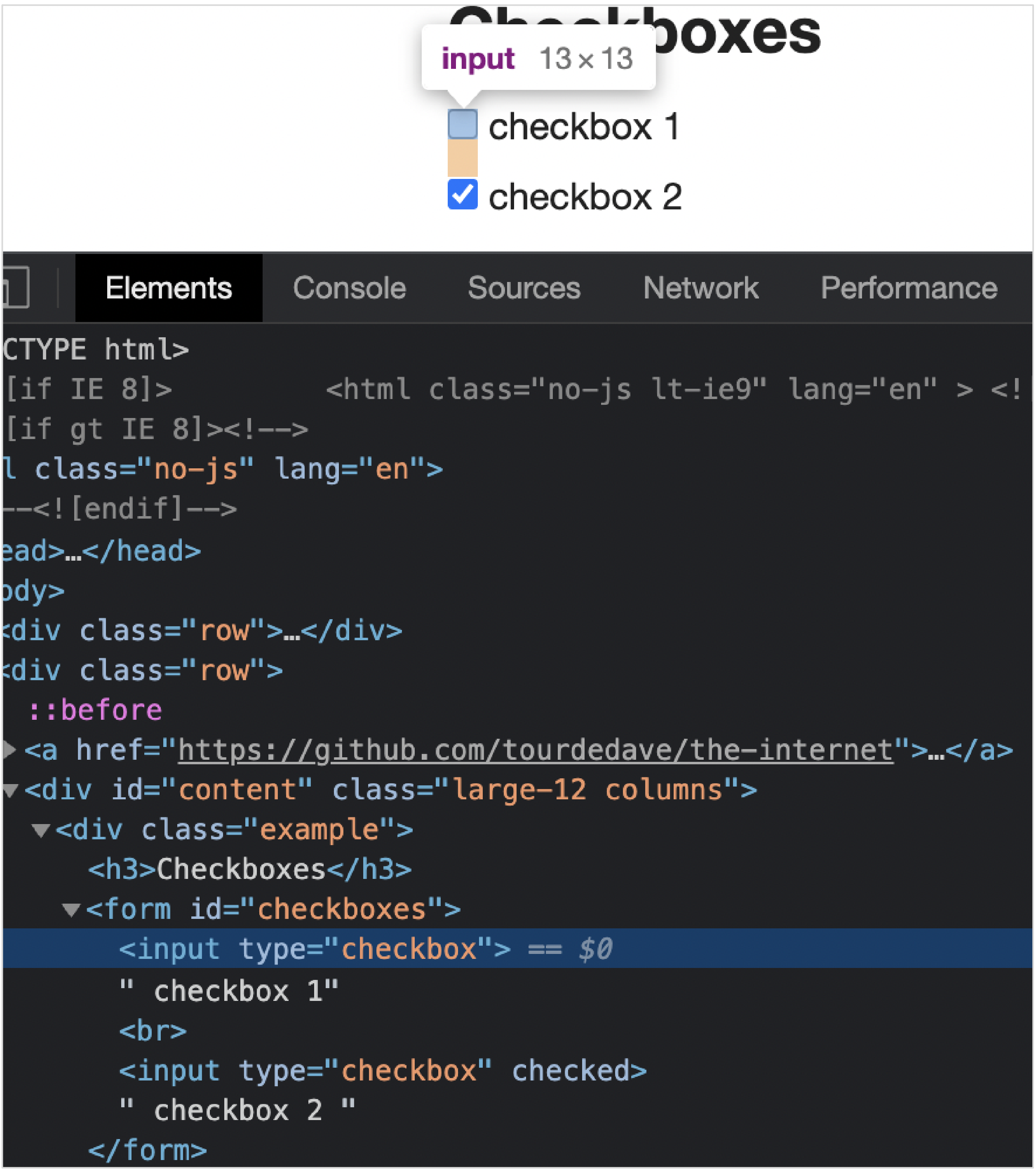
```
v class="gsc-input-box" id="gsc-iw-id1">
table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
 <tbody>
  <tr>
   <td id="gs_tti50" class="gsib_a">
      <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
      spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
      url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 255, 255); outline: non
      e;"> == $0
    </td>
```

Here, input is the tagname. A tag in HTML may or may not have attributes. The type, class, name, id and so on are the attributes of the element.

For example, in the expression id = "gsc-i-id1", text to the left of = is the attribute name (id) and to the right of = is the attribute value (gsc-i-id1).

An attribute may or may not have a value assigned. Also, if a value is assigned, then it should be enclosed in double or single quotes. The value of an attribute is set by a developer as per his choice.

Let us take an example of an element having the below html code:



```
CTYPE html>
[if IE 8]>         <html class="no-js lt-ie9" lang="en" > <!
[if gt IE 8]><!-->
l class="no-js" lang="en">
--<![endif]-->
ead>…</head>
ody>
<div class="row">…</div>
<div class="row">
  ::before
 <a href="https://github.com/tourdedave/the-internet">…</a>
 <div id="content" class="large-12 columns">
  <div class="example">
     <h3>Checkboxes</h3>
   <form id="checkboxes">
       <input type="checkbox"> == $0
       " checkbox 1"
       <br>
       <input type="checkbox" checked>
       " checkbox 2 "
     </form>
```

We can identify the first checkbox in the above image, with the expression:

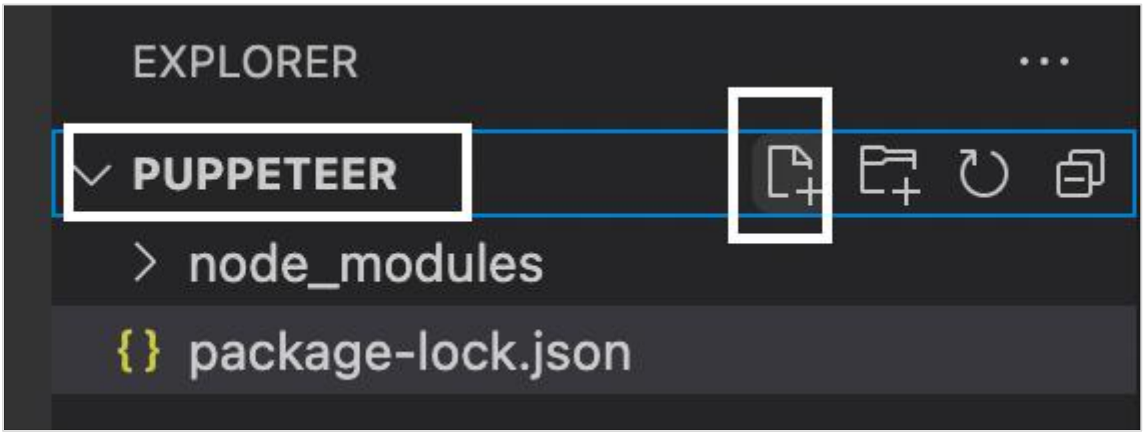
```
const n = await page.$("input[type='checkbox']")
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

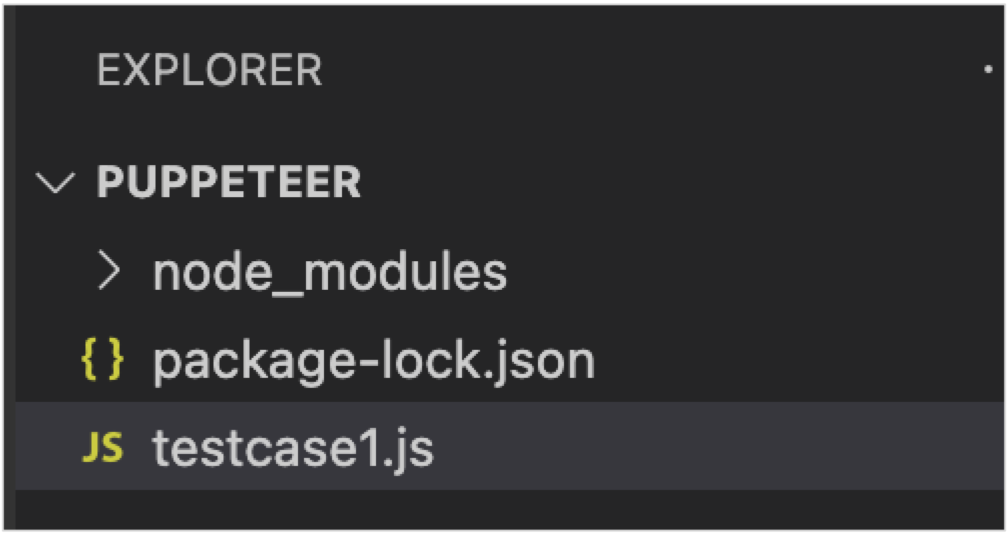
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function checkBoxHandle(){
    //launch browser in headed mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://the-internet.herokuapp.com/checkboxes')
     //identify element with xpath then click
     const n = await page.$("input[type='checkbox']")
     n.click()
```

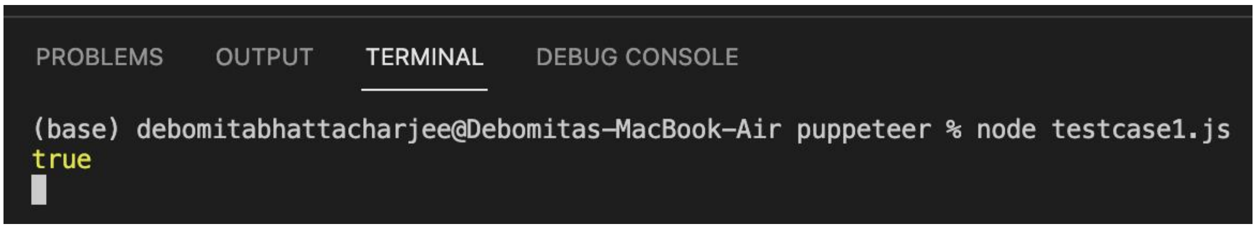
```
      //wait for sometime
      await page.waitForTimeout(4000)
      //verify if checkbox is checked
      const v = await (await n.getProperty("checked")).jsonValue()
      console.log(v)
}
checkBoxHandle()
```

Step 4: Execute the code with the below mentioned command:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
true
```

After the command has been executed successfully, the boolean value true is printed in the console. This is returned by getProperty("checked") which returns true as the checkbox is selected.

20. Puppeteer — Xpath Functions

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, and class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element. For this, we have to use the xpath expression.

If there are duplicate attributes or no attribute for an element, then the function text() is used to identify an element. In order to use the text() function, it is mandatory that the element should have a text visible on the page.

The syntax for the use of text() function is as follows:

```
//tagname[text()='visible text on element']
```

If the value of an element or the text is partially dynamic in nature or very lengthy, we can use the contains() function. In order to use the contains() function, it is mandatory that the element should either have an attribute value or a text.

The syntax for the use of contains() function is as follows:

```
//tagname[contains(@attribute,'value')]

//tagname[contains(text(),'visible text on element')]
```

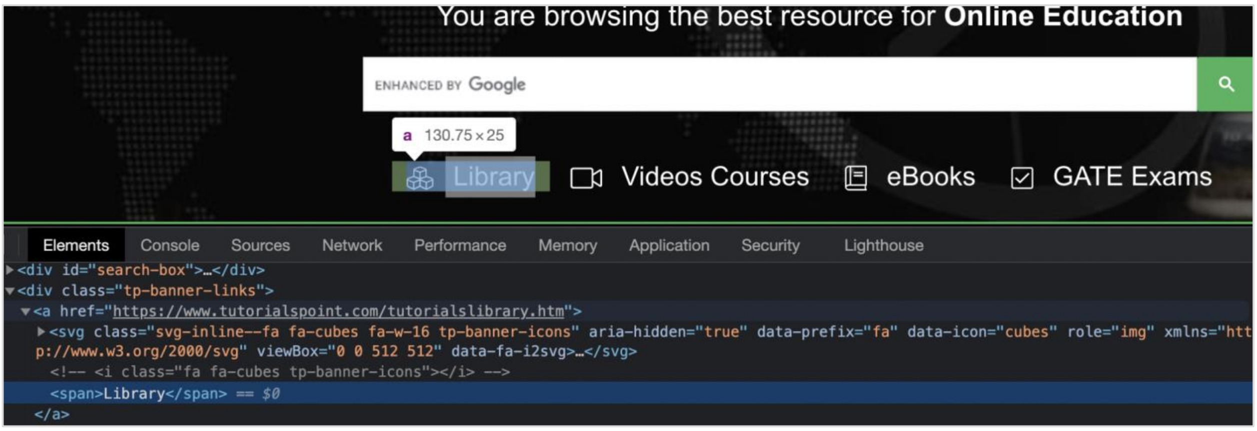
If the text of an element begins with a particular text, we can use the starts-with() function to it.

The syntax for the use of starts-with() function is as follows:

```
//tagname[starts-with(text(),'visible text on element')
```

In all the above functions, tagname is optional. Instead of tagname, we can use the symbol *.

In the below image, let us identify the element - Library with the help of its displayed text and then click on it.



```
▶<div id="search-box">…</div>
▼<div class="tp-banner-links">
  ▼<a href="https://www.tutorialspoint.com/tutorialslibrary.htm">
    ▶<svg class="svg-inline--fa fa-cubes fa-w-16 tp-banner-icons" aria-hidden="true" data-prefix="fa" data-icon="cubes" role="img" xmlns="htt
    p://www.w3.org/2000/svg" viewBox="0 0 512 512" data-fa-i2svg>…</svg>
     <!-- <i class="fa fa-cubes tp-banner-icons"></i> -->
     <span>Library</span> == $0
    </a>
```

The xpath for the element shall be //*[text()='Library'].

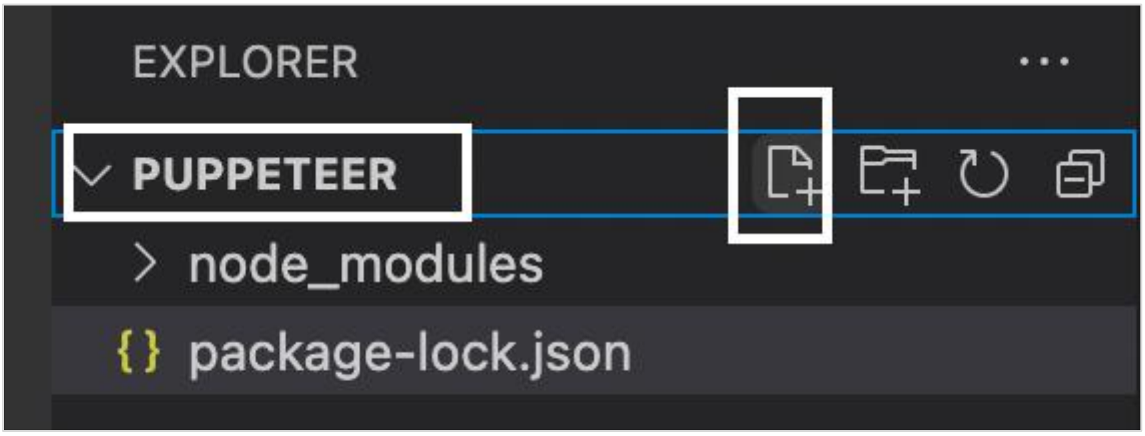
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The detail on this method is discussed in the Chapter - Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

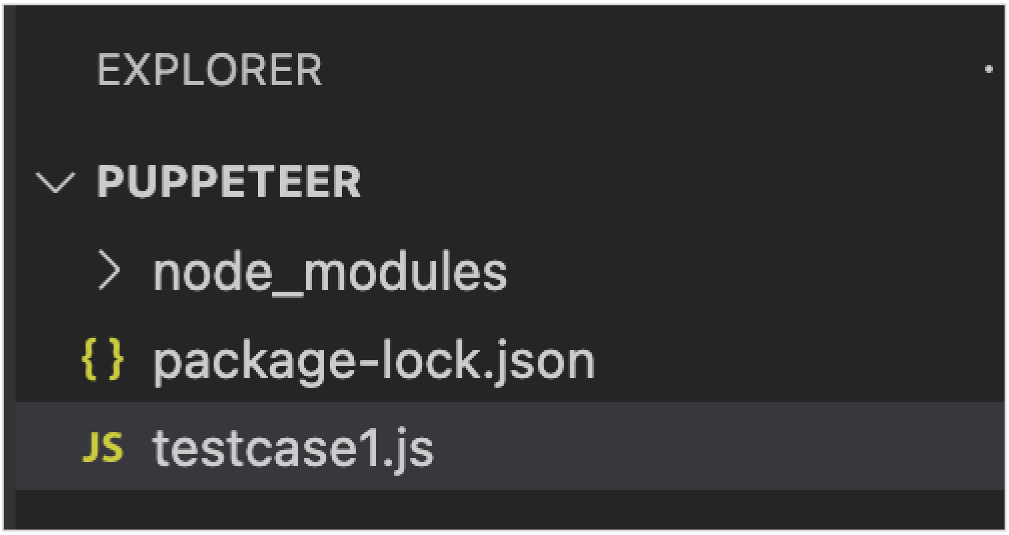
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

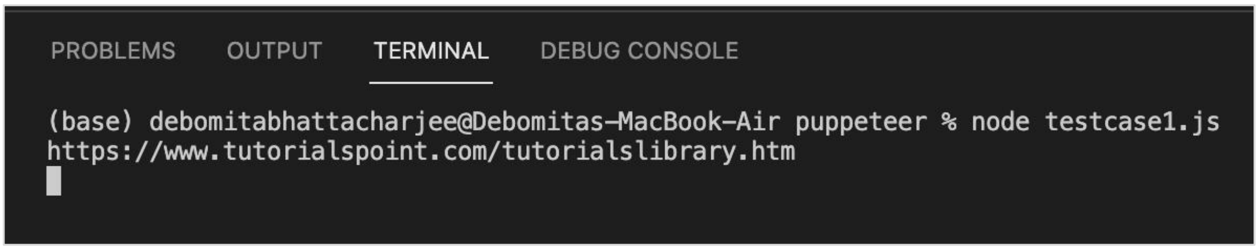
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorFunTextXpath(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element with xpath function - text() then click
     const b = (await page.$x("//*[text()='Library']"))[0]
     b.click()
     //wait for sometime
     await page.waitForTimeout(4000)
    //obtain URL after click
     console.log(await page.url())
}
selectorFunTextXpath()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
https://www.tutorialspoint.com/tutorialslibrary.htm
```

After the command has been successfully executed, the URL of the page navigated on clicking the element Library - https://www.tutorialspoint.com/tutorialslibrary.htm gets printed in the console.

21. Puppeteer — Xpath Attributes

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, and class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element. For this, we have to use the xpath expression.

If an xpath expression with a single attribute identifies multiple elements, we can use more than one attribute in the xpath expression to locate a single element.

The format for writing an xpath with only one attribute is as follows:

```
//tagname[@attribute='value']
```

For multiple attributes, we can apply AND and OR conditions. The format for writing an xpath with AND condition:

```
//tagName[@attribute1='value1'] [@attribute2='value2']
```

Or,

```
//tagName[@attribute1='value1' and @attribute2='value2']
```

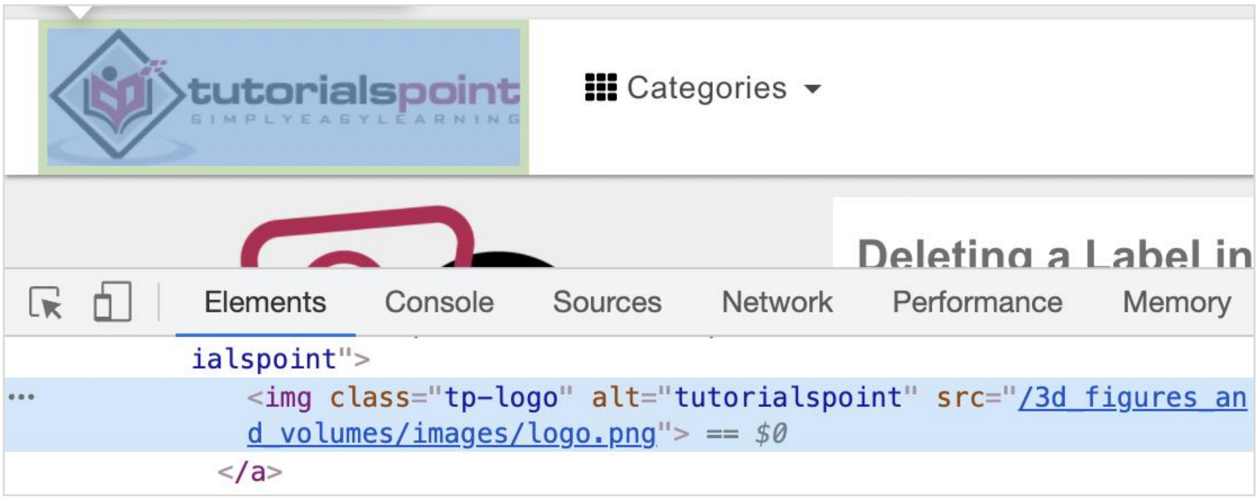
The format for writing an xpath with OR condition is as follows:

```
//tagName[@attribute1='value1' or @attribute2='value2']
```

We can also identify an element by applying the NOT condition on an attribute. The format for writing an xpath with NOT condition:

```
//tagname[not(@attribute='value')]
```

Let us identify the below highlighted logo on the page with the help of the alt attribute and then click on it.



```
ialspoint">
    <img class="tp-logo" alt="tutorialspoint" src="/3d_figures_and_volumes/images/logo.png"> == $0
  </a>
```

The xpath for the element shall be as follows:

```
//img[@alt='tutorialspoint'].
```

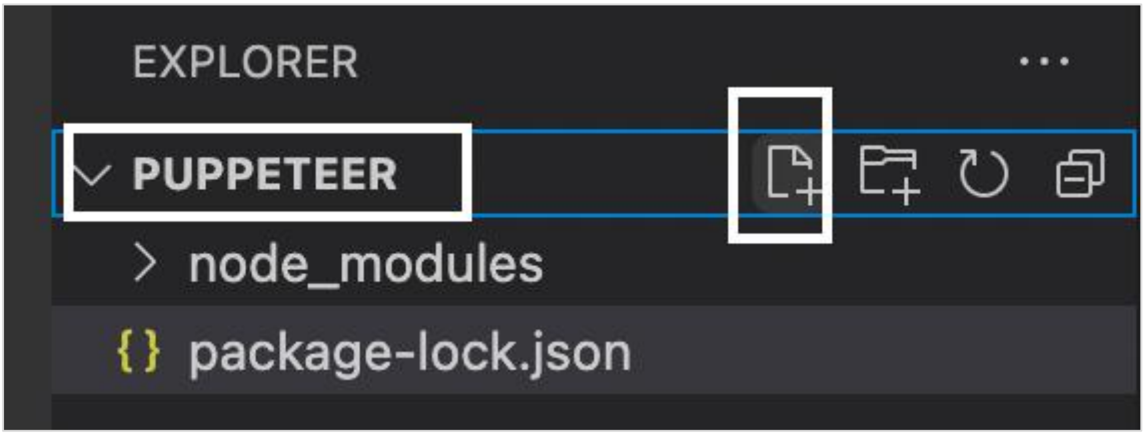
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The detail on this method is discussed in the Chapter of Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

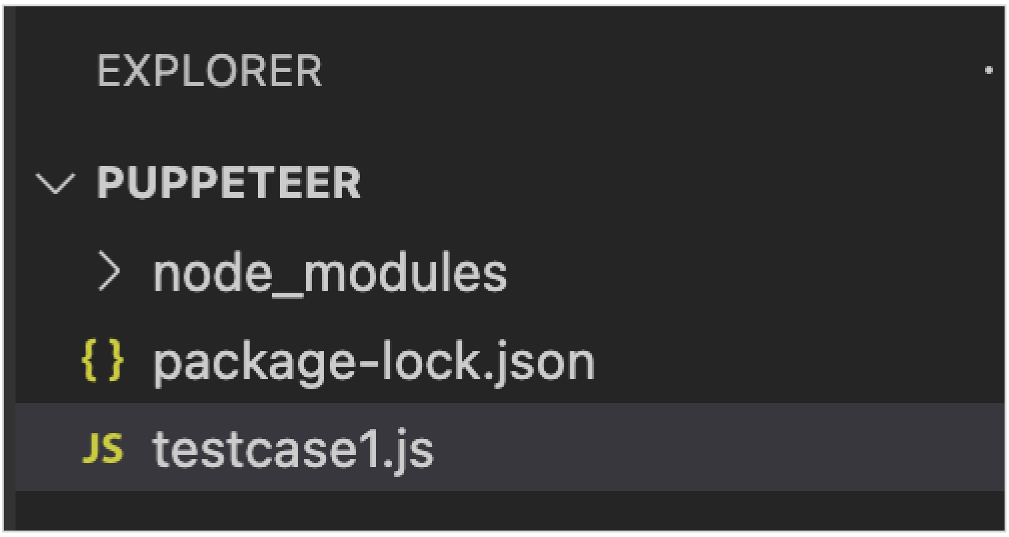
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

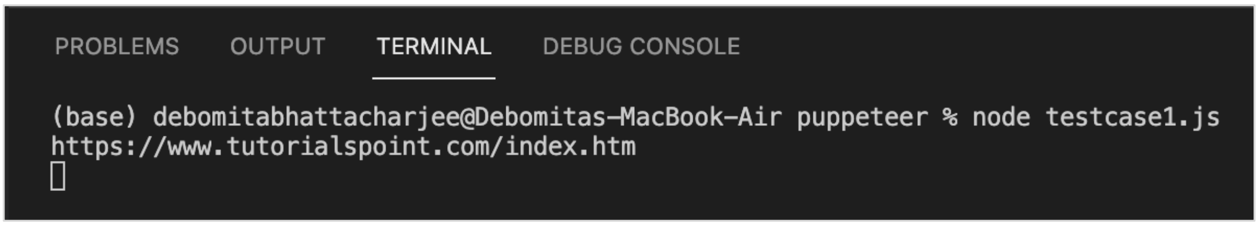
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorAttributeXpath(){
    //launch browser in headed mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/questions/index.php')
     //identify element with relative xpath then click
     const b = (await page.$x("//img[@alt='tutorialspoint']"))[0]
     b.click()
   //wait for sometime
     await page.waitForTimeout(4000)
    //obtain URL after click
     console.log(await page.url())
}
selectorAttributeXpath()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
https://www.tutorialspoint.com/index.htm
```

After the command has been successfully executed, the URL of the page navigated on clicking the logo image - https://www.tutorialspoint.com/index.htm gets printed in the console.

22. Puppeteer — Xpath Grouping

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element. For this, we have to use the xpath expression.

Obtaining one element from a collection of matching elements by utilising the index is known as the group index. If an xpath expression identifies multiple elements, then we can use the group index.

The format for writing a group index is first the xpath expression followed by the index number enclosed in []. It represents an xpath array with index starting from 1. The function last() is used to point to the last element in the xpath array.

The syntax for the use of function last() is as follows:

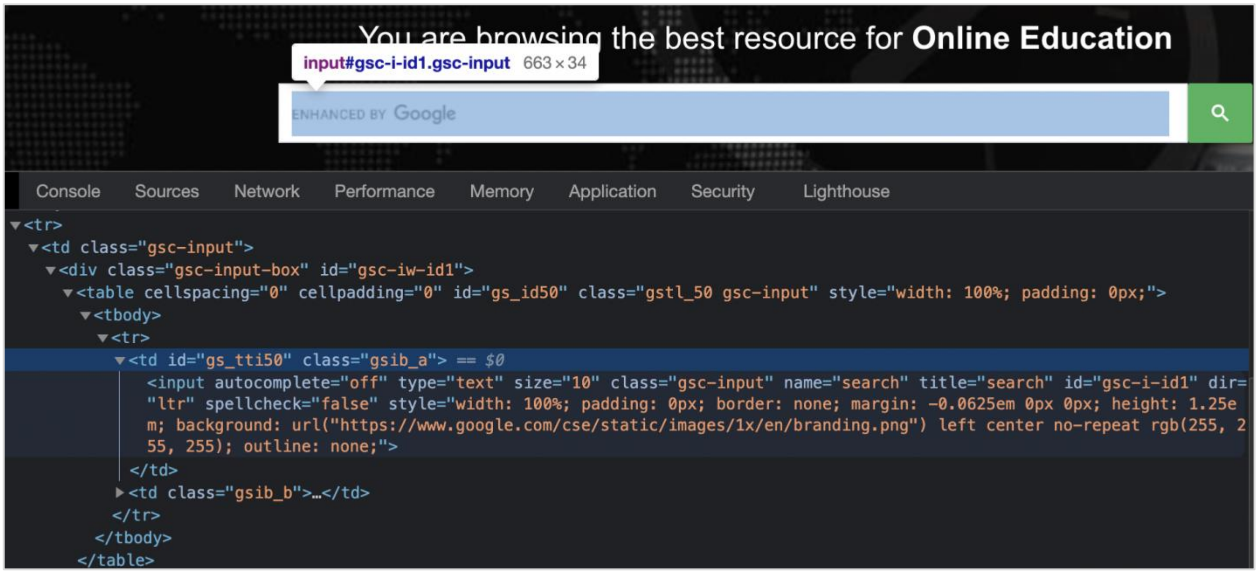
```
(/table/tbody/tr/td[1]/input)[last()]
```

The function position() is used to obtain an element at a particular position in the xpath array. The syntax is as follows:

```
(/table/tbody/tr/td[1]/input)[position()=1]
```

The above xpath expression shall obtain the first element from the group of all the matching elements.

In the below image, let us identify the highlighted edit box and input some text in it.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
Console
Sources
Network
Performance
Memory
Application
Security
Lighthouse

```
▼<tr>
  ▼<td class="gsc-input">
    ▼<div class="gsc-input-box" id="gsc-iw-id1">
      ▼<table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
        ▼<tbody>
          ▼<tr>
            ▼<td id="gs_tti50" class="gsib_a"> == $0
                <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir=
                "ltr" spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25e
                m; background: url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 2
                55, 255); outline: none;">
              </td>
            ▶<td class="gsib_b">…</td>
            </tr>
          </tbody>
        </table>
```

In the above example, there are two columns (represented by td tags) in the table having the tr tag as their parent. The input box is present in the first column.

So the xpath expression shall be as follows:

```
//table/tbody/tr/td[1]/input
```

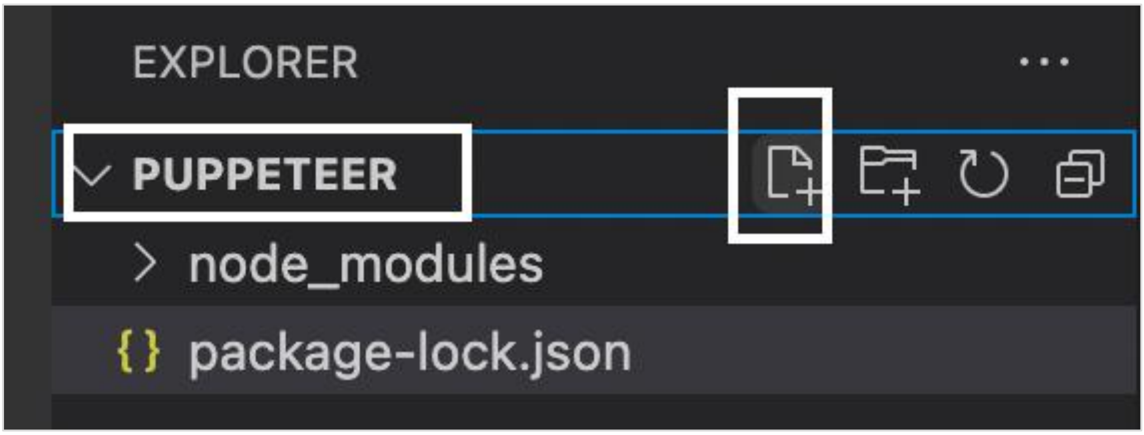
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The details on this method are discussed in the Chapter of Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

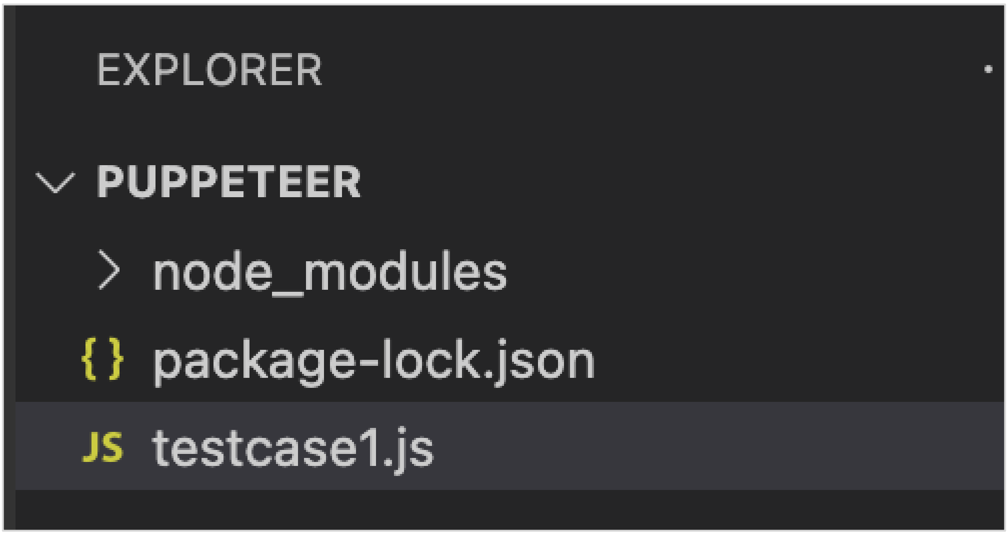
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

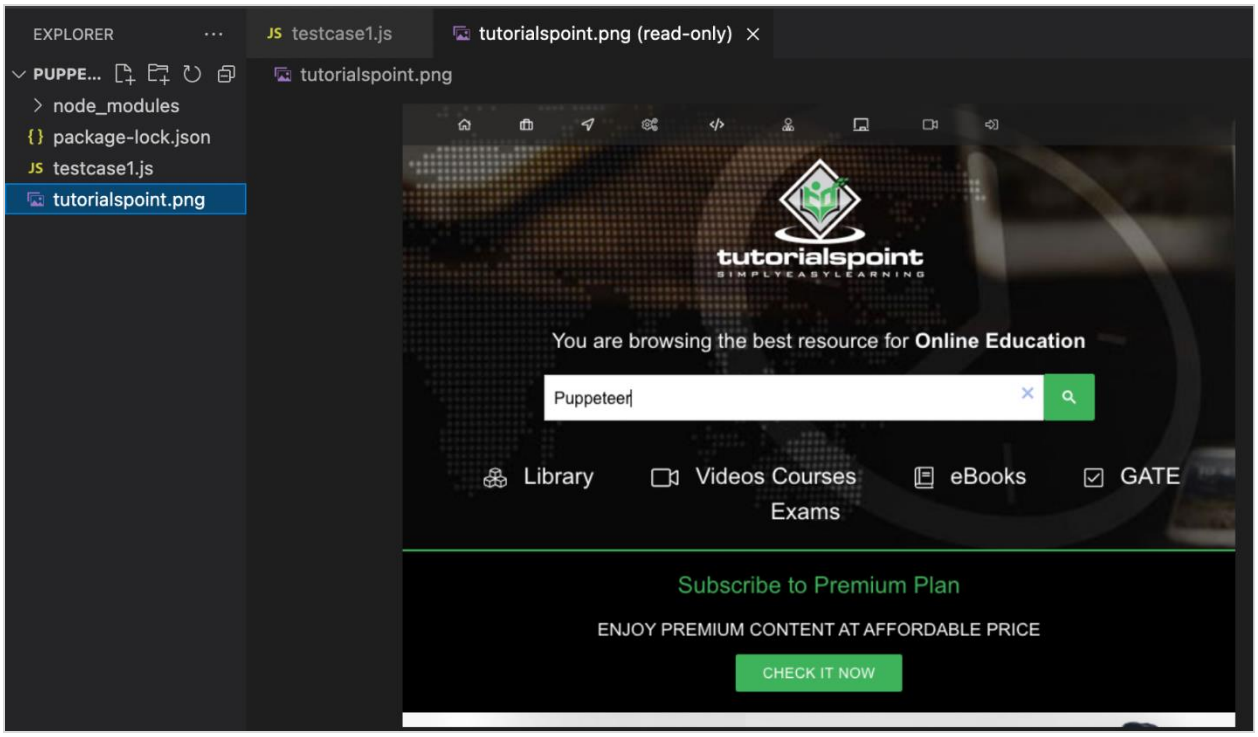
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorGroupXpath(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element with group index xpath then enter text
     const f = (await page.$x("//table/tbody/tr/td[1]/input"))[0]
     f.type("Puppeteer")
     //wait for sometime
     await page.waitForTimeout(4000)
     //capture screenshot
      await page.screenshot({
        path: 'tutorialspoint.png'
    });
    //browser close
    await browser.close()
}
selectorGroupXpath()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



After the command has been successfully executed, a new file called the tutorialspoint.png gets created within the page directory. It contains the captured screenshot of the page launched in the browser with the text Puppeteer.

23. Puppeteer — Absolute Xpath

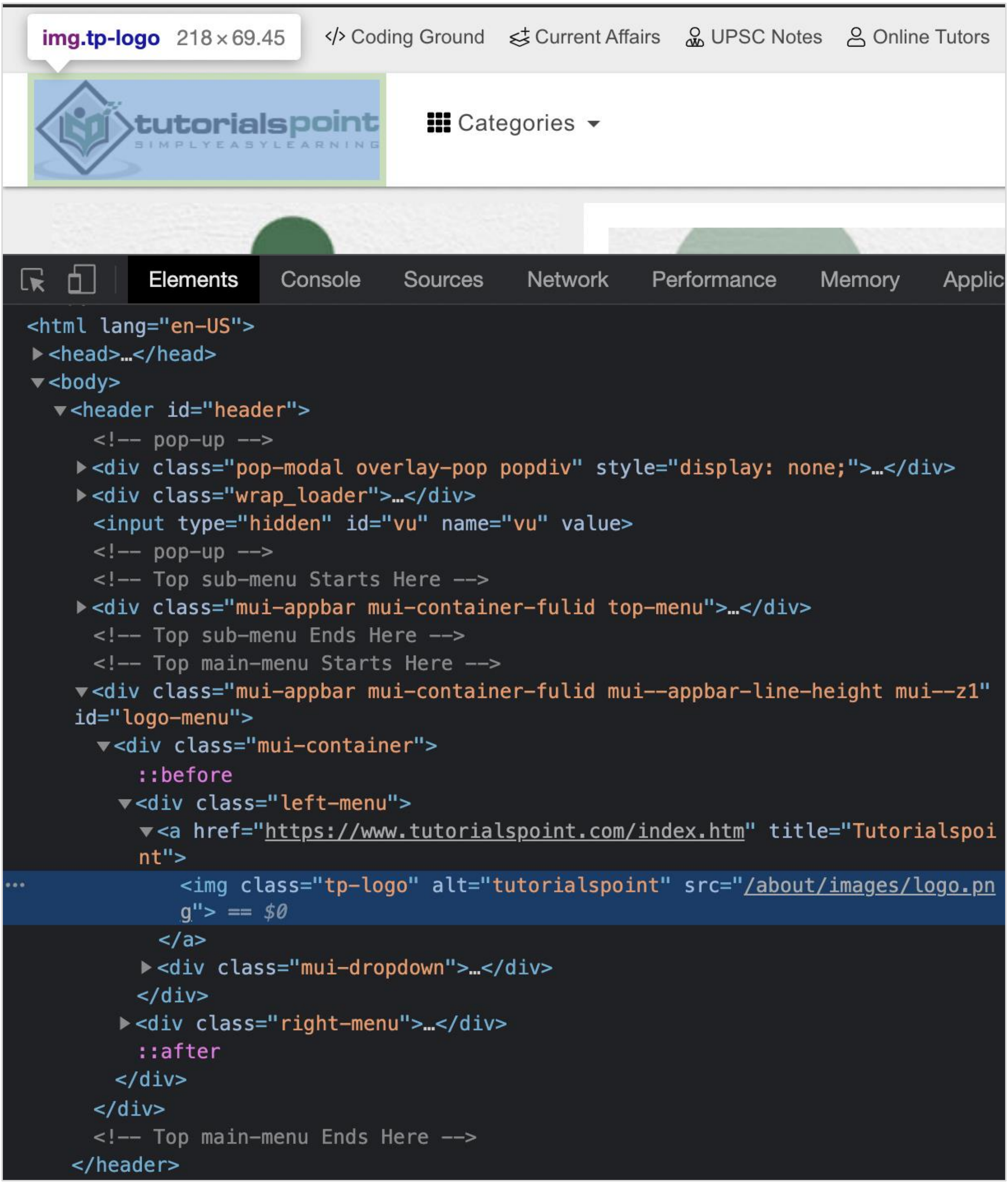
To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element. For this, we have to use the xpath expression. Also, if the element on a page is dynamic, then xpath selector can be a good choice as a selector.

Xpath can be of two types - absolute and relative. The absolute xpath begins with / symbol and starts from the root node upto the element that we want to identify. An example is given below for the same.

```
        /html/body/div[1]/div/div[1]/a
```

Let us identify the below highlighted logo on the page with the help of the absolute xpath and then click on it.



```
<html lang="en-US">
 ▶<head>…</head>
 ▼<body>
   ▼<header id="header">
      <!-- pop-up -->
     ▶<div class="pop-modal overlay-pop popdiv" style="display: none;">…</div>
     ▶<div class="wrap_loader">…</div>
      <input type="hidden" id="vu" name="vu" value>
      <!-- pop-up -->
      <!-- Top sub-menu Starts Here -->
     ▶<div class="mui-appbar mui-container-fulid top-menu">…</div>
      <!-- Top sub-menu Ends Here -->
      <!-- Top main-menu Starts Here -->
     ▼<div class="mui-appbar mui-container-fulid mui--appbar-line-height mui--z1"
     id="logo-menu">
       ▼<div class="mui-container">
          ::before
         ▼<div class="left-menu">
           ▼<a href="https://www.tutorialspoint.com/index.htm" title="Tutorialspoi
           nt">
              <img class="tp-logo" alt="tutorialspoint" src="/about/images/logo.pn
              g"> == $0
            </a>
           ▶<div class="mui-dropdown">…</div>
          </div>
         ▶<div class="right-menu">…</div>
          ::after
        </div>
      </div>
      <!-- Top main-menu Ends Here -->
    </header>
```

The absolute xpath for the logo is as follows:

```
html/body/header/div[4]/div[1]/div[1]/a/img.
```

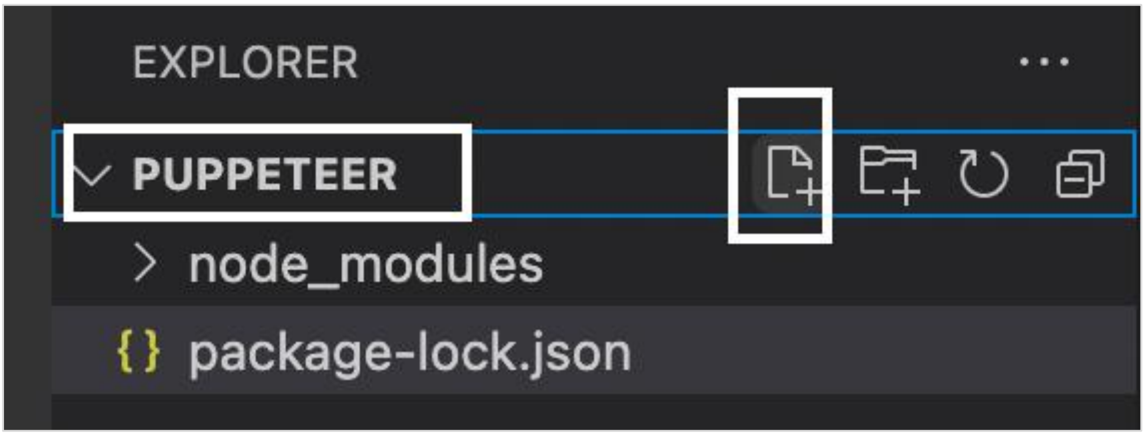
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The detail on this method is discussed in the Chapter of Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

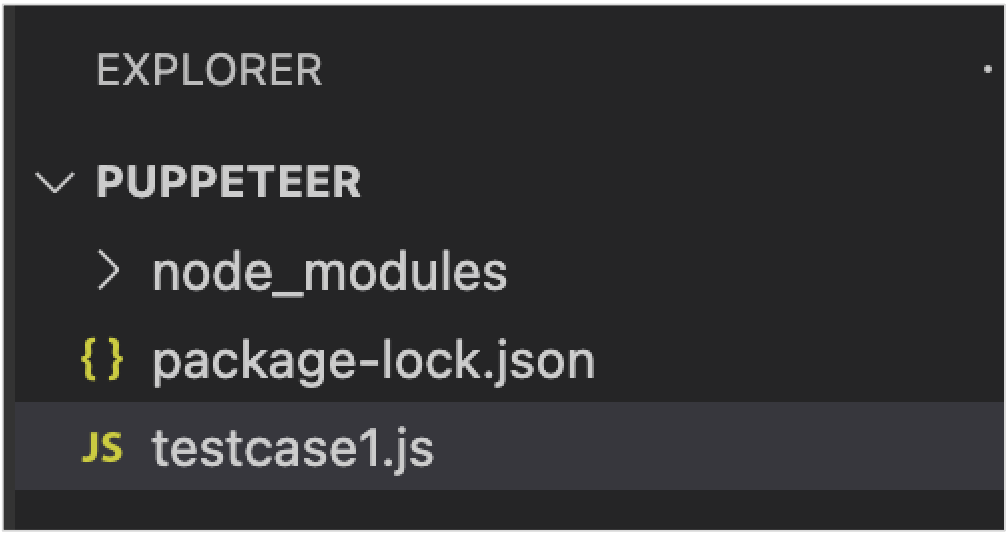
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function selectorAbsoluteXpath(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
   //launch URL
```

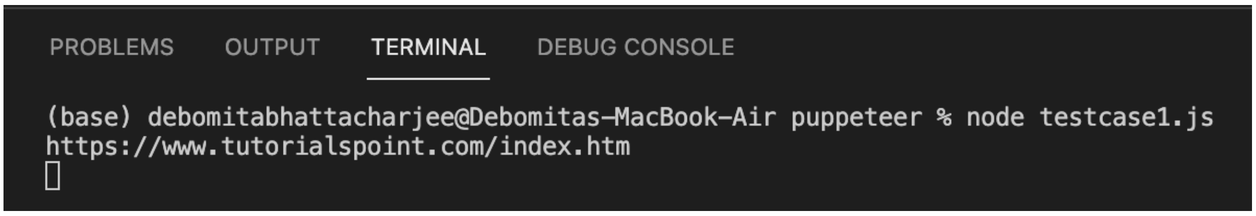
```
  await page.goto('https://www.tutorialspoint.com/about/about_careers.htm')
   //identify element with absolute xpath then click
   const b = (await page.$x("/html/body/header/div[4]/div[1]/div[1]/a/img"))[0]
     b.click()
     //wait for sometime
     await page.waitForTimeout(4000)
    //obtain URL after click
     console.log(await page.url())
}
selectorAbsoluteXpath()
```

Step 4: Execute the code with the command mentioned below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
https://www.tutorialspoint.com/index.htm
```

After the command has been successfully executed, the URL of the page navigated on clicking the logo image - https://www.tutorialspoint.com/index.htm gets printed in the console.

24. Puppeteer — Relative Xpath

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, and class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element.

For this, we have to use the xpath expression. Also, if the element on a page is dynamic, then xpath selector can be a good choice as a selector.

Relative Xpath

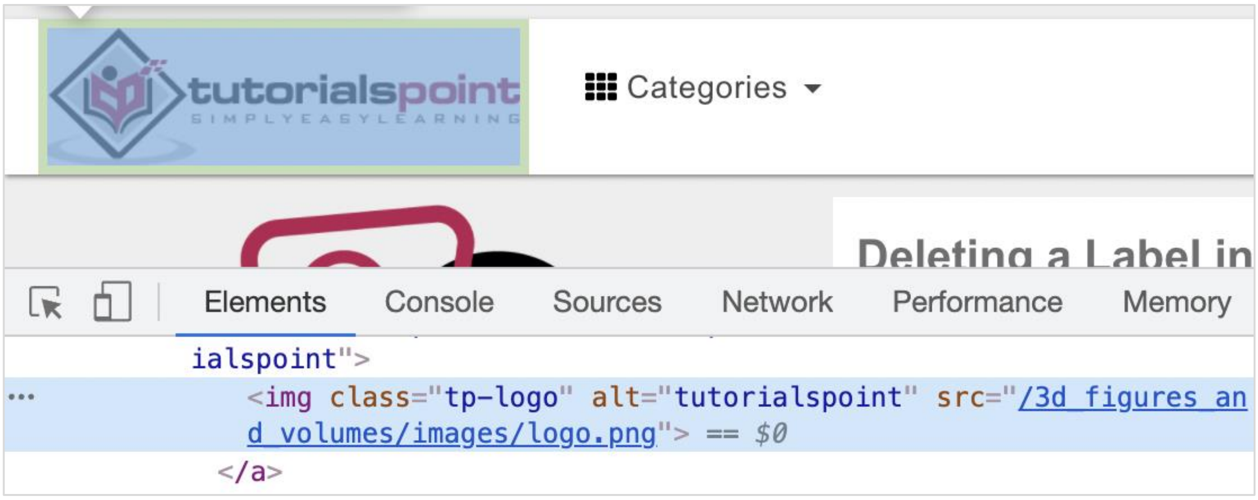
Xpath can be of two types - absolute and relative. A relative xpath begins from the element to be located and not from the root.

It begins with the // symbol which refers to any descendant. Its advantage is that even if an element is deleted or added in the DOM, the relative xpath for a specific element remains unaffected.

To obtain a relative path by an attribute, the xpath expression is as follows:

```
//tagname[@attribute='value'].
```

Let us identify the below highlighted logo on the page with the help of the alt attribute and then click on it.



```
ialspoint">
    <img class="tp-logo" alt="tutorialspoint" src="/3d_figures_and_volumes/images/logo.png"> == $0
  </a>
```

The relative xpath for the element is given below:

```
//img[@alt='tutorialspoint'].
```

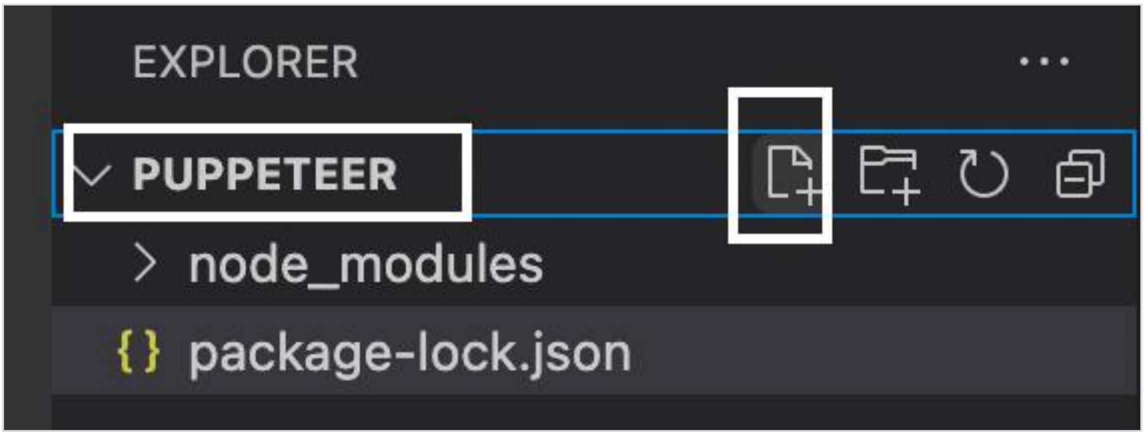
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The detail on this method is discussed in the Chapter - Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

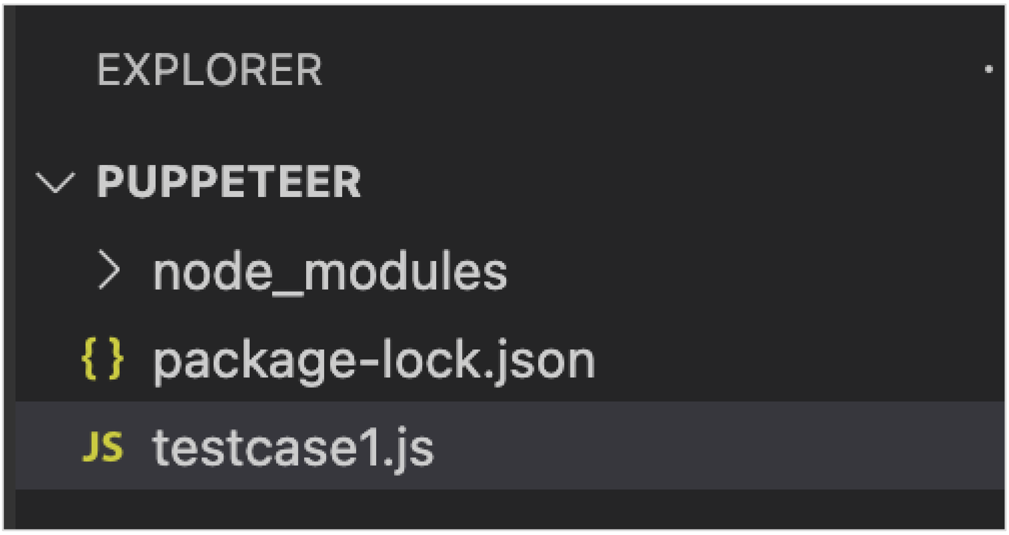
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function selectorRelativeXpath(){
    //launch browser in headless mode
```

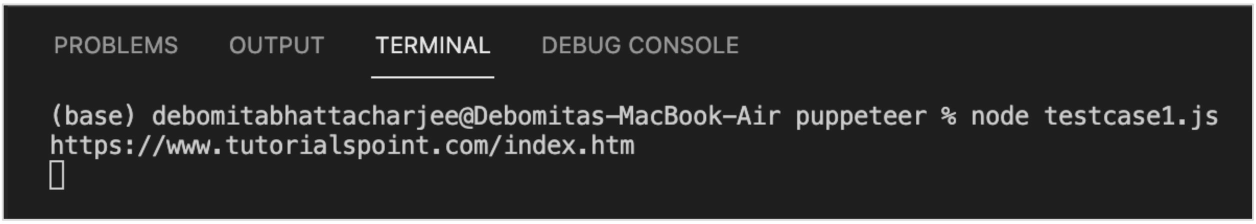
```
      const browser = await pt.launch()
      //browser new page
      const page = await browser.newPage()
      //launch URL
      await page.goto('https://www.tutorialspoint.com/questions/index.php')
      //identify element with relative xpath then click
      const b = (await page.$x("//img[@alt='tutorialspoint']"))[0]
      b.click()
      //wait for sometime
      await page.waitForTimeout(4000)
     //obtain URL after click
      console.log(await page.url())
}
selectorRelativeXpath()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
https://www.tutorialspoint.com/index.htm
```

After the command has been successfully executed, the URL of the page navigated on clicking the logo image - https://www.tutorialspoint.com/index.htm gets printed in the console.

25. Puppeteer — Xpath Axes

To determine an element uniquely, we can either take the help of any of the attributes within the html tag or we can use a combination of attributes on the html tag. Mostly the id attribute is used since it is unique to a page.

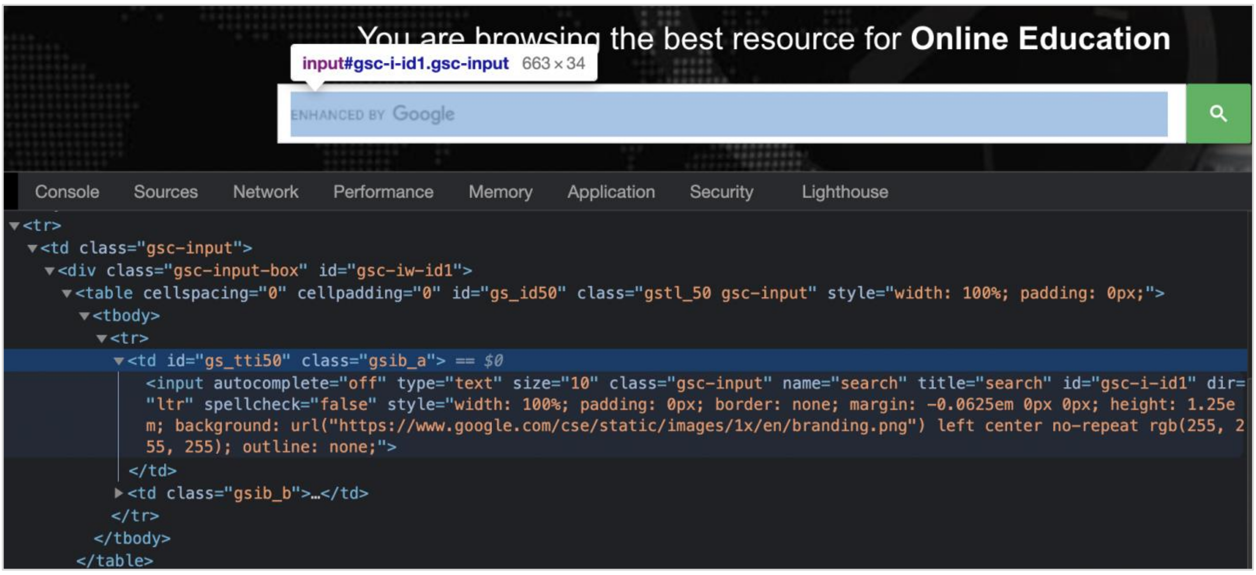
However, if the id attribute is not present, we can use other attributes like the class, name, and so on. In case the attributes like id, name, and class are not present, we can utilise a distinct attribute available to only that tag or a combination of attributes and their values to identify an element.

For this, we have to use the xpath expression. Also, if the element on a page is dynamic, then xpath selector can be a good choice as a selector.

The xpath is bi-directional which means we can traverse from the parent to the child element and also from the child to the parent element. The details of xpath axes shall be available in the below link:

https://www.tutorialspoint.com/xpath/xpath_axes.htm

In the below image, let us identify the highlighted edit box and obtain the value of its class attribute - gsc-input.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
Console
Sources
Network
Performance
Memory
Application
Security
Lighthouse

```
▼<tr>
  ▼<td class="gsc-input">
    ▼<div class="gsc-input-box" id="gsc-iw-id1">
      ▼<table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
        ▼<tbody>
          ▼<tr>
            ▼<td id="gs_tti50" class="gsib_a"> == $0
                <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir=
                "ltr" spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25e
                m; background: url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 2
                55, 255); outline: none;">
              </td>
            ▶<td class="gsib_b">…</td>
            </tr>
          </tbody>
        </table>
```

In the above example, there are two columns (represented by td tags) in the table having the tr tag as their parent. The input box is present in the first column.

So the xpath expression shall be as follows:

```
//table/tbody/tr/child::td.
```

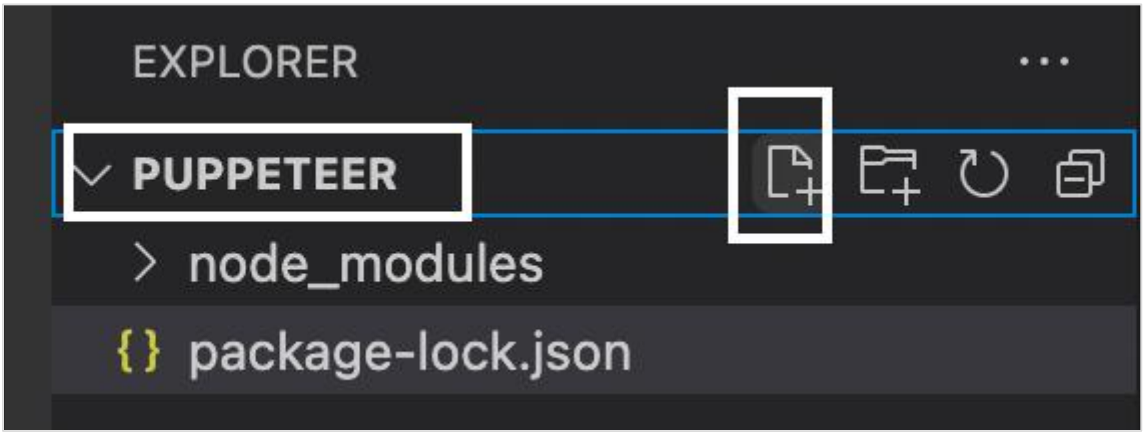
Here, we are working with the xpath selector, so we have to use the method: page.$x(xpath value). The details on this method are discussed in the Chapter of Puppeteer Locators.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

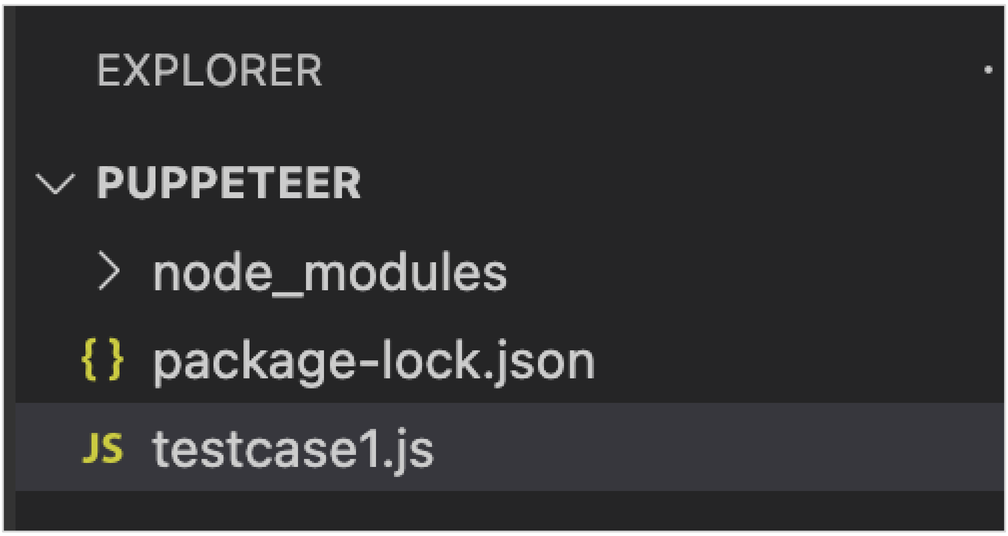
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

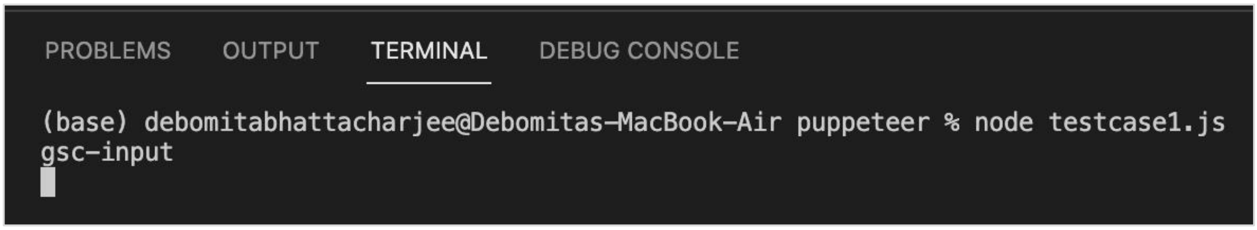
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorAxesXpath(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element with xpath axes
     const n = (await page.$x("//table/tbody/tr/child::td"))[0]
  // get value of class attribute
     let v  = await page.$eval("input",
                n => n.getAttribute("class"))
     console.log(v)
}
selectorAxesXpath()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
gsc-input
```

After the command has been successfully executed, the value of the class attribute for the element - gsc-input gets printed in the console.

26. Puppeteer — Type Selector

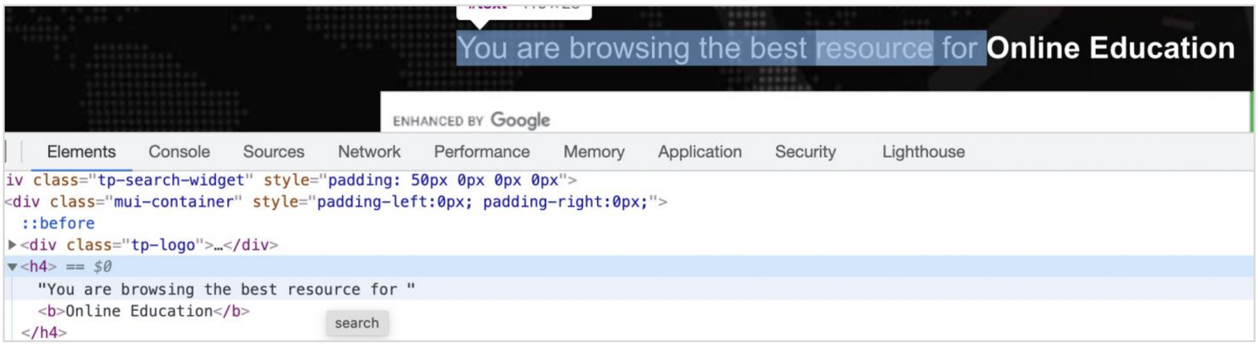
Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. If a tag is used only one time in a page, we can use it as a type selector. If there are multiple elements with the same tag, only the first matching element on the page shall be identified.

The syntax for type selector is as follows:

```
const n = await page.$("h4")
```

In the below example, let us identify the highlighted element having tagname h4 and obtain its text - You are browsing the best resource for Online Education.



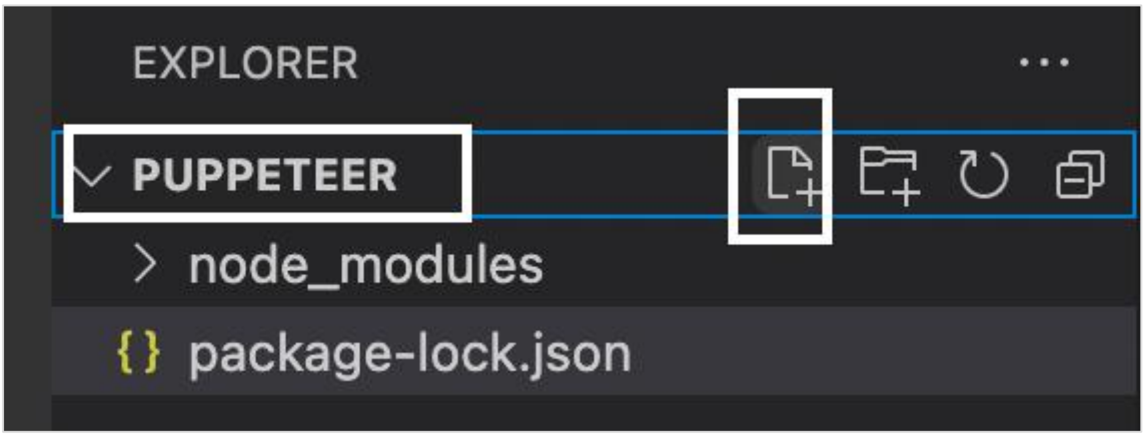
```
iv class="tp-search-widget" style="padding: 50px 0px 0px 0px">
<div class="mui-container" style="padding-left:0px; padding-right:0px;">
  ::before
▶<div class="tp-logo">…</div>
▼<h4> == $0
    "You are browsing the best resource for "
    <b>Online Education</b>
 </h4>
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which is as follows:

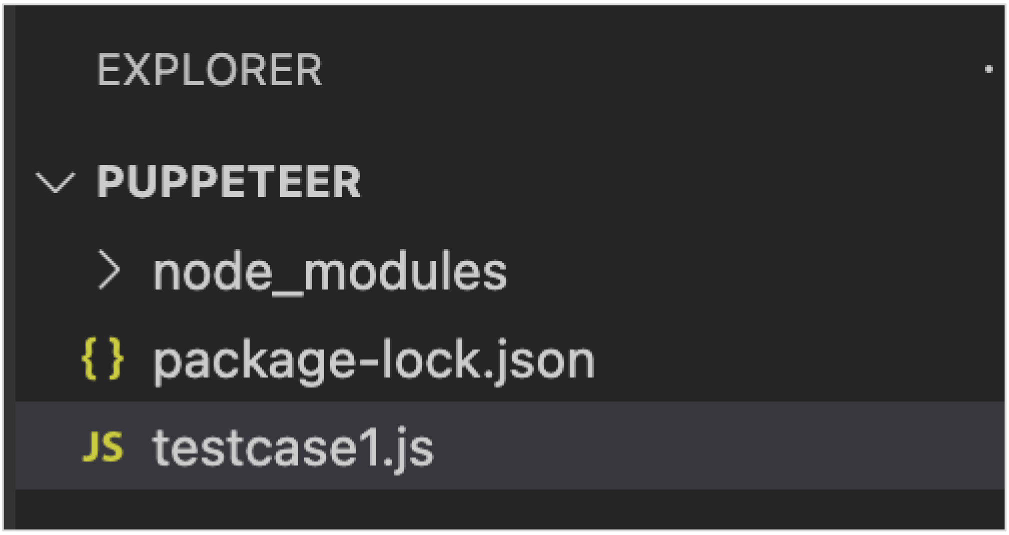
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

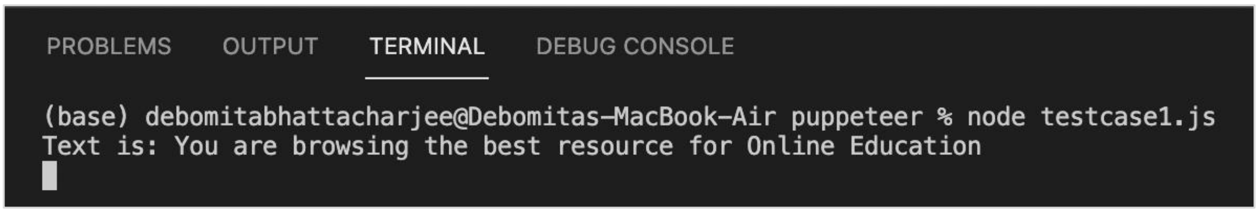
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorType(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element with type selector
     const n = await page.$("h4")
     //obtain text
     const text = await (await n.getProperty('textContent')).jsonValue()
     console.log("Text is: " + text)
}
selectorType()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Text is: You are browsing the best resource for Online Education
```

After the command has been successfully executed, the text on the element - You are browsing the best resource for Online Education gets printed in the console.

27. Puppeteer — Name Selector and Class Name Selector

Let us begin by learning about name selector.

Name Selector

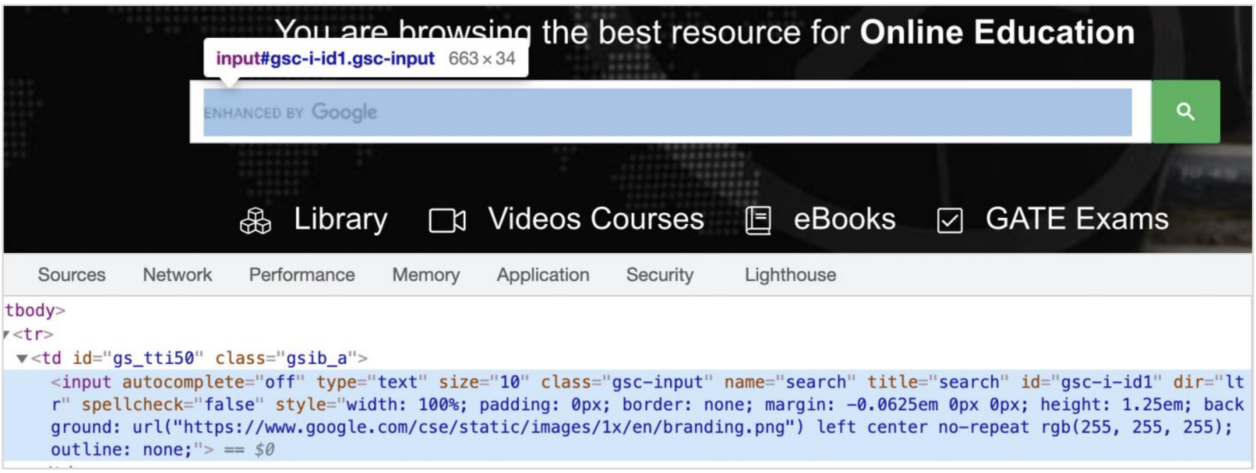
Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. If a value of the name attribute is used only one time in a page, we can use it as a name selector. If there are multiple elements with the same name, only the first matching element on the page shall be identified.

The syntax for name selector is as follows:

```
const f = await page.$('[name="search"]')
```

Let us identify the edit box highlighted in the below image and enter text:



```
tbody>
▾<tr>
  ▾<td id="gs_tti50" class="gsib_a">
      <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="lt
      r" spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; back
      ground: url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 255, 255);
      outline: none;"> == $0
```

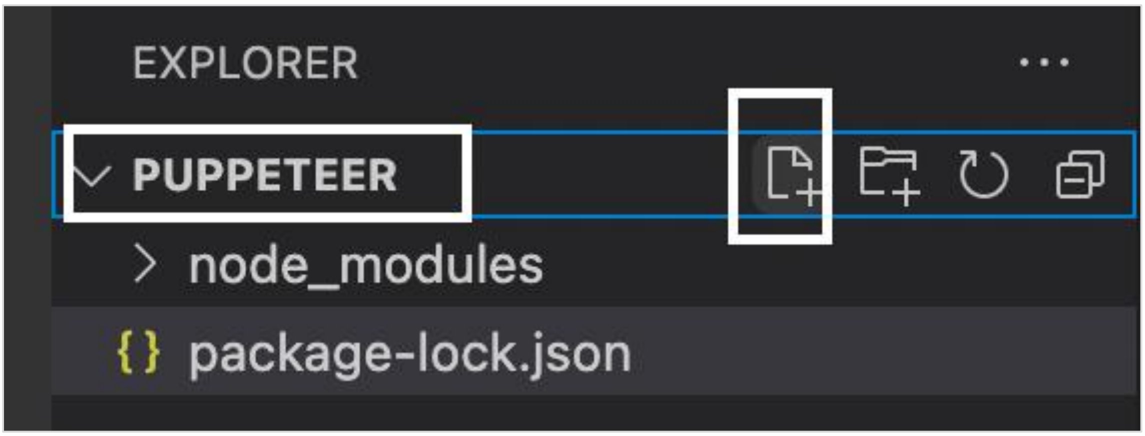
The element highlighted in the above image has the name attribute value as search. The name selector expression for the above element shall be [name="search"].

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

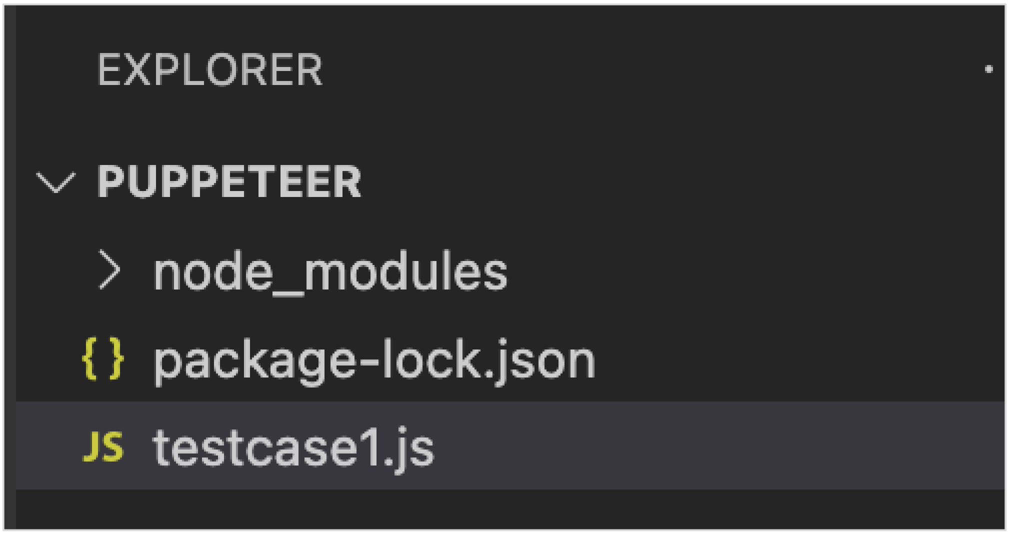
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function selectorName(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage();
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify edit box with name
     const f = await page.$('[name="search"]')
     //enter text
     f.type("Puppeteer")
```

```
        //wait for sometime
        await page.waitForTimeout(4000)
      //browser close
      await browser.close()
}
selectorName()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```

Class Name Selector

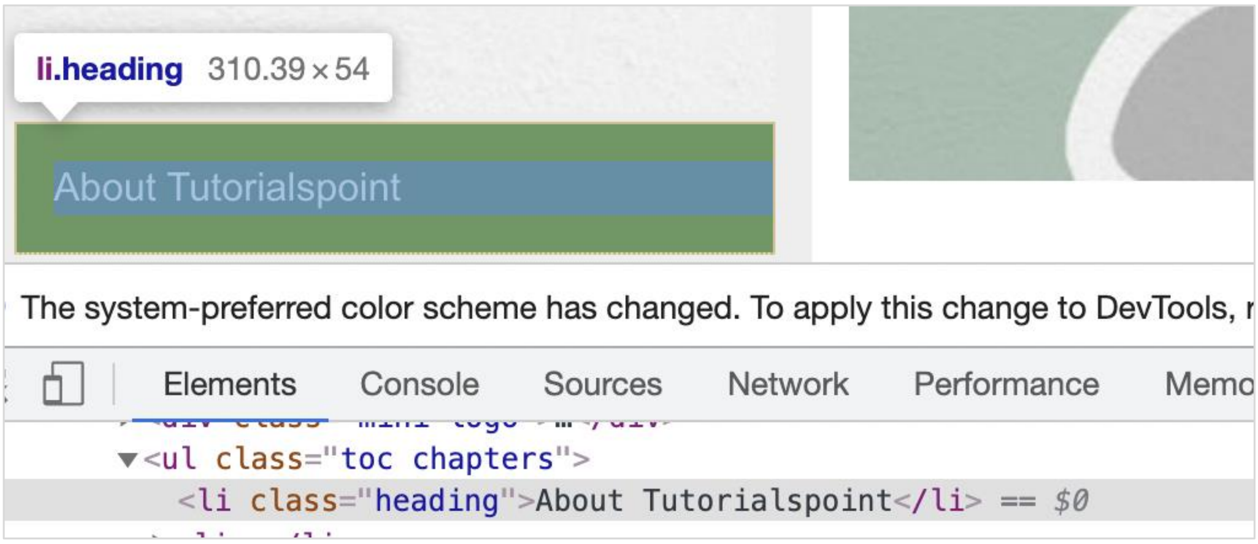
Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. If a class name is used only one time in a page, we can use it as a class name selector. If there are multiple elements with the same class name, only the first matching element on the page shall be identified.

The syntax for class name selector is as follows:

```
const n = await page.$(".txtloc")
```

In the below example, let us identify the highlighted element having class name heading and obtain its text - About Tutorialspoint.



The system-preferred color scheme has changed. To apply this change to DevTools, r

```
▼<ul class="toc chapters">
   <li class="heading">About Tutorialspoint</li> == $0
```

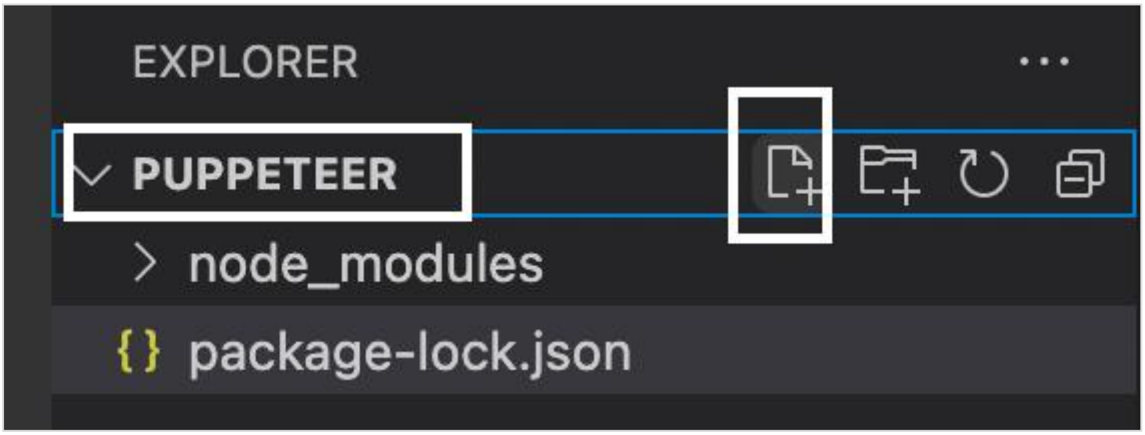
The id selector expression for the above element shall be .heading.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

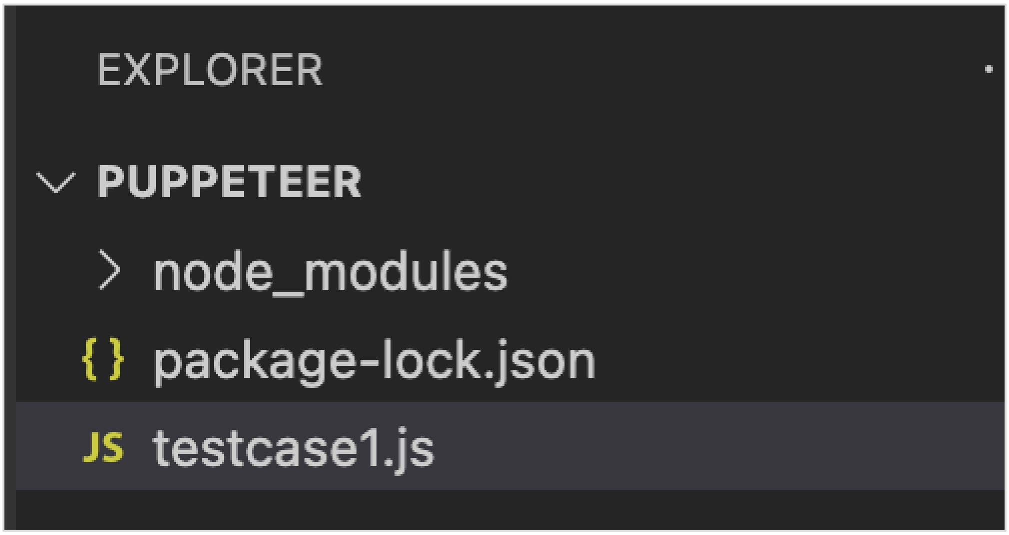
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

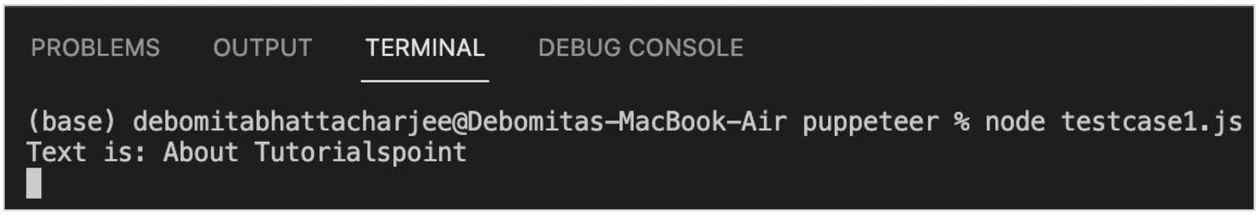
```
//Puppeteer library
const pt= require('puppeteer')
async function getText(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
    await page.goto('https://www.tutorialspoint.com/about/about_careers.htm')
     //identify element with class name
     const f = await page.$(".heading")
     //obtain text
     const text = await (await f.getProperty('textContent')).jsonValue()
     console.log("Text is: " + text)
}
getText()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Text is: About Tutorialspoint
```

After the command has been successfully executed, the text of the element - About Tutorialspoint gets printed in the console.

28. Puppeteer — Id Selector

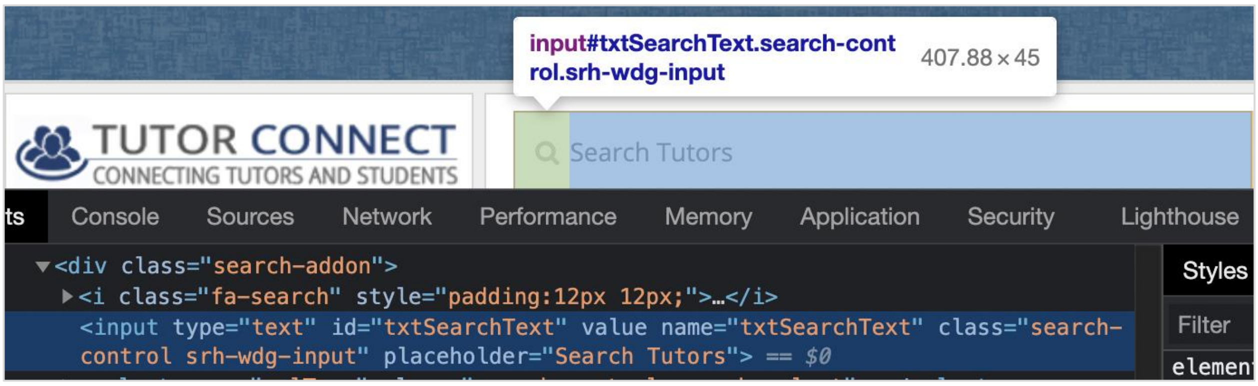
Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

For this, our first job is to identify the element. An id attribute is generally unique in a page and can be used as an id selector. It is a very useful locator and speeds up the execution of automation tests in comparison to all the selectors.

The syntax for Id selector is as follows:

```
const n = await page.$("#loc")
```

In the below example, let us identify the highlighted element having id txtSearchText and enter text into it.



```
<div class="search-addon">
  <i class="fa-search" style="padding:12px 12px;">…</i>
  <input type="text" id="txtSearchText" value name="txtSearchText" class="search-control srh-wdg-input" placeholder="Search Tutors"> == $0
```

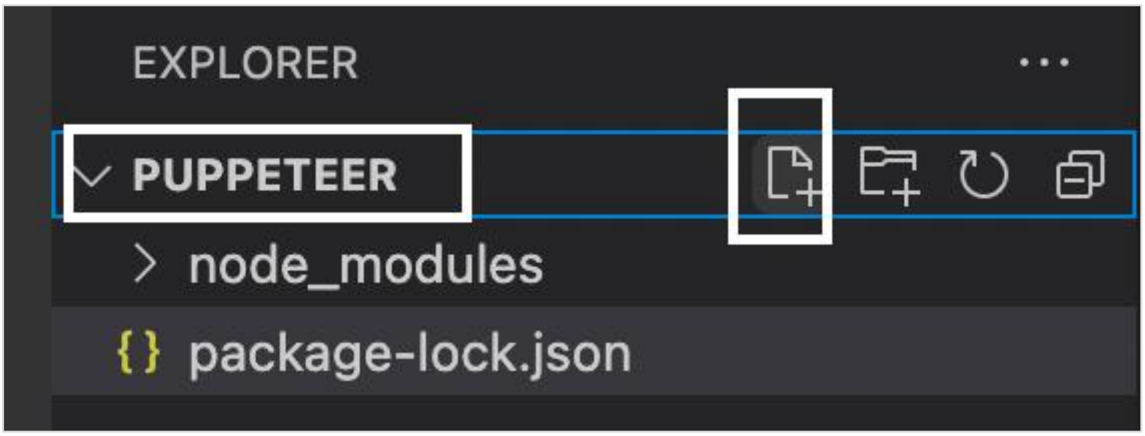
The id selector expression for the above element shall be #txtSearchText.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

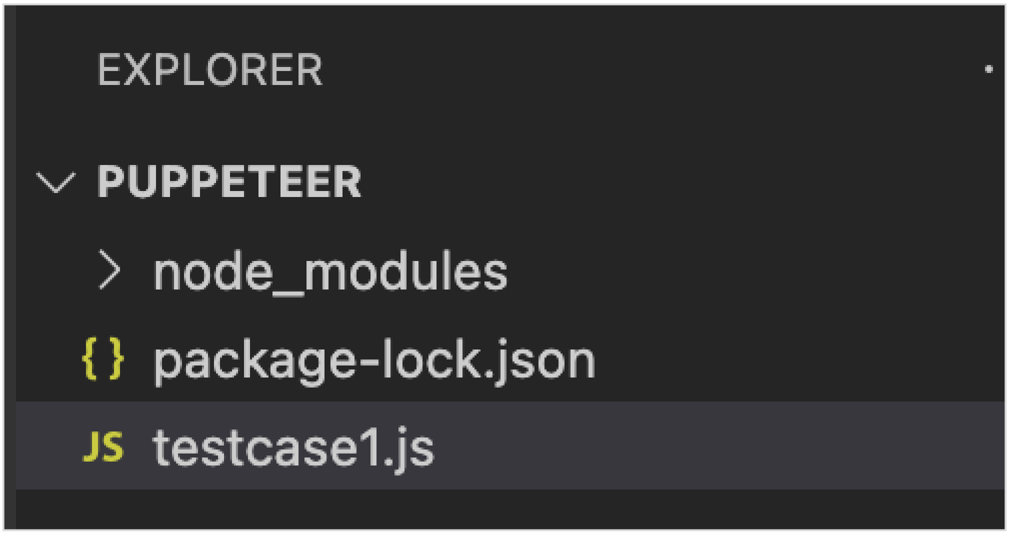
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function selectorId(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage();
     //launch URL
     await page.goto('https://www.tutorialspoint.com/tutor_connect/index.php')
     //identify element with id
     const f = await page.$("#txtSearchText")
     //enter text
     f.type("Puppeteer")
```

```
       //wait for sometime
       await page.waitForTimeout(4000)
     //browser close
     await browser.close()
}
selectorId()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```

29. Puppeteer — Attribute Selector

Once we navigate to a webpage, we have to interact with the webelements available on the page like clicking a link/button, entering text within an edit box, and so on to complete our automation test case.

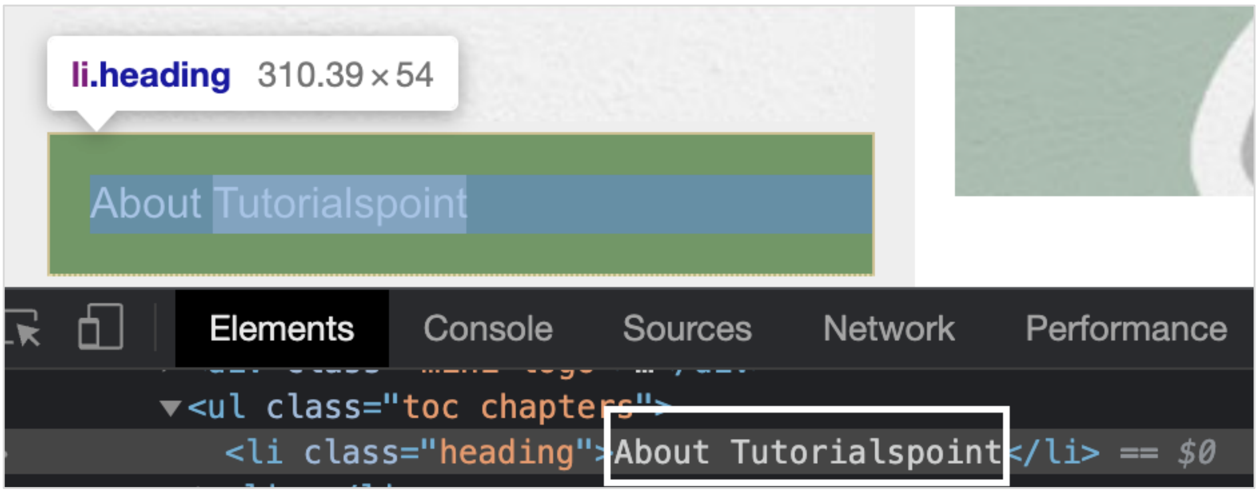
For this, our first job is to identify the element. If an attribute and its value is used only one time in a tag, we can use it as an attribute selector. If there are multiple elements with the same attribute value, only the first matching element on the page shall be identified.

The syntax for attribute selector is as follows:

```
const f = await page.$("ul[name='val']")
```

Here, ul is the tagname and val is the value set for the name attribute.

In the below image, let us obtain the text - About Tutorialspoint for the highlighted element:



```
▼<ul class="toc chapters">
    <li class="heading">About Tutorialspoint</li> == $0
```

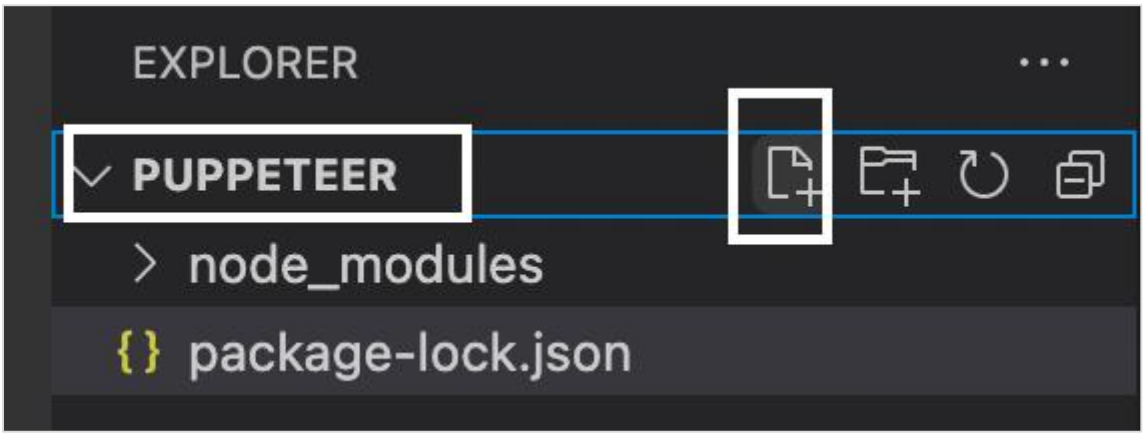
The attribute selector expression for the above element shall be li[class='heading'].

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

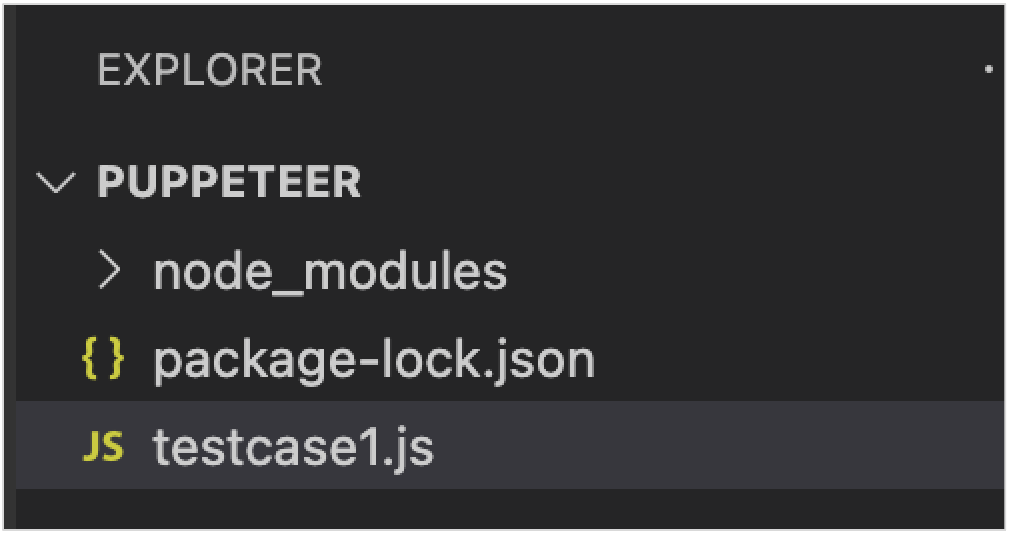
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

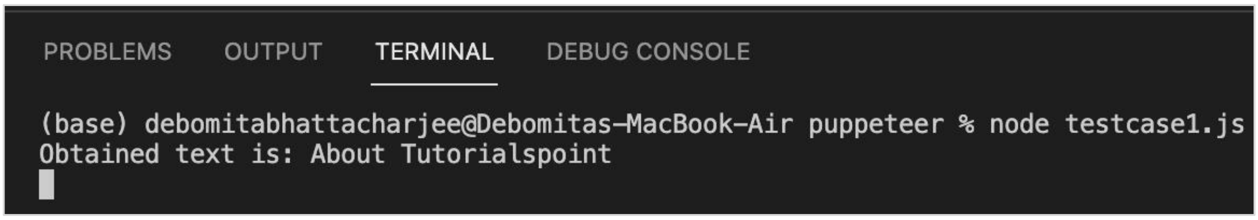
```
//Puppeteer library
const pt= require('puppeteer')
async function selectorAttribute(){
    //launch browser in headed mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
    await page.goto('https://www.tutorialspoint.com/about/about_careers.htm')
     //identify element with attribute selector
     const n = await page.$("li[class='heading']")
     //obtain text
     const t = await (await n.getProperty('textContent')).jsonValue()
    console.log("Obtained text is: " + t)
}
selectorAttribute()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



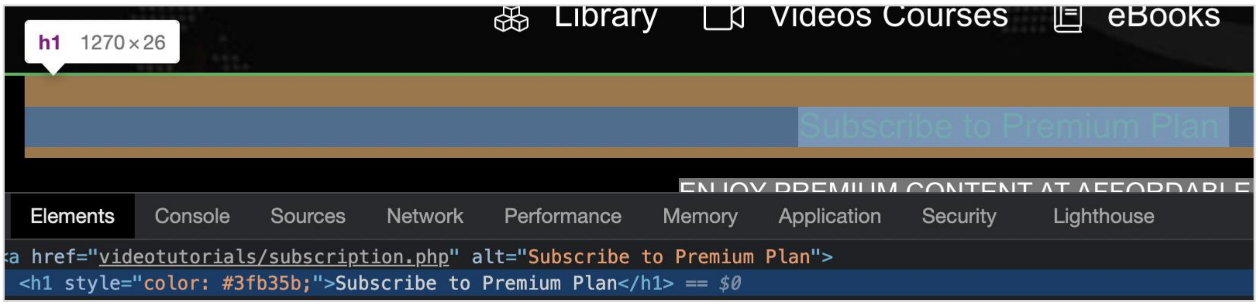
```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Obtained text is: About Tutorialspoint
```

After the command has been successfully executed, the text of the element - About Tutorialspoint gets printed in the console.

30. Puppeteer — Handling Links/Button

Puppeteer is capable of handling a link/button on a page. Before clicking an element we must be able to uniquely identify it with the help of any of the locators. In Puppeteer, we can click an element only if its dimensions are greater than zero pixel.

In the below image, we shall click on the below highlighted link - Subscribe to Premium Plan having tagname as h1:



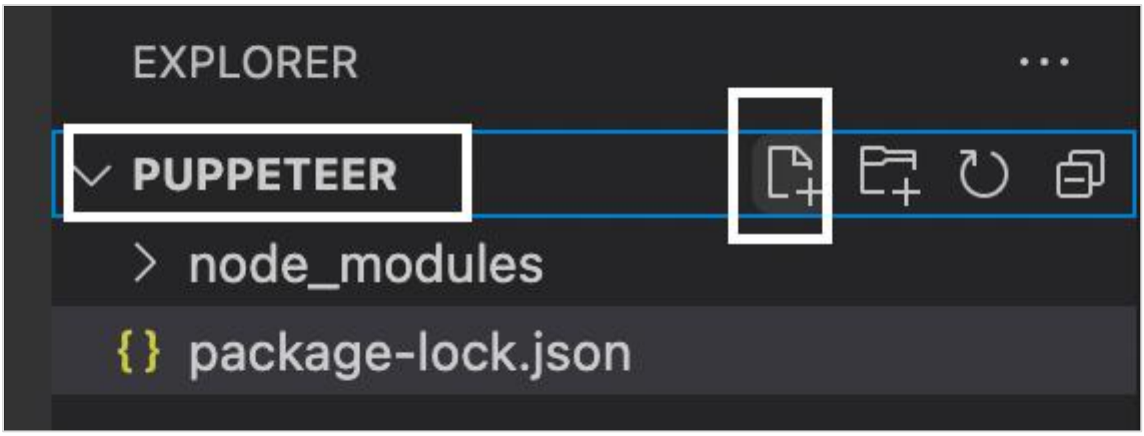
```
<a href="videotutorials/subscription.php" alt="Subscribe to Premium Plan">
  <h1 style="color: #3fb35b;">Subscribe to Premium Plan</h1> == $0
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

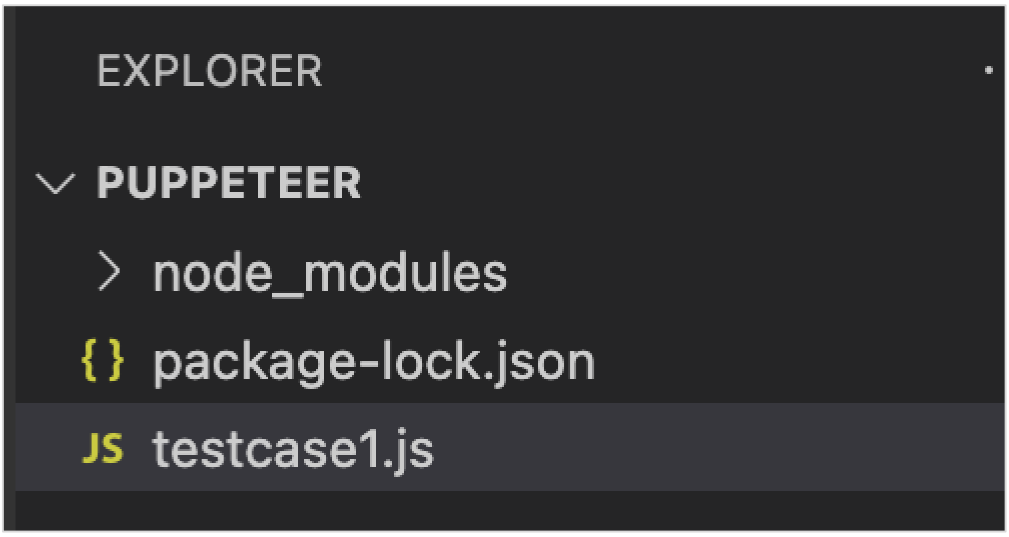
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

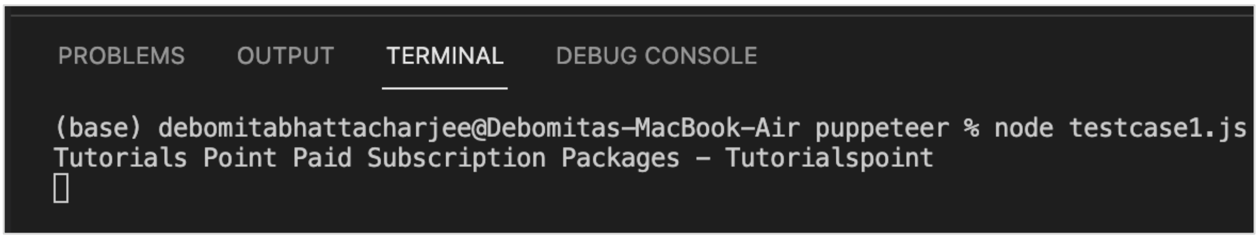
```
//Puppeteer library
const pt= require('puppeteer')
async function clickElement(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element then click
     await page.click('h1');
     //get page title after click
     console.log(await page.title())
}
clickElement()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Tutorials Point Paid Subscription Packages - Tutorialspoint
```

After the command has been successfully executed, the title - Tutorials Point Paid Subscription Packages - Tutorialspoint obtained after clicking the link - Subscribe to Premium Plan gets printed in the console.

31. Puppeteer — Handling Edit Boxes and Checkboxes

Let us understand how Puppeteer can handle edit boxes.

Handling Edit Boxes

Puppeteer is capable of handling edit boxes. An edit box has an HTML tag as input and its type attribute is set to the value as text.

Some methods to work with edit boxes are listed below:

type()

This method is used to input text into an edit box and text area without replacing the already present content.

The syntax for type() is as follows::

```
const n = await page.$("#txt")

await n.type("Puppeteer")
```

We can enter text in an edit box with some delay. This is done by adding the parameter {delay:time interval}. The time interval is expressed in the milliseconds.

The syntax for the same is as follows:

```
await page.type("[class='loc']", "Tutorialspoint", {delay:700})
```

To delete a text entered in an edit box, we have to perform the click event three times on the field(with the parameter clickCount) and then press backspace. It is similar to selecting all values in an edit box and then pressing backspace.

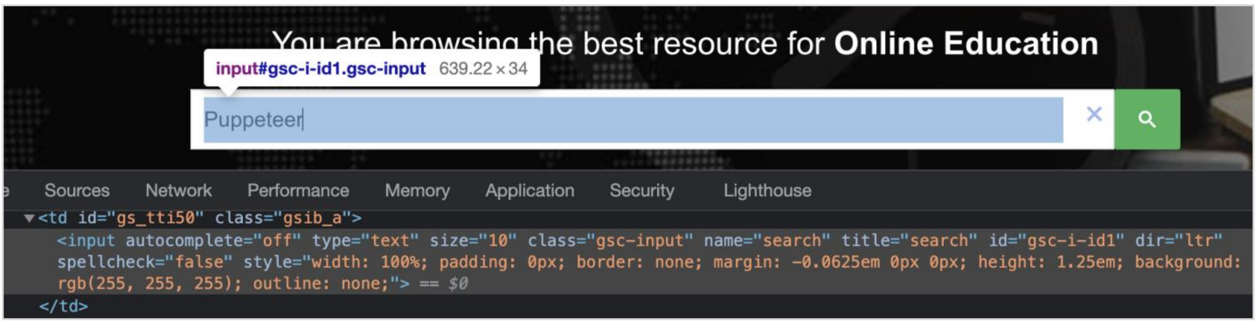
The syntax is given below:

```
const n = await page.$("#txt")

await n.type("Puppeteer")

await n.click({clickCount: 3});

await page.keyboard.press('Backspace')
```

To get value entered in an edit box, we have to use the getProperty method and pass value as a parameter to this field.

```
const v = await (await n.getProperty("value")).jsonValue()

console.log(v)
```

In the below image, let us input the text Puppeteer and then clear it.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 639.22 × 34
Puppeteer
Sources
Network
Performance
Memory
Application
Security
Lighthouse

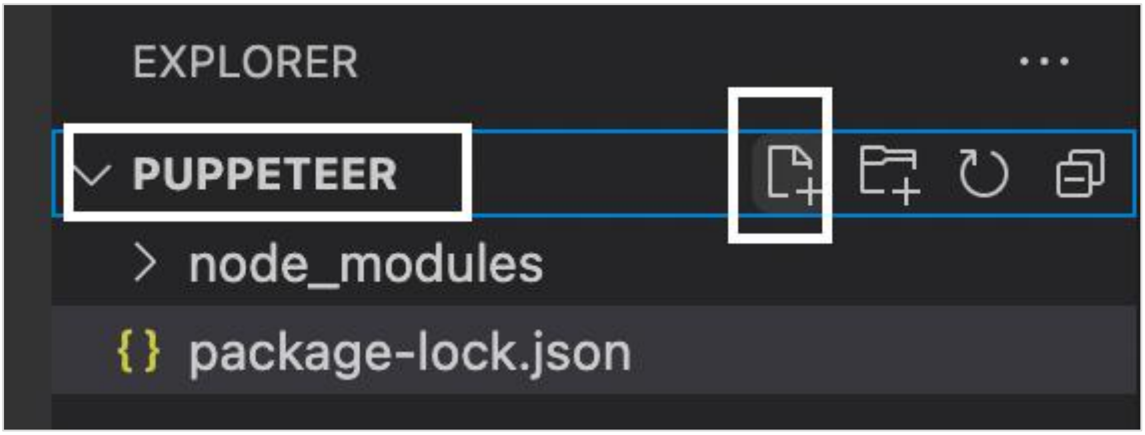
```
▼<td id="gs_tti50" class="gsib_a">
    <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
    spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
    rgb(255, 255, 255); outline: none;"> == $0
  </td>
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which is as follows:

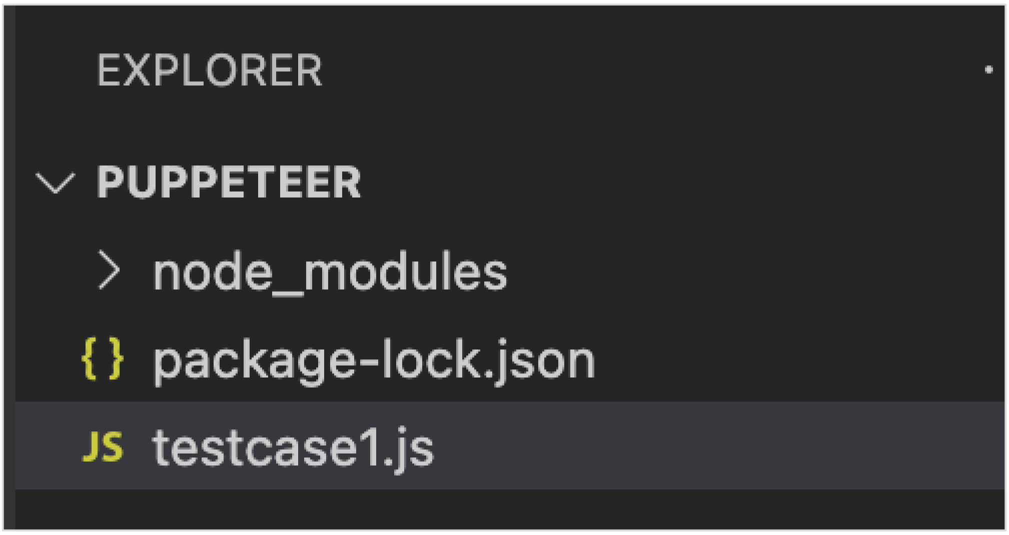
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function enterText(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage();
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify edit box
     const f = await page.$("#gsc-i-id1")
     //enter text
     f.type("Puppeteer")
     //clear text entered
     await f.click({clickCount: 3})
     //wait for sometime
     await page.waitForTimeout(4000)
     await page.keyboard.press('Backspace')
    //browser close
    await browser.close()
}
enterText()
```

Step 4: Execute the code with the command given below:

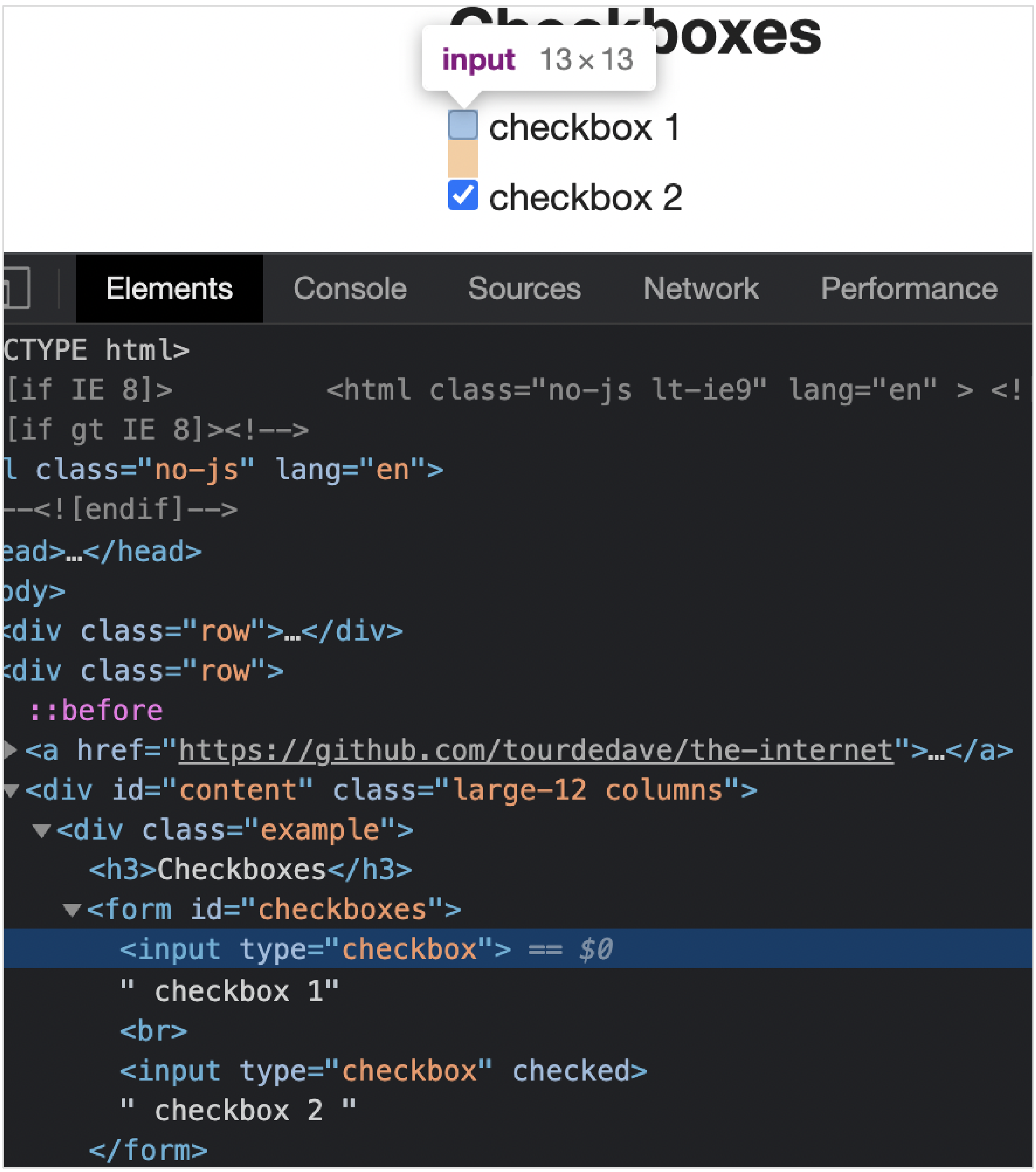
```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```

Handling Checkboxes

We can handle checkboxes in the UI while automating a test using Puppeteer. The checkboxes are identified in the html code with the tagname as input and type as checkbox.



```
CTYPE html>
[if IE 8]>          <html class="no-js lt-ie9" lang="en" > <!
[if gt IE 8]><!-->
l class="no-js" lang="en">
--<![endif]-->
ead>…</head>
ody>
<div class="row">…</div>
<div class="row">
  ::before
 ▶<a href="https://github.com/tourdedave/the-internet">…</a>
 ▼<div id="content" class="large-12 columns">
   ▼<div class="example">
      <h3>Checkboxes</h3>
     ▼<form id="checkboxes">
        <input type="checkbox"> == $0
        " checkbox 1"
        <br>
        <input type="checkbox" checked>
        " checkbox 2 "
      </form>
```

Some methods to work with checkboxes are given below:

click()

It is used to check and uncheck a checkbox. This method is a part of the ElementHandle class.

The syntax of click() is as follows:

```
const n = await page.$("#txt")
n.click()
```

To verify if a checkbox is checked, we have to use the getProperty method and pass value as a parameter to this field. It returns a Boolean value(true if checked, false if not).

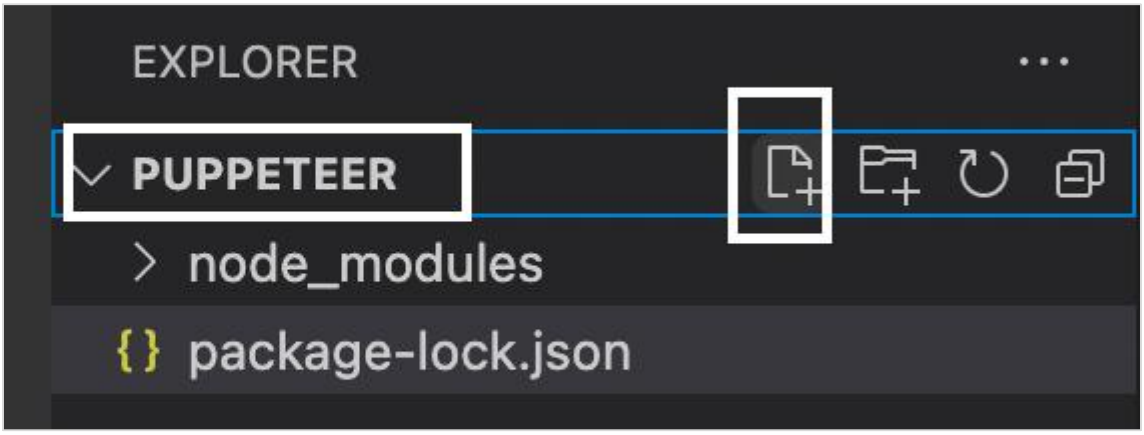
```
const v = await (await n.getProperty("checked")).jsonValue()

console.log(v)
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

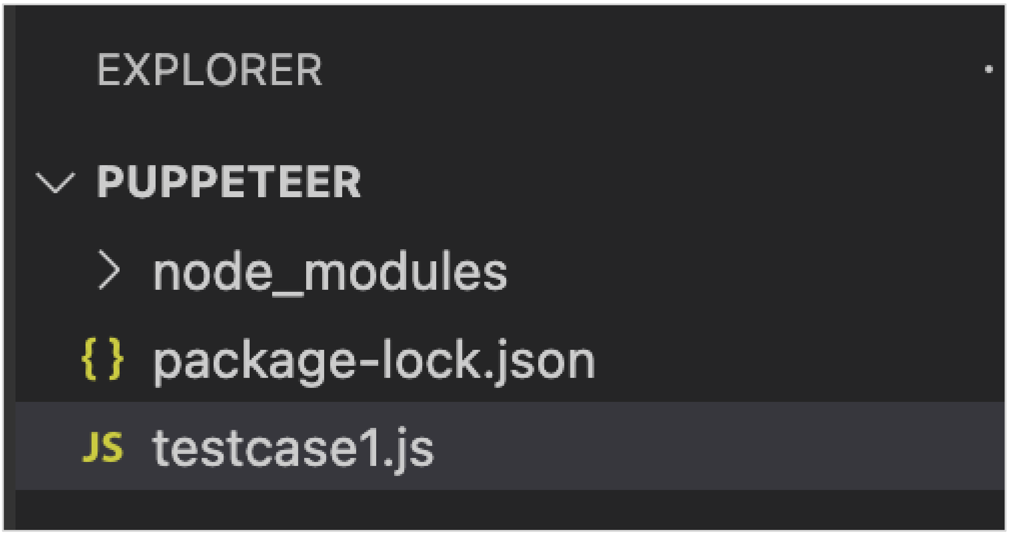
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
```

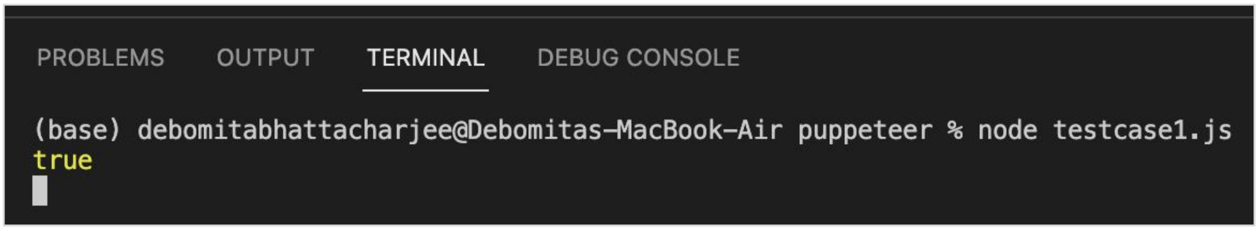
```
const pt= require('puppeteer')
async function checkBoxHandle(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://the-internet.herokuapp.com/checkboxes')
     //identify element then click
     const n = await page.$("input[type='checkbox']")
     n.click()
     //wait for sometime
     await page.waitForTimeout(4000)
     //verify if checkbox is checked
     const v = await (await n.getProperty("checked")).jsonValue()
     console.log(v)
}
checkBoxHandle()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
true
```

After the command has been executed successfully, the boolean value true is printed in the console. This is returned by the getProperty("checked") which returns true as the checkbox is selected.

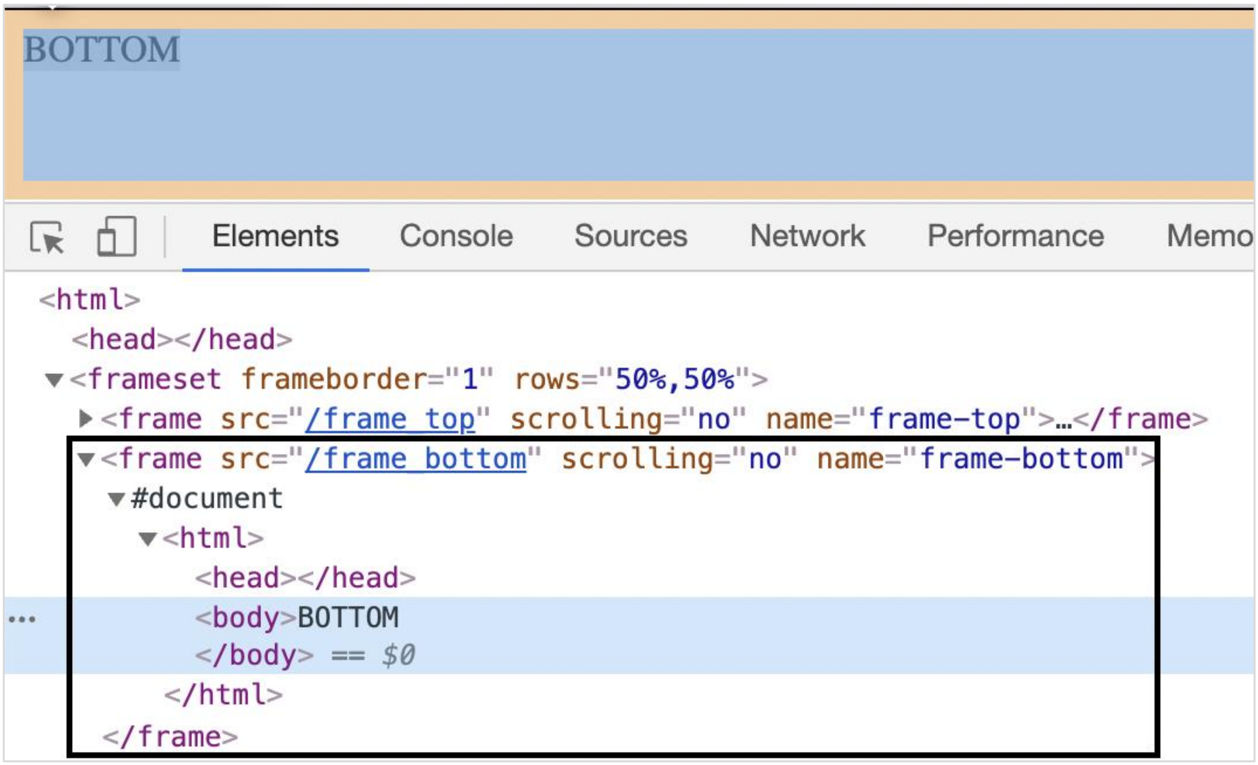
32. Puppeteer — Handling Frames

The frames in an html code are represented by the frames/iframe tag. Puppeteer can handle frames by switching from the main page to the frame. To work with elements inside a frame, first we have to identify the frame with the help of locators. The method contentFrame is used to access the elements inside the frame.

The syntax to handle frames is as follows:

```
const f = await page.$("frame[name='frame-bottom']")

const m = await f.contentFrame()
```

Let us see the html code of an element inside a frame and obtain the text - BOTTOM inside it.



```
<html>
  <head></head>
▼<frameset frameborder="1" rows="50%,50%">
  ▶<frame src="/frame_top" scrolling="no" name="frame-top">…</frame>
  ▼<frame src="/frame_bottom" scrolling="no" name="frame-bottom">
    ▼#document
      ▼<html>
          <head></head>
...       <body>BOTTOM
          </body> == $0
        </html>
  </frame>
```

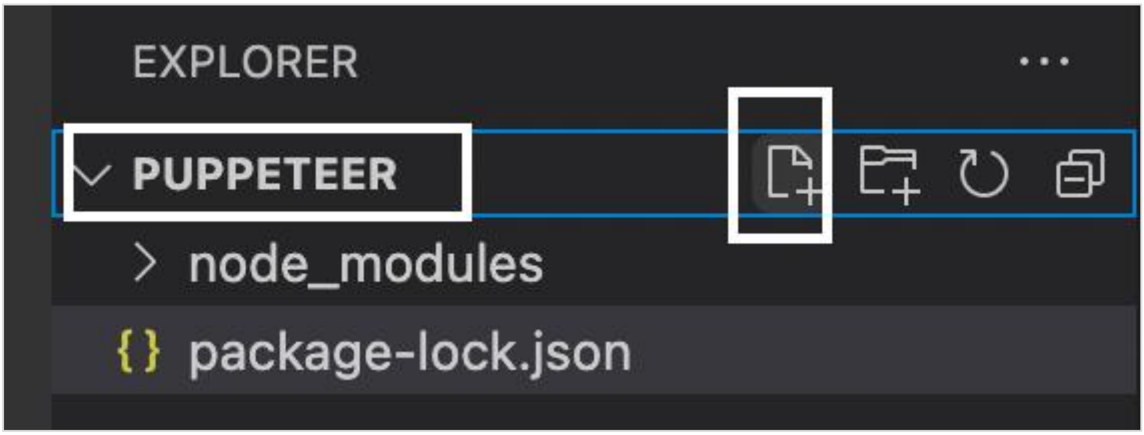
The tagname highlighted in the above image is frame and the value of its name attribute is frame-bottom.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

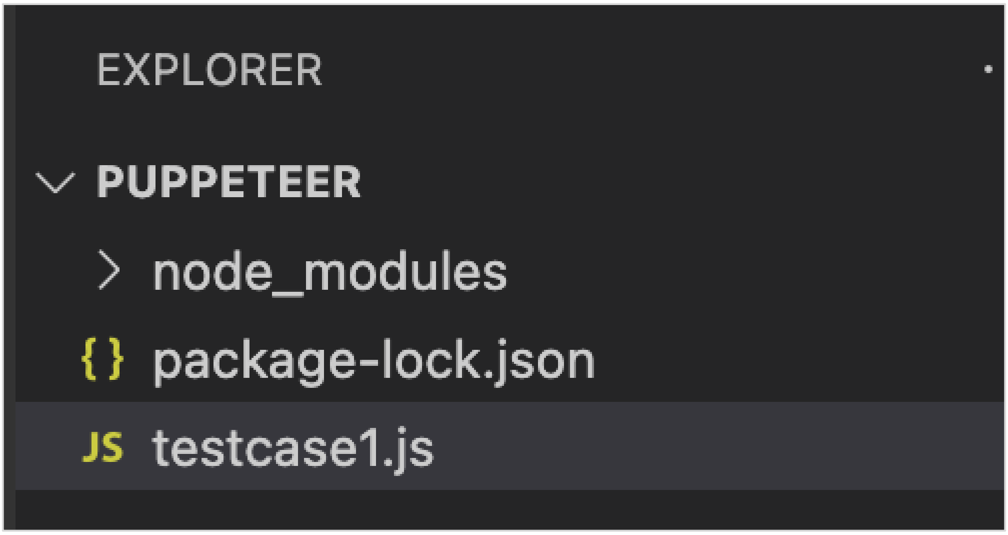
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
//Puppeteer library
const pt= require('puppeteer')
async function frameHandle(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://the-internet.herokuapp.com/nested_frames')
     //identify frame
     const f = await page.$("frame[name='frame-bottom']")
```

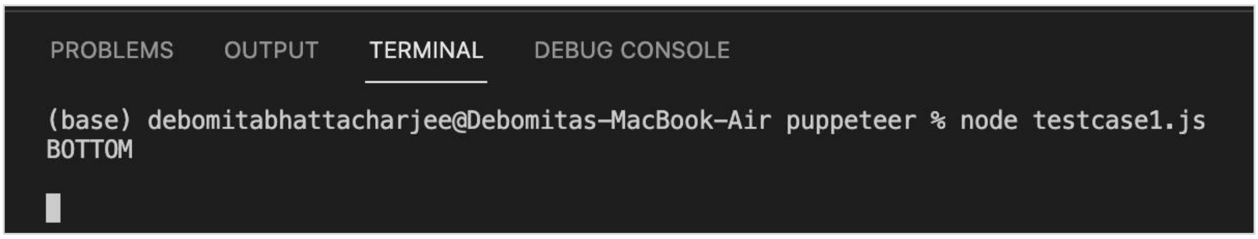
```
      //move to frame
      const x = await f.contentFrame();

      //identify element inside frame
      const n = await x.$("body")
      //get text
      const v = await (await n.getProperty("textContent")).jsonValue()
      console.log(v)
}
frameHandle()
```

Step 4: Execute the code with the command:

```
node <filename>
```

So in our example, we shall run the command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
BOTTOM
```

After the command has been successfully executed, the text within the frame - BOTTOM gets printed in the console.

33. Puppeteer — Keyboard Simulation

Puppeteer can perform keyboard simulation actions like pressing a key in the keyboard, pressing the up, down keys, and so on. All these are done using the keyboard method.

Keyboard Methods

Some of the keyboard methods are as follows:

keyboard.press()

This method is used to simulate a key press. The key to be pressed is passed as a parameter to this method. The syntax is as follows:

```
keyboard.press('Enter')
```

keyboard.type()

This method is used to simulate entering text from the keyboard. The text to be entered is passed as a parameter to this method. The syntax is as follows:

```
keyboard.type('Puppeteer')
```

keyboard.sendCharacter()

It is same as keyboard.type(). The syntax is as follows:

```
keyboard.sendCharacter('Puppeteer')
```

keyboard.up()

This method is used to simulate pressing the up arrow from the keyboard. The syntax is as follows:

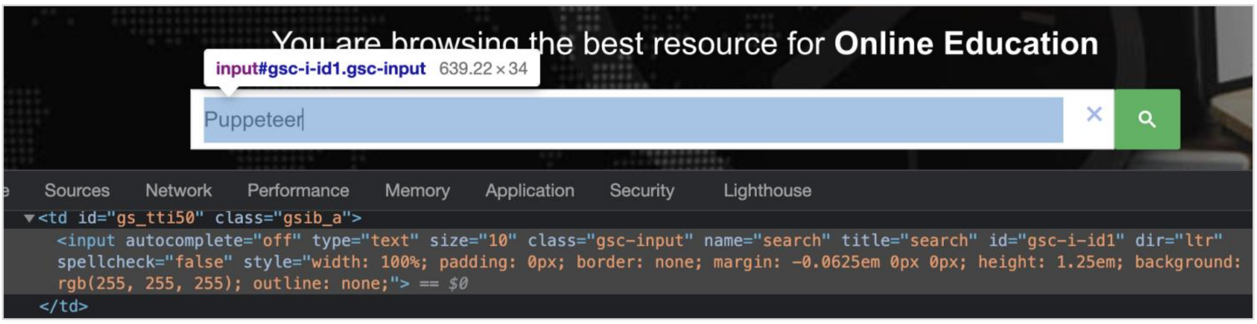
```
keyboard.up()
```

keyboard.down()

This method is used to simulate pressing the down arrow from the keyboard. The syntax is as follows:

```
keyboard.down()
```

In the below image, let us input a text and then press Enter.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 639.22 × 34
Puppeteer
Sources
Network
Performance
Memory
Application
Security
Lighthouse

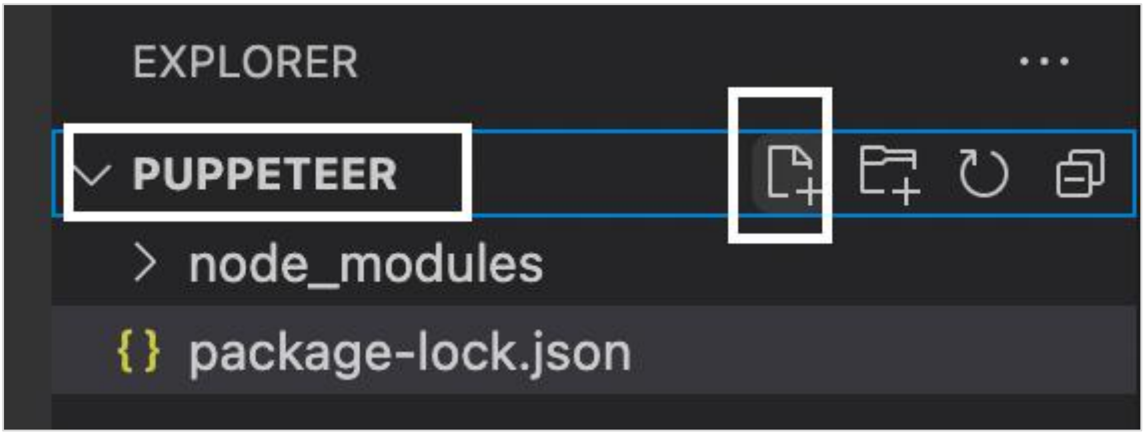
```
▼<td id="gs_tti50" class="gsib_a">
    <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
    spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
    rgb(255, 255, 255); outline: none;"> == $0
  </td>
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

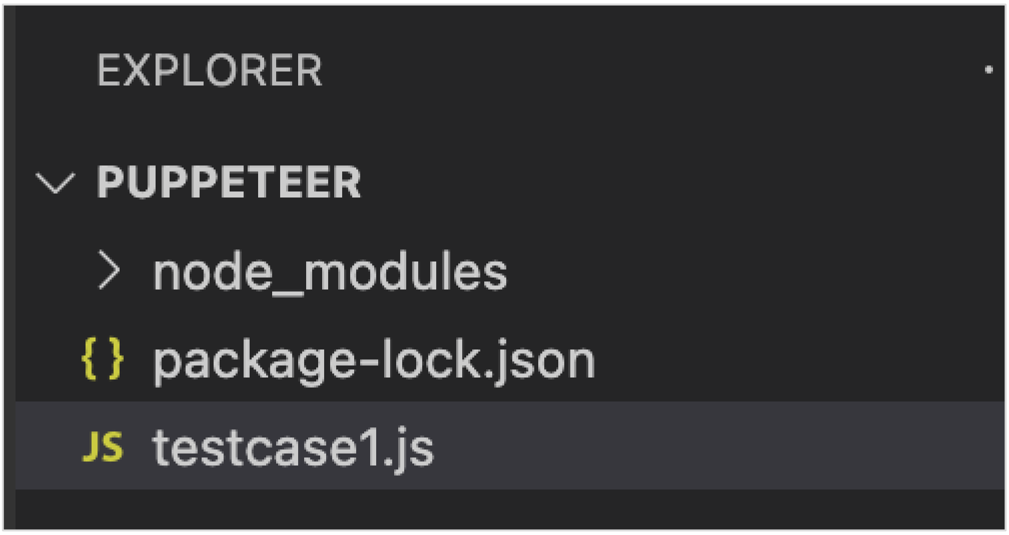
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

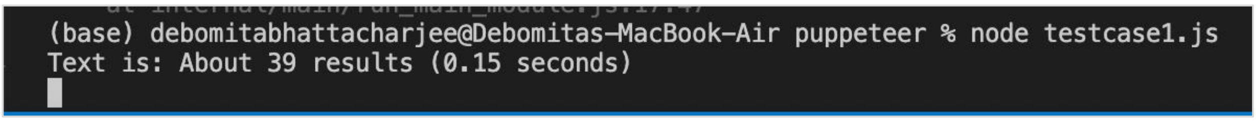
```
//Puppeteer library
const pt= require('puppeteer')
async function keyboradSimulation(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify edit box with id
     const f = await page.$("#gsc-i-id1")
     //enter text
     f.type("Puppeteer")
     //wait for sometime
     await page.waitForTimeout(4000)
     //press Enter
     await page.keyboard.press('Enter')
      //wait for sometime
      await page.waitForTimeout(4000)
     //identify element
     const t = await page.$(".gsc-result-info")
     //obtain text
     const text = await (await t.getProperty('textContent')).jsonValue()
     console.log("Text is: " + text)
}
keyboradSimulation()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Text is: About 39 results (0.15 seconds)
```

After the command has been successfully executed, the text obtained on pressing Enter after entering Puppeteer - About 39 results (0.15 seconds) gets printed in the console.

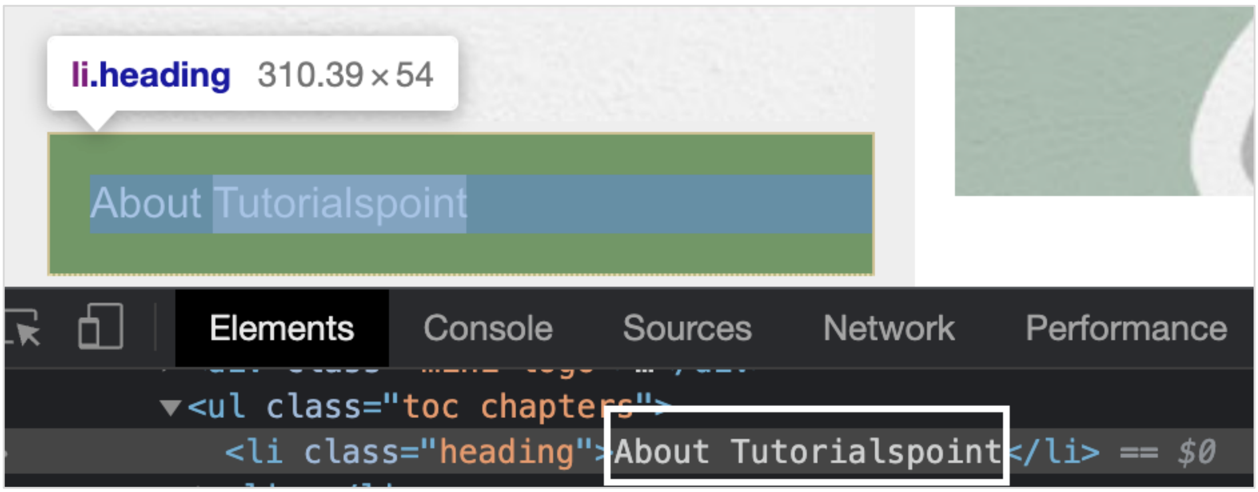
34. Puppeteer — Getting Element Text

We can get element text in Puppeteer. This is done with the help of the textContent property. This property of the element is passed as a parameter to the getProperty method.

The syntax of getting element text is as follows:

```
const n = await page.$("#txt")
 const t = await (await n.getProperty('textContent')).jsonValue()
```

In the below image, let us obtain the text - About Tutorialspoint for the highlighted element:



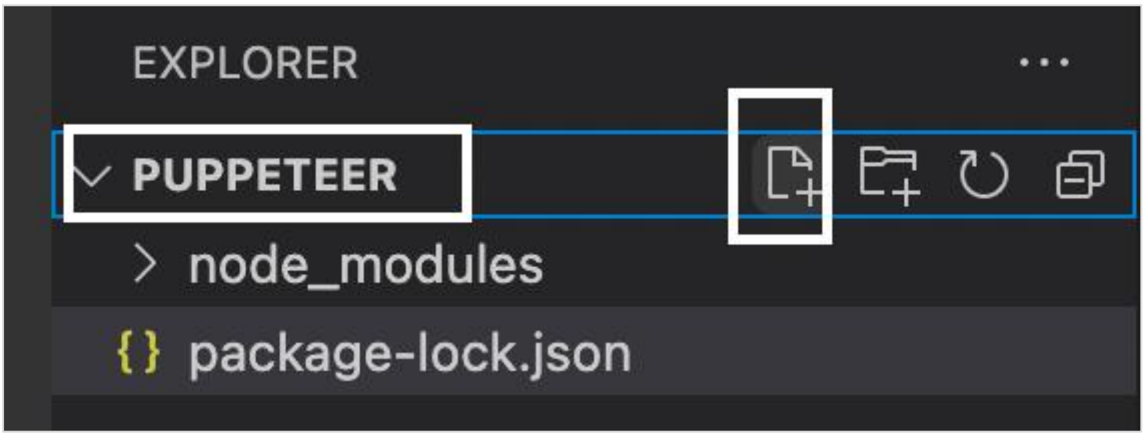
```
▼<ul class="toc chapters">
   <li class="heading">About Tutorialspoint</li> == $0
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

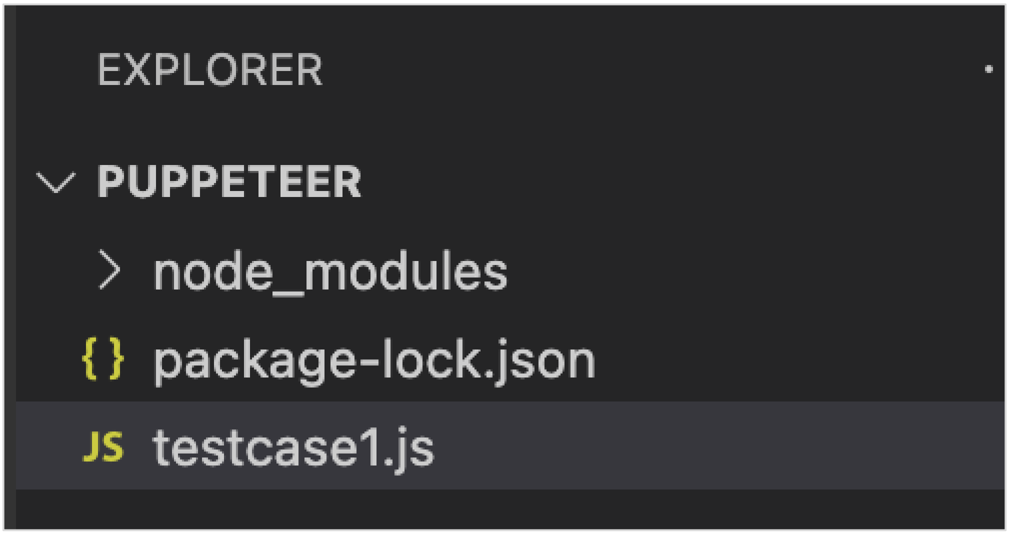
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

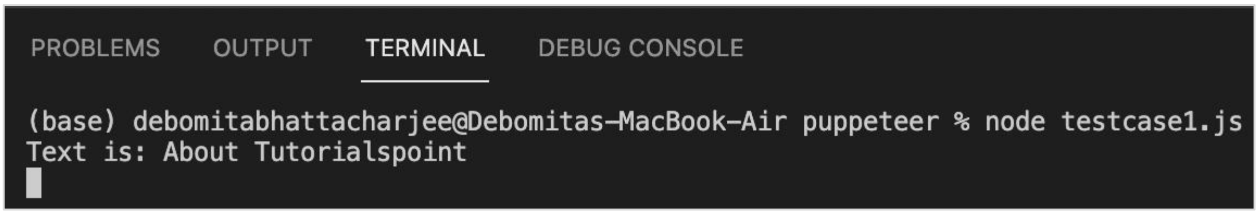
```
//Puppeteer library
const pt= require('puppeteer')
async function getText(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
    await page.goto('https://www.tutorialspoint.com/about/about_careers.htm')
     //identify element
     const f = await page.$("[class='heading']")
     //obtain text
     const text = await (await f.getProperty('textContent')).jsonValue()
    console.log("Text is: " + text)
}
getText()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



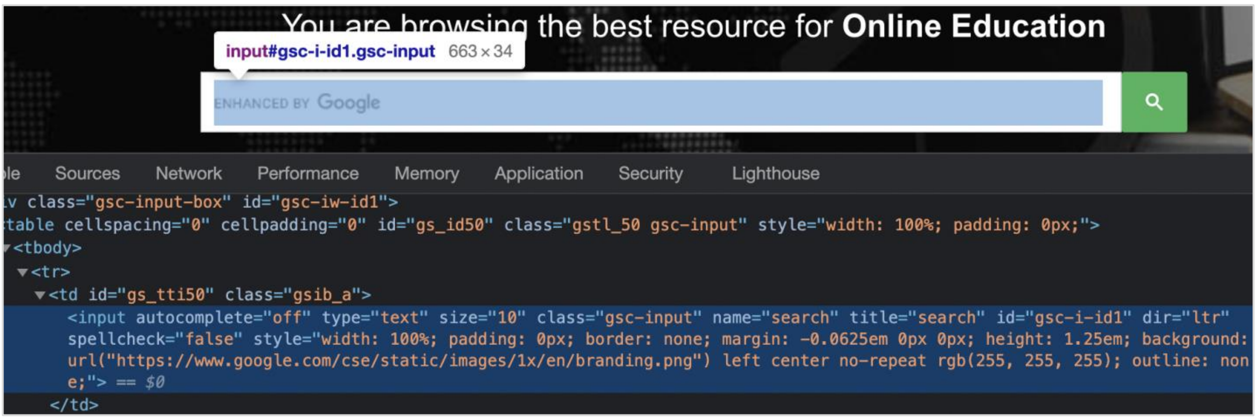
```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Text is: About Tutorialspoint
```

After the command has been successfully executed, the text of the element - About Tutorialspoint gets printed in the console.

35. Puppeteer — Getting Element Attribute

We can get attribute values of an element using Puppeteer. The attributes are added within the HTML tag. They are used to describe the properties of an element. An attribute and its value are defined in a key-value pair.

Let us take an example of an edit box having the below properties:


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
le Sources Network Performance Memory Application Security Lighthouse

```
v class="gsc-input-box" id="gsc-iw-id1">
table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
▾<tbody>
  ▾<tr>
    ▾<td id="gs_tti50" class="gsib_a">
       <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
       spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
       url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 255, 255); outline: non
       e;"> == $0
     </td>
```

Here, input is the tagname. A tag in HTML may or may not have attributes. The type, class , name, id and so on are the attributes of this element. For example, in id = gsc-i-id1, text to the left of = is the attribute name(i.e id) and to the right of = is the attribute value(i.e gsc-i-id1).

An attribute may or may not have a value assigned. Also, if a value is assigned, then it should be enclosed in double or single quotes. The value of an attribute is set by a developer as per his choice.

Methods for Element Attribute

The ways to obtain an element attribute are listed below:

getAttribute()

This method is used to get the value of the attribute which is passed as a parameter to this method. The syntax is as follows:

```
let v  = await page.$eval("input",
                element=> element.getAttribute("class"))
```

element.<attribute name>

The syntax is as follows:

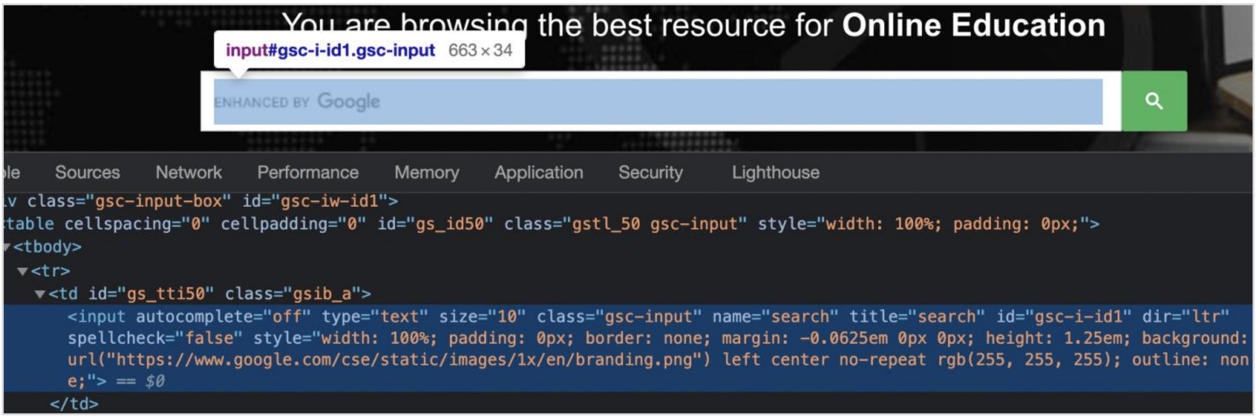
```
let v  = await page.$eval("input",
                element=> element.class)
```

element.getProperty()

This method is used to get the value of the attribute which is passed as a parameter to this method. The syntax is as follows:

```
const n = await page.$("#txt")
 const t = await (await n.getProperty('textContent')).jsonValue()
```

In the below image, let us identify the highlighted edit box and obtain the value of its class attribute - gsc-input.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 663 × 34
ENHANCED BY Google
le Sources Network Performance Memory Application Security Lighthouse

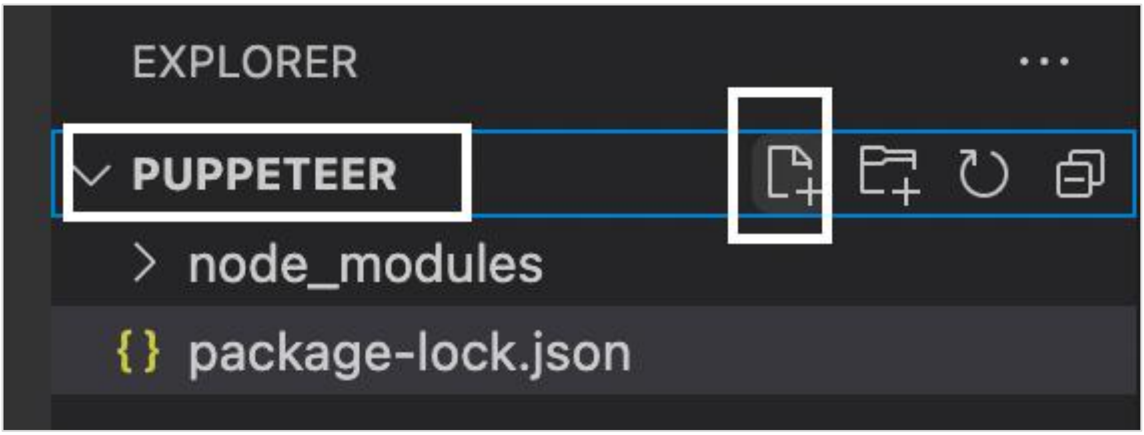
```
v class="gsc-input-box" id="gsc-iw-id1">
table cellspacing="0" cellpadding="0" id="gs_id50" class="gstl_50 gsc-input" style="width: 100%; padding: 0px;">
▼<tbody>
  ▼<tr>
    ▼<td id="gs_tti50" class="gsib_a">
        <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
        spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
        url("https://www.google.com/cse/static/images/1x/en/branding.png") left center no-repeat rgb(255, 255, 255); outline: non
        e;"> == $0
      </td>
```

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

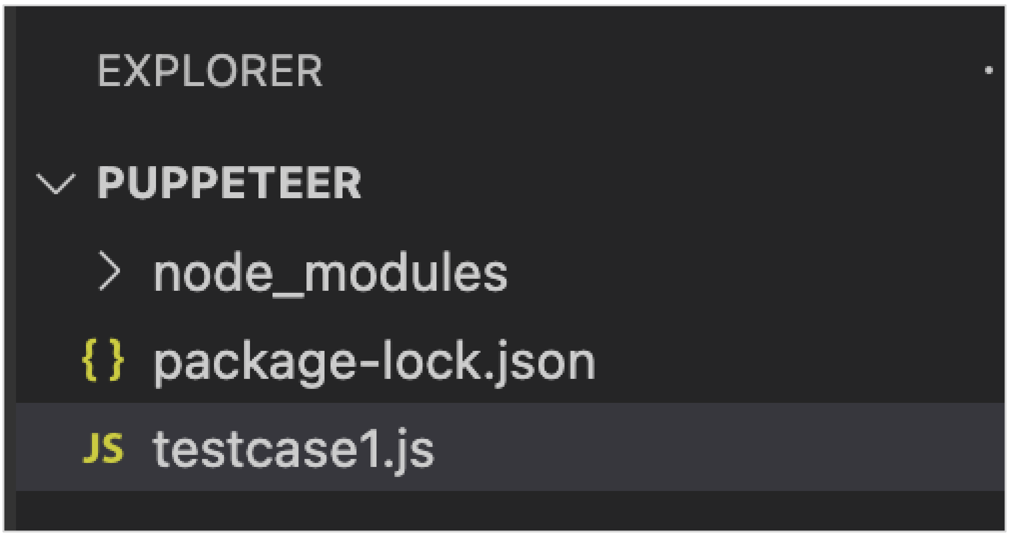
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

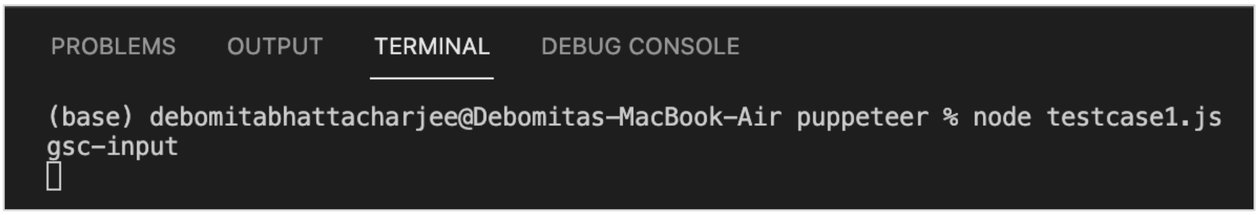
```
//Puppeteer library
const pt= require('puppeteer')
async function getElementAttribute(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify element with id
     const n = await page.$("#gsc-i-id1")
     //get class attribute
     let v  = await page.$eval("input",
                n => n.getAttribute("class"))
     console.log(v)
}
getElementAttribute()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```

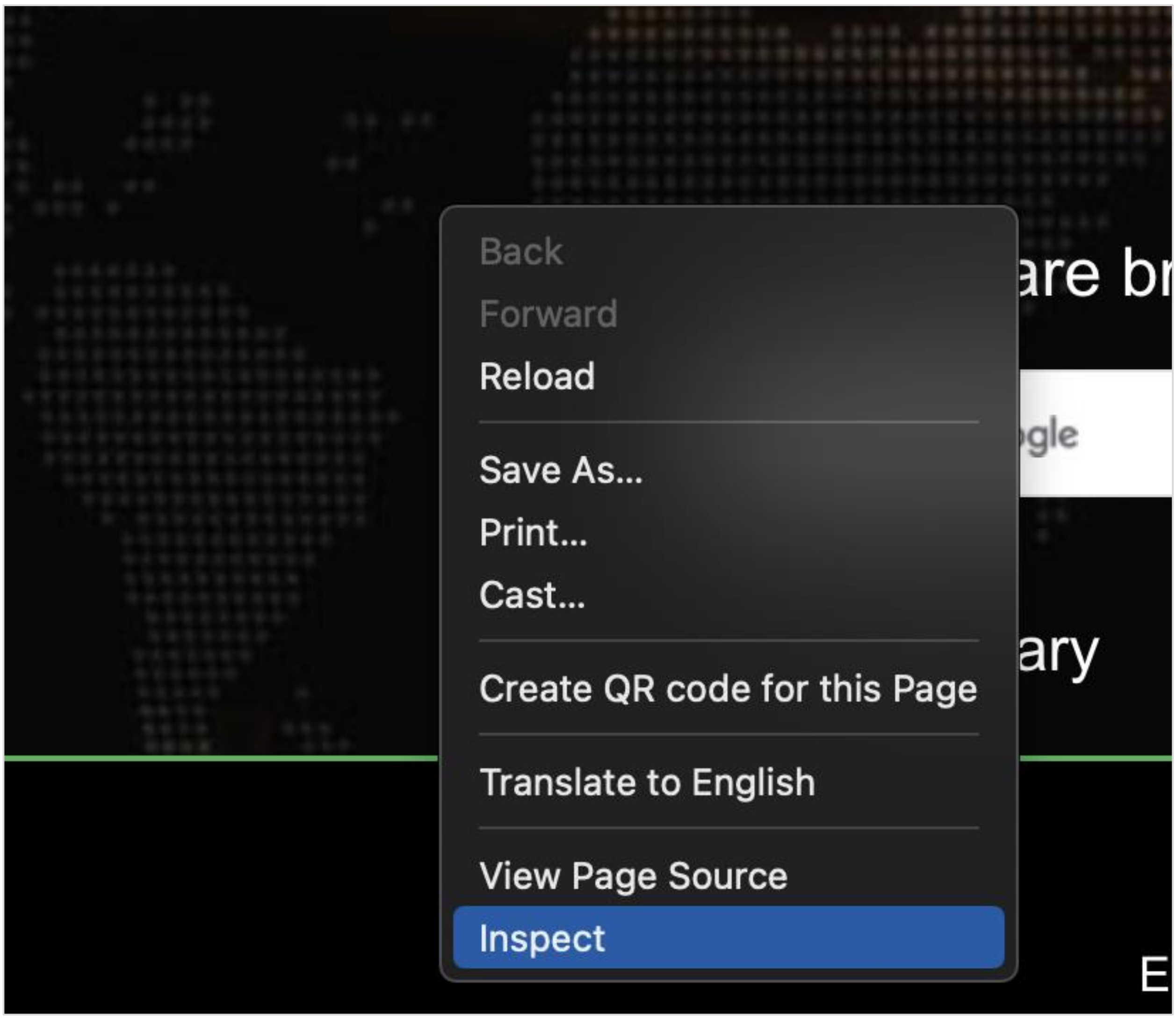


```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
gsc-input
```

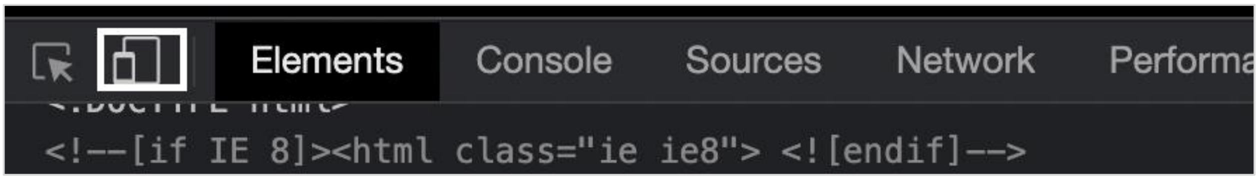
After the command has been successfully executed, the value of the class attribute for the element - gsc-input gets printed in the console.

36. Puppeteer — Device Emulation

We can run tests with mobile configurations in Puppeteer and check the responsive property of a webpage. The list of devices that the Puppeteer supports can be obtained from the Chrome DevTools. Right-click on a page opened in the Chrome browser, then select Inspect.

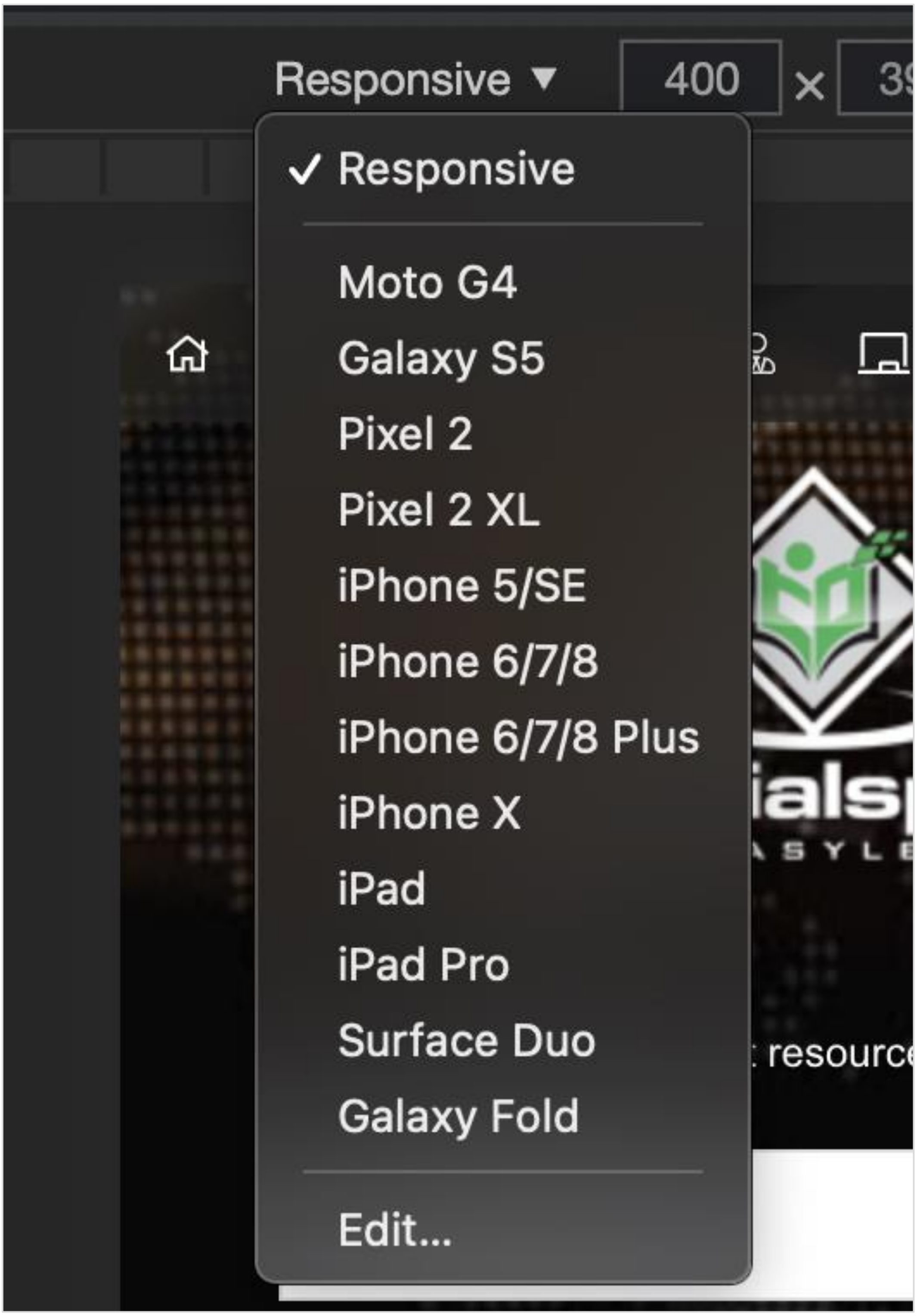


Then, click on the Toggle Device Toolbar.



```
<!--[if IE 8]><html class="ie ie8"> <![endif]-->
```

Click on the dropdown - Responsive to get the list of devices.



To emulate a device, we have to use the method emulate() and the device to be emulated is passed as a parameter to this method. The syntax for this method is as follows:

```
const m = puppeteer.devices['iPhone X']
 //emulate iPhoneX
 await page.emulate(m)
```

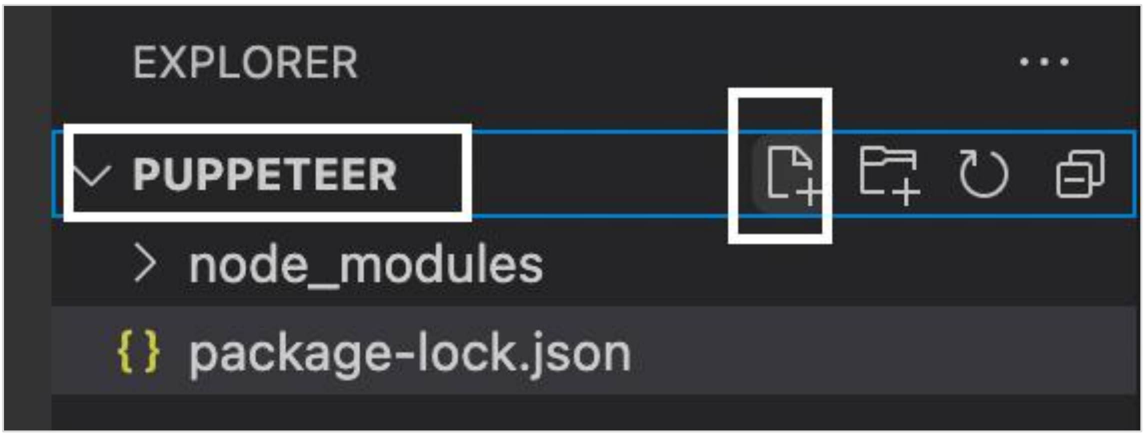
Let us emulate the device iPhone X using the emulate function in Puppeteer.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

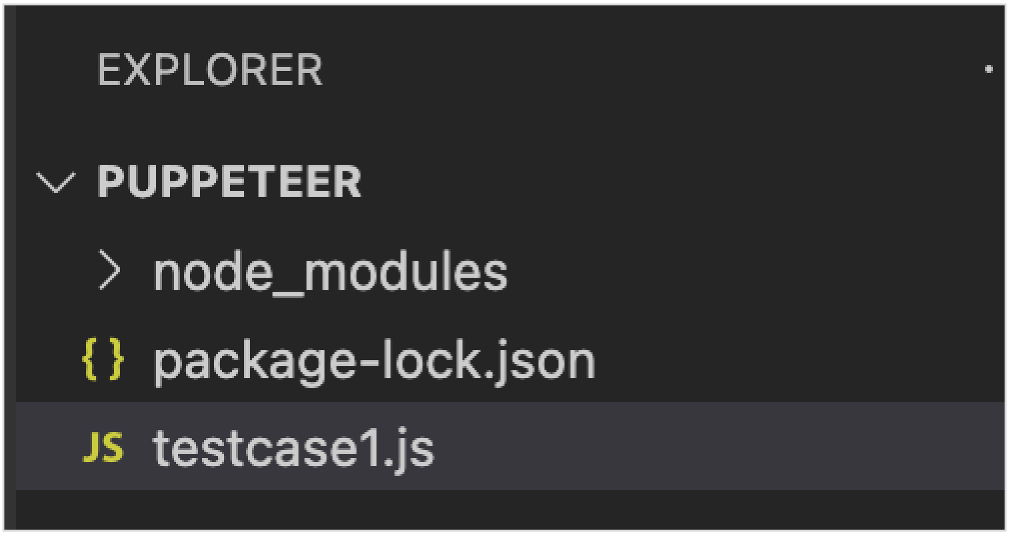
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

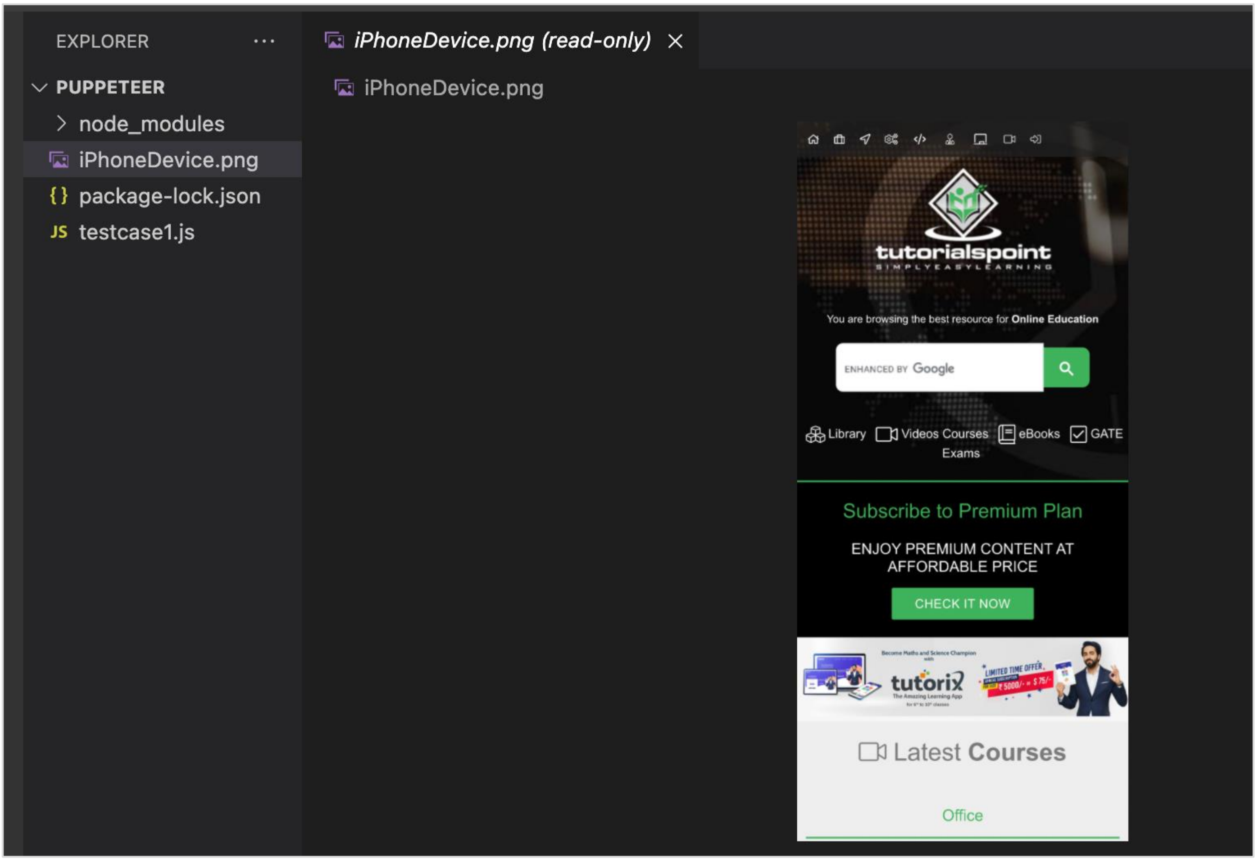
```
//Puppeteer library
const puppeteer = require('puppeteer')
//launch browser in headed mode
puppeteer.launch({headless:false}).then(async browser => {
  //browser new page
  const page = await browser.newPage()
 //set device to iPhone X
  const m = puppeteer.devices['iPhone X']
  //emulate iPhoneX
  await page.emulate(m)
  //launch URL
  await page.goto('https://www.tutorialspoint.com/index.htm')
  //capture screenshot of emulated device
  await page.screenshot({ path: 'iPhoneDevice.png'})
  //browser close
  await browser.close()
})
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



After the command has been successfully executed, a new file called the iPhoneDevice.png gets created within the page directory. It contains the captured screenshot of the emulated webpage for the iPhone X device.

37. Puppeteer — Disable JavaScript

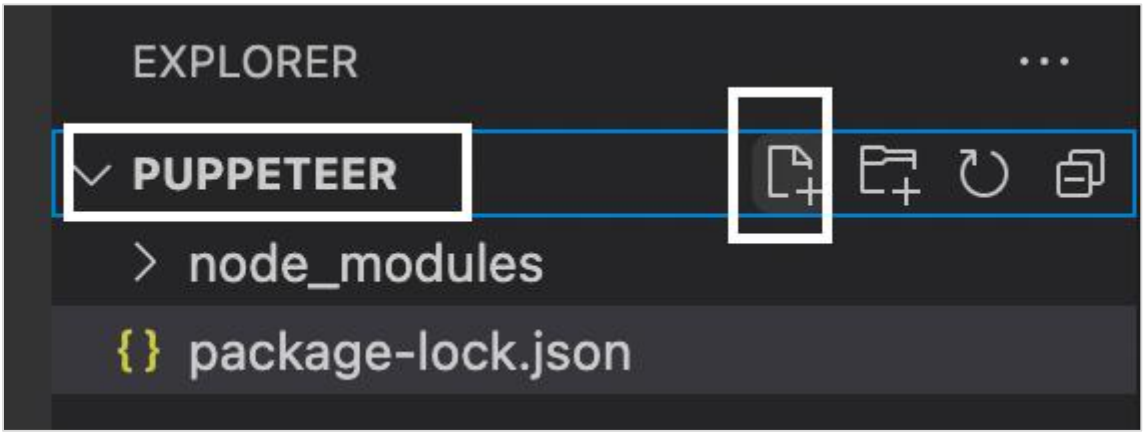
We can disable JavaScript using Puppeteer. For this, we have to block the requests/response based on its type. Let us make an attempt to launch a page by disabling JavaScript.

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

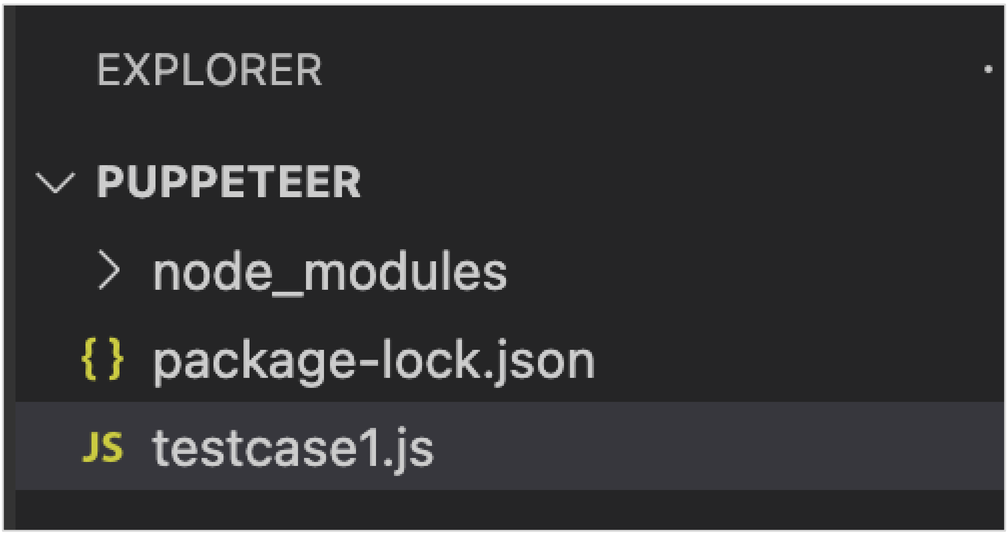
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

```
  //Puppeteer library
   const pt = require('puppeteer')
   pt.launch().then(async browser => {

     //browser new page
    const page = await browser.newPage()
  //monitor requests
  await page.setRequestInterception(true)
  //check resourceType is script
  page.on('request', request => {
    if (request.resourceType() === 'script')
      request.abort();
    else
      request.continue();
  })
  //launch application
  await page.goto('https://www.tutorialspoint.com/index.htm')
   //browser close
   await browser.close()
 })
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```

38. Puppeteer — Synchronization

Puppeteer Page class contains methods to achieve synchronization. These methods are used to wait for an action/element on the page. It waits for criteria to be met (a true value). For example, we often wait for a text to appear on the page.

Synchronization methods

The synchronization methods in Puppeteer are listed below:

waitFor

This method is used to wait for a specific amount of time before resolving a Promise. The syntax is as follows:

```
await page.waitFor(4000)
```

waitForSelector

This method is used to wait for an element to be visible or disappear from the webpage. The syntax is as follows:

```
page.waitForSelector(
    selector,
    {options : value}
)
```

The waitForSelector accepts two parameters. The first parameter is the selector value of an element. The second parameter is the array of options. The options are listed below:

- **Visible**: Puppeteer shall wait till an element locator is visible on the page. The default value is false.
- **Hidden**: Puppeteer shall wait till an element locator is hidden from the page. The default value is false.
- **Timeout**: The maximum wait time for an element in milliseconds. The default value is 30000. If the timeout is set to zero, this is discarded.

The default wait time can be modified by using the method given below:

```
page.setDefaultTimeout(6000)
```

For example,

```
let l = await page.waitForSelector( "#ltxt", { visible: true } )
```

waitForXpath

This method is used to wait for element/elements identified by xpath to be visible or disappear from the webpage. The syntax is as follows:

```
page.waitXpath(
    Xpath value,
    {options : value}
)
```

The waitForXpath accepts two parameters. The first parameter is the xpath selector value of an element. The second parameter is the array of options. The options are listed below:

- **Visible:** Puppeteer shall wait till an element locator is visible on the page. The default value is false.
- **Hidden:** Puppeteer shall wait till an element locator is hidden from the page. The default value is false.
- **Timeout:** The maximum wait time for an element in milliseconds. The default value is 30000. If the timeout is set to zero, this is discarded.

The default wait time can be modified using the below method:

```
page.setDefaultTimeout(6000)
```

For example,

```
 let x= await page.waitForXPath( "//*[@name='search']", { visible: true } )
```

waitForFunction

This method is used to wait till the provided function returns a true value. The syntax is as follows:

```
page.waitForFunction(
    pagefunction,
    {options : value},
    pagefunction args
)
```

The waitForFunction has the following parameters:

The pagefunction is the function to be executed. For example,

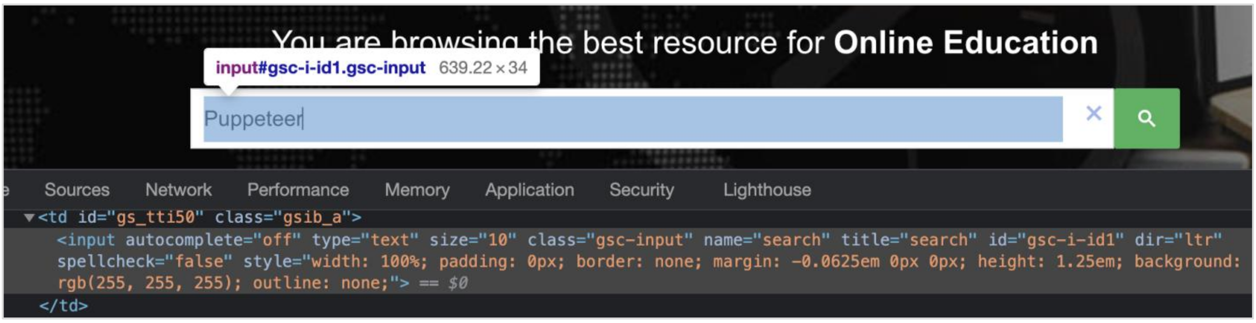
```
page.waitForFunction("document.getElementById('txt').value === 'text'", {})
```

This function shall wait till the value of the element with id is equal to text.

The option is an array of waiting parameters. They are - polling (the interval at which the pagefunction should be executed in milliseconds) and timeout (The maximum time the Puppeteer shall wait for the pagefunction to return true value).

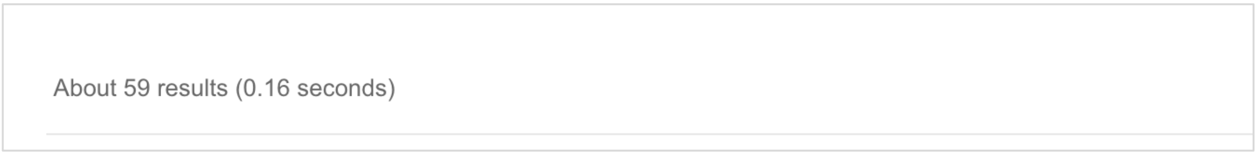
The pagefunction args are the arguments passed to the pagefunction function.

In the below image, let us input text - Puppeteer and then press Enter.


You are browsing the best resource for Online Education
input#gsc-i-id1.gsc-input 639.22×34
Puppeteer
Sources
Network
Performance
Memory
Application
Security
Lighthouse

```
▼<td id="gs_tti50" class="gsib_a">
  <input autocomplete="off" type="text" size="10" class="gsc-input" name="search" title="search" id="gsc-i-id1" dir="ltr"
  spellcheck="false" style="width: 100%; padding: 0px; border: none; margin: -0.0625em 0px 0px; height: 1.25em; background:
  rgb(255, 255, 255); outline: none;"> == $0
</td>
```

After pressing Enter, a new window having the search results with text - About 39 results should open up.



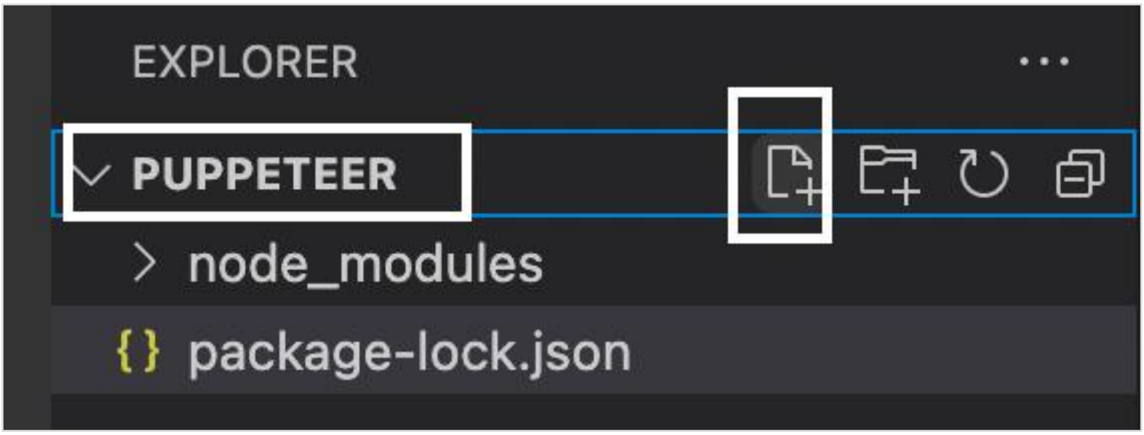
About 59 results (0.16 seconds)

To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

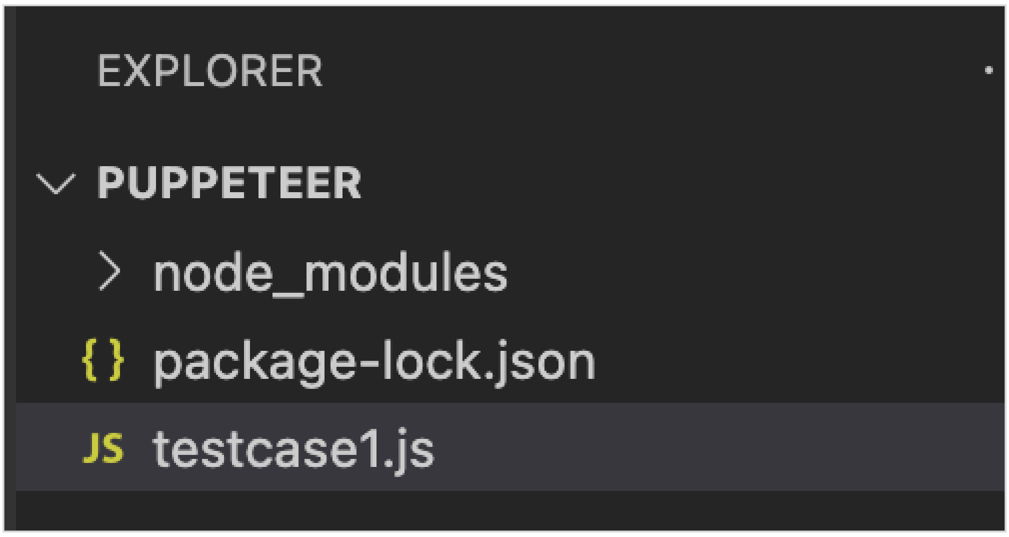
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

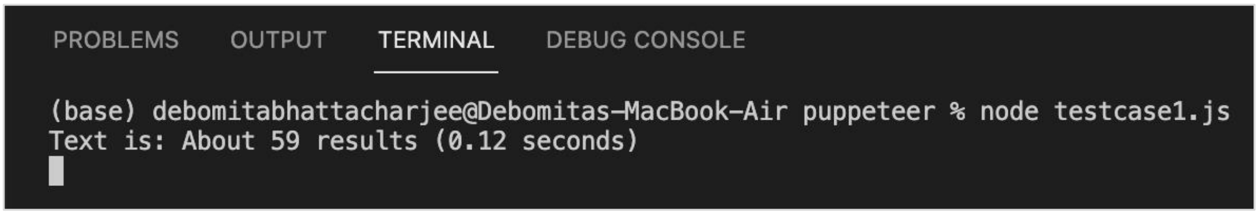
```
    //Puppeteer library
const pt= require('puppeteer')
async function waitImplementation(){
    //launch browser in headless mode
     const browser = await pt.launch()
     //browser new page
     const page = await browser.newPage()
     //launch URL
     await page.goto('https://www.tutorialspoint.com/index.htm')
     //identify edit box
     const f = await page.$("#gsc-i-id1")
     //enter text
     f.type("Puppeteer")
     //wait for sometime
     await page.waitForTimeout(4000)
     //press Enter
     await page.keyboard.press('Enter')
      //wait for an element xpath
      await page.waitForXPath("//div[@class='gsc-result-info']")
     //identify element
     const t = await page.$(".gsc-result-info")
     //obtain text
     const text = await (await t.getProperty('textContent')).jsonValue()
     console.log("Text is: " + text)
}
waitImplementation()
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
Text is: About 59 results (0.12 seconds)
```

39. Puppeteer — Capture Screenshot

We can capture screenshots while working on automation tests developed in Puppeteer using the screenshot method. A screenshot is generally captured if we encounter an application error, a failure in a test case, and so on.

The syntax to capture screenshot in Puppeteer is as follows:

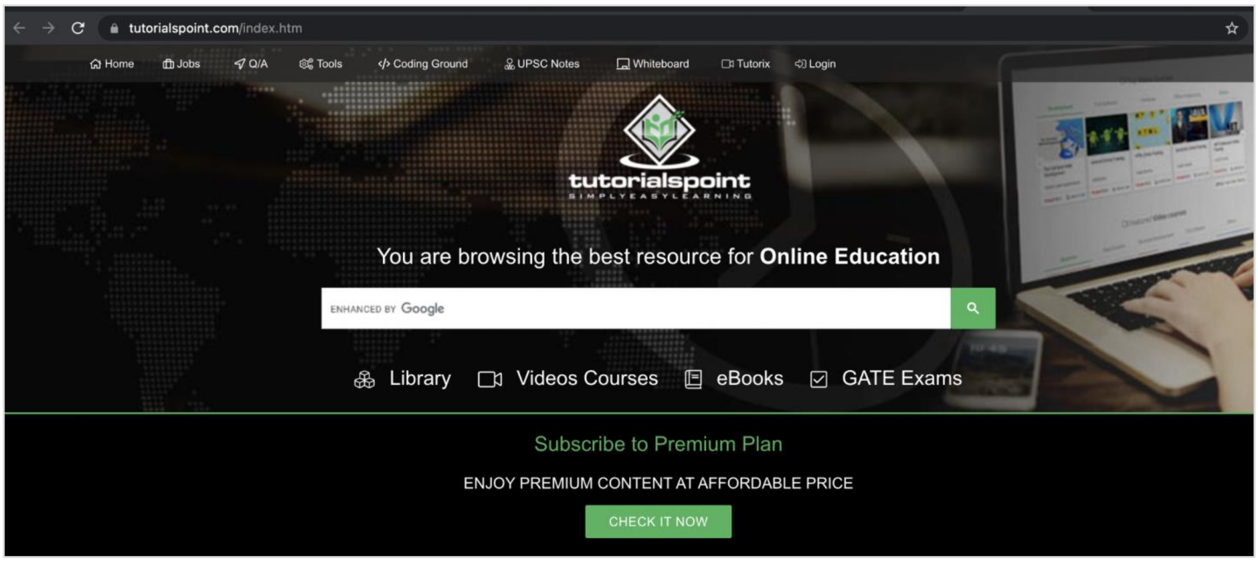
```
await page.screenshot({
        path: 'tutorialspoint.png'
    })
```

Here, the path where the screenshot is to be saved is passed as a parameter to the method. With this, only the viewable part of the web page shall be captured. To capture the full page screenshot, we have to pass another parameter called the fullPage and set its value to true.

The syntax is as follows:

```
await page.screenshot({
        path: 'tutorialspoint.png', fullPage: true
    })
```

Let us capture the screenshot of the below page:

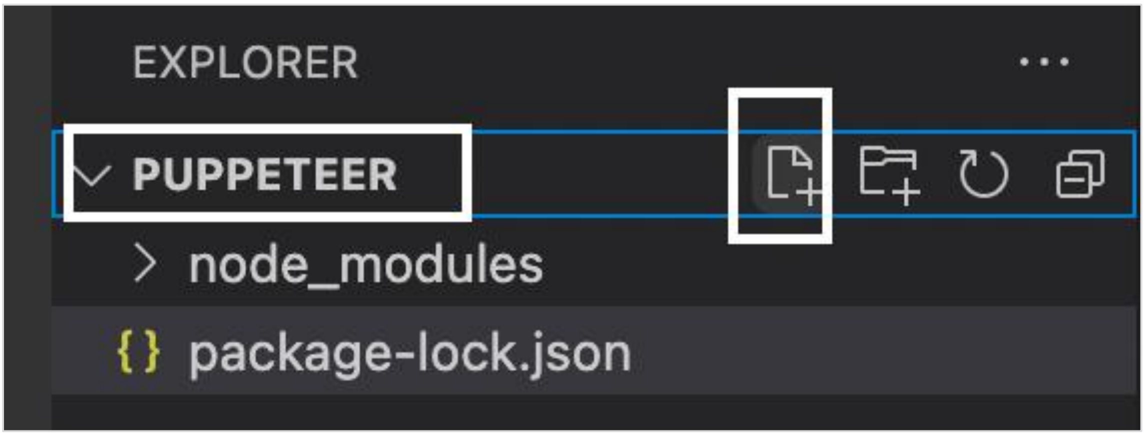


To begin, follow Steps 1 to 2 from the Chapter of Basic Test on Puppeteer which are as follows:

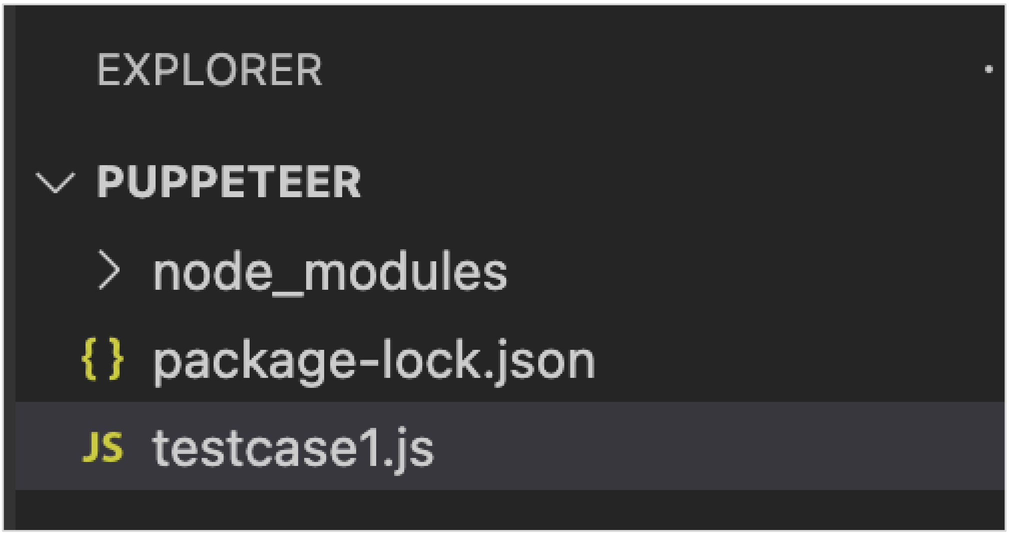
Step 1: Create a new file within the directory where the node_modules folder is created (location where the Puppeteer and Puppeteer core have been installed).

The details on Puppeteer installation is discussed in the Chapter of Puppeteer Installation.

Right-click on the folder where the node_modules folder is created, then click on the New file button.



Step 2: Enter a filename, say testcase1.js.



Step 3: Add the below code within the testcase1.js file created.

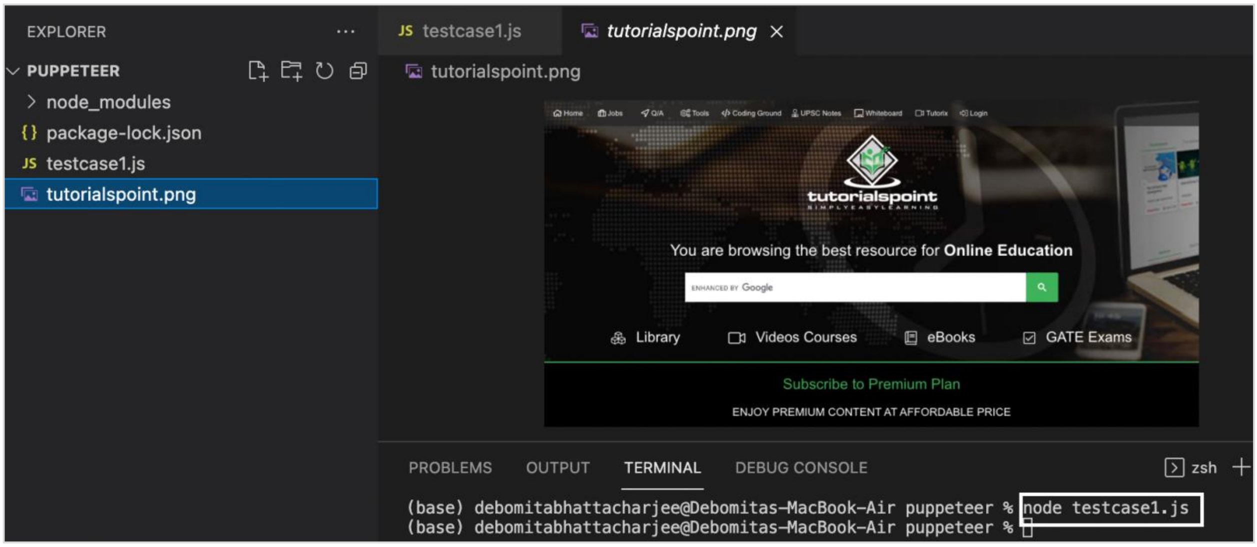
```
//adding Puppeteer library
const pt = require('puppeteer');
pt.launch().then(async browser => {
    //browser new page
    const p = await browser.newPage();
    //set viewpoint of browser page
    await p.setViewport({ width: 1000, height: 500 })
    //launch URL
    await p.goto('https://www.tutorialspoint.com/index.htm')
    //capture screenshot
    await p.screenshot({
        path: 'tutorialspoint.png'
    });
    //browser close
    await browser.close()
})
```

Step 4: Execute the code with the command given below:

```
node <filename>
```

So in our example, we shall run the following command:

```
node testcase1.js
```



```
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer % node testcase1.js
(base) debomitabhattacharjee@Debomitas-MacBook-Air puppeteer %
```

After the command has been successfully executed, a new file called the tutorialspoint.png gets created within the page directory. It contains the captured screenshot of the page launched in the browser.