

Assignment 3 : Web Scraping with Selenium

Variant 28 : Scrape data from a gardening or landscaping site, such as plant names, descriptions, and care instructions.

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Section : 2

Introduction:

The practice of pulling information from webpages is known as "web scraping," and it can be a useful tool for obtaining information from multiple internet sources. Sites dedicated to gardening and landscaping offer a plethora of knowledge on plants, such as names, descriptions, and maintenance guidelines. I'm going to automate the extraction of this important data for analysis by using web scraping techniques. I'm going to use the Better Homes and Gardens garden dictionary website, which can be found at <https://www.bhg.com/gardening/plant-dictionary/> . It contains information on a variety of plants and their requirements, including soil, light, temperature, fertilizer, pruning, pests, and problems. I'll use this to carry out a number of tasks in order to examine the website's flow and gather data.

Task 1: Create a Selenium project using java and perform various operations on it.

a. Open browser using selenium.

For this work, I've decided to use the Chrome web browser. I obtained the version of Chrome Driver that works with my browser. In my instance, I was using the most recent Chrome browser and driver, which is version 119.0.6045.105.

Set the path to the location where Chrome Driver executable is stored

```
System.setProperty("webdriver.chrome.driver",  
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-  
win64/chromedriver.exe");
```

We can utilize the Chrome Options function to open the Chrome browser in full screen mode. The option "--start-maximized," which launches the browser in full screen mode, should be added to ChromeOptions. With the supplied ChromeOptions, start a fresh instance of the Chrome driver.

```
// Create ChromeOptions  
ChromeOptions options = new ChromeOptions();  
// Add the start-maximized argument  
options.addArguments("--start-maximized");  
// Create a new instance of the Chrome driver with the configured  
ChromeOptions  
WebDriver driver = new ChromeDriver(options);
```

Navigate to the initial website

```
driver.get("https://www.bhg.com/gardening/plant-dictionary/");
```

b. Find and interact with various elements on the page

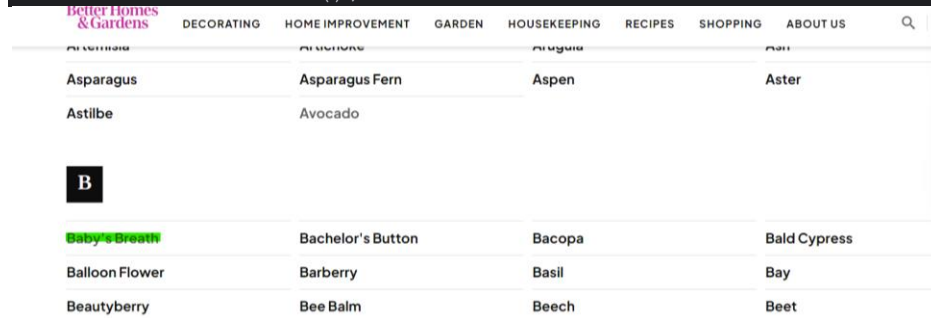
i. Click on a link

HTML Code : <a href="https://www.bhg.com/gardening/plant-dictionary/perennial/babys-breath/"

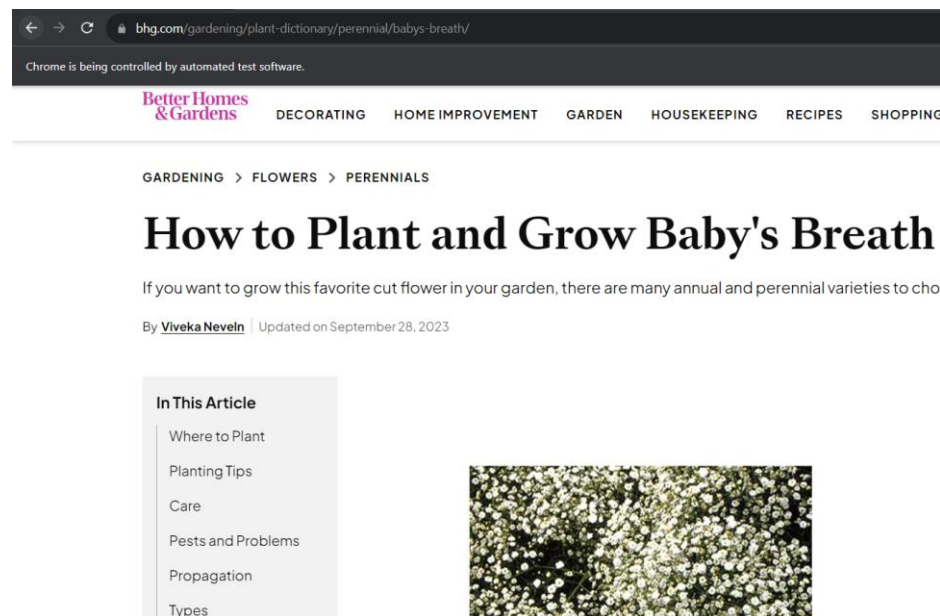
```
rel="nocaes" class="link-list__link type--dog-bold type--dog-link" previewlistener="true"> Baby's Breath</a>
```

Select the element by matching the text that is associated with the link and click on it. Here I am searching for “Baby's Breath”. The click() function clicks on the element and takes us to <https://www.bhg.com/gardening/plant-dictionary/perennial/babys-breath/> this URL.

```
WebElement learnMoreLink = driver.findElement(By.linkText("Baby's Breath"));
learnMoreLink.click();
```



Redirecting to the new URL



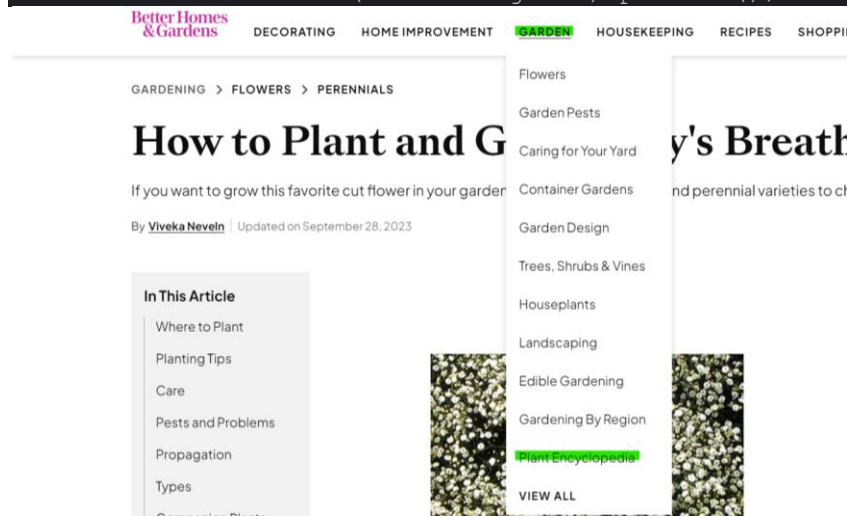
ii. Interact with dropdown menu

I am going to hover over the garden dropdown menu on the top of the web page. In order to do that first find the element “Garden” using its xpath and perform an action “moveToElement” on the element. This will show us the dropdown menu.

```
// Find the "Garden" Dropdown menu using its XPath
WebElement decoratingLink = driver.findElement(By.xpath("//*[@id=\"header-nav_1-0\"]/div[1]/ul/li[3]/a"));

// Create an instance of the Actions class
Actions actions = new Actions(driver);
```

```
// Perform the mouse hover over the "Garden" dropdown menu
actions.moveToElement(decoratingLink).perform();
```



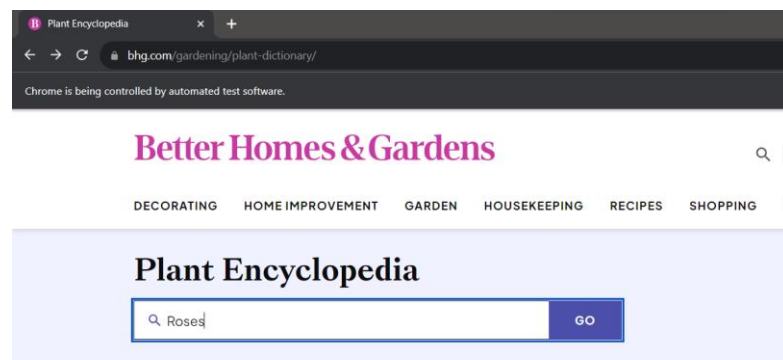
Go back to the main first page <https://www.bhg.com/gardening/plant-dictionary/> by clicking on the Plant Encyclopedia option from the dropdown

```
// Clicking on the "Plant Encyclopedia" link under "Garden" dropdown menu
link this will take us to the starting page
"https://www.bhg.com/gardening/plant-dictionary/"
WebElement subMenuLink = driver.findElement(By.xpath("//*[@id=\"header-
nav_1-0\"]/div[1]/ul/li[3]/ul/li[11]/a"));
subMenuLink.click();
```

iii. Fill in a text box

Search for the text box by its ID and enter the text to search in my case I entered "Roses".

```
WebElement searchBox = driver.findElement(By.id("search-box__search-input"));
searchBox.sendKeys("Roses");
```



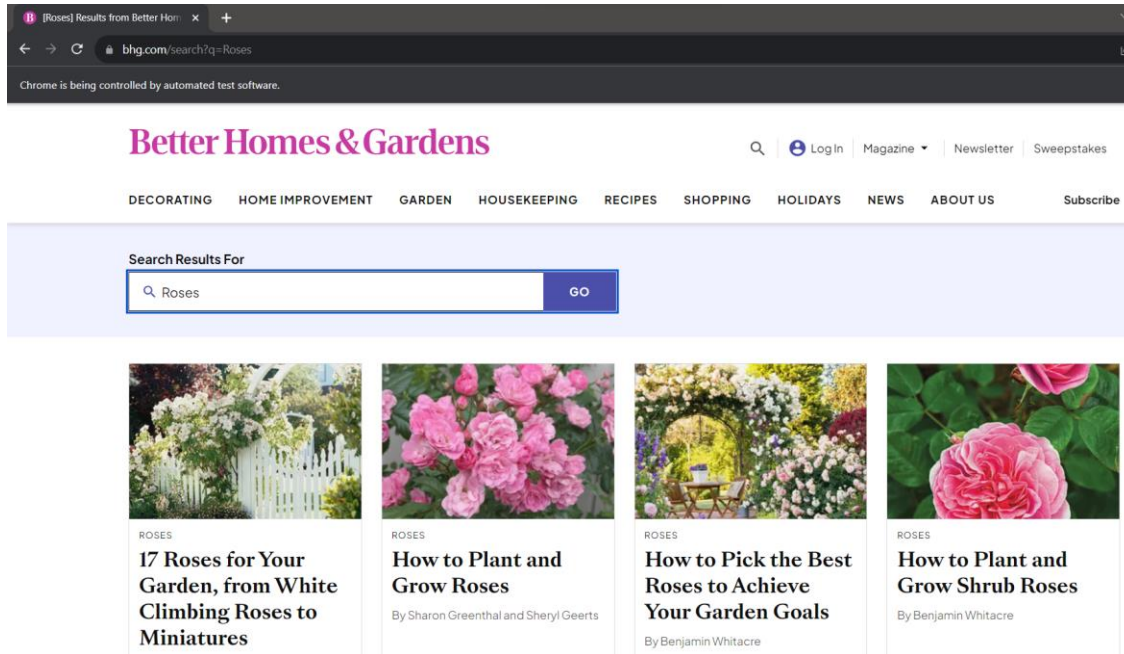
Popular Plants



iv. Click on a button

Click on the "Go" button which gives results for "Roses"

```
WebElement searchButton = driver.findElement(By.xpath("//*[@id=\"search-box_1-0\"]/form/div/button[1]"));
searchButton.click();
```



v. Extract text from an element

I have written a code which identifies and collects all elements with the class name "alphabetical-list__group," which represent groups of plants alphabetically. For each group, it iterates through the anchor (a) elements to extract the text (plant name) and href attribute (link). The extracted data is then written to a CSV file named "Task1_Plant_NamesAndLink.csv," with each row containing the plant name and its corresponding link. The code also includes error handling using a try-with-resources block to ensure proper closure of the BufferedWriter and handle potential IOExceptions.

```
// Go to plant dictionary url
driver.get("https://www.bhg.com/gardening/plant-dictionary/");
// Find all the <a> elements within the specified div
// Find all elements with the class name "alphabetical-list__group"
List<WebElement> divElements =
driver.findElements(By.className("alphabetical-list__group"));

try (BufferedWriter writer = new BufferedWriter(new
FileWriter("Task1_Plant_NamesAndLink.csv"))) {
    // Write CSV header
    writer.write("Text,Href");
    writer.newLine();
    for (WebElement divElement : divElements) {
        List<WebElement> aElements =
divElement.findElements(By.tagName("a"));

        // Iterate through each <a> element
```

```

for (WebElement aElement : aElements) {
    // Get the text and href value
    String text = aElement.getText();
    String hrefLink = aElement.getAttribute("href");

    // Write data to CSV
    writer.write(text + "," + hrefLink);
    writer.newLine();
}
}
} catch (IOException e) {
    e.printStackTrace();
}
}

```

A

African Daisy	African Violet	Agapanthus
Ajuga	Allium	Aloe Vera
Amaranth	Amaryllis	Anemone
Angelica	Anise	Arborvitae
Artemisia	Artichoke	Arugula
Asparagus	Asparagus Fern	Aspen
Astilbe	Avocado	

B

Baby's Breath	Bachelor's Button	Bacopa
Balloon Flower	Barberry	Basil

	A	B	C	D	E	F	G	H	I	J
1	Text	Href								
2	African Da	https://www.bhg.com/gardening/plant-dictionary/annual/african-daisy/								
3	African Vic	https://www.bhg.com/gardening/plant-dictionary/houseplant/african-violet/								
4	Agapanthu	https://www.bhg.com/gardening/plant-dictionary/bulb/agapanthus/								
5	Agave	https://www.bhg.com/gardening/plant-dictionary/perennial/agave/								
6	Ajuga	https://www.bhg.com/gardening/plant-dictionary/perennial/ajuga/								
7	Allium	https://www.bhg.com/gardening/plant-dictionary/bulb/allium/								
8	Aloe Vera	https://www.bhg.com/gardening/plant-dictionary/herb/aloe-vera/								
9	Alstroeme	https://www.bhg.com/gardening/plant-dictionary/perennial/alstroemeria/								
10	Amaranth	https://www.bhg.com/gardening/plant-dictionary/annual/amaranthus/								
11	Amaryllis	https://www.bhg.com/gardening/plant-dictionary/houseplant/amaryllis/								
12	Anemone	https://www.bhg.com/gardening/plant-dictionary/perennial/anemone/								
13	Angel's Tru	https://www.bhg.com/gardening/plant-dictionary/annual/angels-trumpet/								
14	Angelica	https://www.bhg.com/gardening/plant-dictionary/herb/angelica/								
15	Anise	https://www.bhg.com/how-to-grow-anise-7090848								
16	Arborvitae	https://www.bhg.com/gardening/plant-dictionary/shrub/arborvitae/								
17	Arrowhead	https://www.bhg.com/gardening/plant-dictionary/water/arrowhead/								
18	Artemisia	https://www.bhg.com/gardening/plant-dictionary/perennial/artemisia/								
19	Artichoke	https://www.bhg.com/gardening/plant-dictionary/vegetable/artichoke/								
20	Arugula	https://www.bhg.com/gardening/plant-dictionary/vegetable/arugula/								
21	Ash	https://www.bhg.com/gardening/plant-dictionary/tree/ash/								

Task 2 : Scrape 378 pages from the same website and combine the results

This Java program utilizes Selenium WebDriver to perform web scraping on the Better Homes & Gardens plant dictionary website. The main method initializes a ChromeDriver, navigates to the plant dictionary URL, and collects all plant names using the "alphabetical-list__group" class. For each group, it extracts plant names and links. There are 378 plant names and links on <https://www.bhg.com/gardening/plant->

[dictionary/](#) this page. I am going to scrape all the 378 pages to extract plant information from them and combine all the results.

```
public static void main(String[] args) throws InterruptedException {
    // Set the path to the location where ChromeDriver executable is stored
    System.setProperty("webdriver.chrome.driver",
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-
win64/chromedriver.exe");

    // Create ChromeOptions
    ChromeOptions options = new ChromeOptions();

    // Add the start-maximized argument
    options.addArguments("--start-maximized");

    // Create a new instance of the Chrome driver with the configured
ChromeOptions
    WebDriver driver = new ChromeDriver(options);

    // Navigate to the website
    driver.get("https://www.bhg.com/gardening/plant-dictionary/");
    Thread.sleep(5000);

    List<WebElement> divElements =
driver.findElements(By.className("alphabetical-list__group"));

    try (BufferedWriter writer = new BufferedWriter(new
FileWriter("Task2_Plants_Scrapping.csv"))) {
        // Write CSV header
        writer.write("Text,Href,Genus Name,Common Name,Plant
Type,Light,Height,Width,Propagation,Soil and Water,Temperature and
Humidity,Fertilizer,Pruning,Pests and Problems");
        writer.newLine();
        for (WebElement divElement : divElements) {
            List<WebElement> aElements =
divElement.findElements(By.tagName("a"));

            // Iterate through each <a> element
            for (WebElement aElement : aElements) {
                // Get the text and href value
                String plantName = aElement.getText();
                String hrefLink = aElement.getAttribute("href");

extractDataFromMultiplePlants(plantName,hrefLink,writer,driver);
            }
        }
    } catch (IOException e) {
        e.printStackTrace();
    }
    driver.quit();
}
```

I am calling the "extractDataFromMultiplePlants" method to open each link in a new tab and extract additional information, such as genus name, common name, plant type, etc. It extracts information from different types of elements like tables, paragraphs, etc. The information is written to a CSV file named

"Task2_Plants_Scrapping.csv." The program handles exceptions, such as NoSuchElementException, to continue processing even when certain data is not found.

```
private static void extractDataFromMultiplePlants(String plantName, String
hrefLink, BufferedWriter writer, WebDriver driver) throws IOException {
    // Open the link in a new tab
    openLinkInNewTab(driver, hrefLink);

    // Switch to the new tab
    switchToNewTab(driver);

    //First Column is the plant name
    writer.write(plantName);

    //Second column is the link for the page
    writer.write(", "+hrefLink);

    // Find the row with "Genus Name" and handle NoSuchElementException
    for (String fieldName : Arrays.asList("Genus Name", "Common Name", "Plant
Type", "Light", "Height", "Width", "Propagation")) {
        String valueFound = "";
        try {
            WebElement valueNameRow =
driver.findElement(By.xpath("//td[text()=' "+fieldName+"']/following-
sibling::td"));
            valueFound = valueNameRow.getText();
        } catch (NoSuchElementException e) {
            // Handle the case where the element is not found
            System.out.println("Element with "+fieldName+" not found for : "
+ plantName);
        }
        // Print or write the result
        writer.write(", \"" + valueFound + "\"");
    }

    //Soil and water the plant needs
    // Find the h3 element with the specified conditions
    for (String description : Arrays.asList("Soil and Water", "Temperature and
Humidity", "Fertilizer", "Pruning", "Pests and Problems")) {
        try {
            WebElement h3Element =
driver.findElement(By.xpath("//h3[contains(@class, 'mntl-sc-block-
subheading') and ./span[normalize-space()=' "+description+"']"]));

            WebElement choosenElement =
h3Element.findElement(By.xpath("following-sibling::p"));
            // Iterate through the p elements and print their text
            while (!Objects.equals(choosenElement.getTagName(), "h3")) {
                if (Objects.equals(choosenElement.getTagName(), "p")) {
                    String paragraphText = choosenElement.getText();
                    writer.write(", \"" + paragraphText + "\"");
                }
                choosenElement =
choosenElement.findElement(By.xpath("following-sibling::*[1]"));
            }
        }
    }
}
```

```

    } catch (NoSuchElementException e) {
        // Handle the case where the element is not found
        System.out.println("Element not found for : " + plantName);
    }
}
writer.newLine();

// Close the new tab
closeCurrentTab(driver);
}

```

The data is extracted from tables by searching for the name and its corresponding value in the table row.
Eg: Searching from “Genus Name” and the value “Arctotis” associated with it.

African Daisy Overview

GENUS NAME	Arctotis
COMMON NAME	African Daisy
PLANT TYPE	Annual
LIGHT	Sun
HEIGHT	1 to 3 feet
WIDTH	2 to 3 feet

Data is also extracted from paragraphs by searching for the heading Eg: “Soil and Water” and then getting the “following-sibling::p” which follow the h3 tag we found. This will get all the paragraphs which are associated with “Soil and Water”

DECORATING HOME IMPROVEMENT GARDEN HOUSEKEEPING RECIPES

African daisies thrive in full sun, and if there's too much shade, they won't flower as abundantly.

Soil and Water

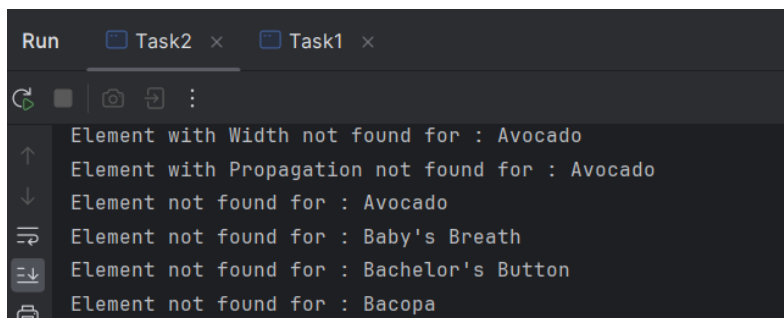
African daisies are fairly drought-tolerant. For best growth, though, they need 1 inch of water per week from rainfall or irrigation. Maintain consistently moist soil that's well-drained and somewhat acidic with 5 or 5.5 pH. Add compost to the soil before planting.

Be careful not to overwater since soggy soil often leads to root rot. If it gets hot or dry, African daisies can stop growing. Additional water should solve the problem.

Temperature and Humidity

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Text	Href	Genus Name	Common Name	Plant Type	Light	Height	Width	Propagation	Soil and Water	Temperature and Humidity	Fertilizer	Pruning	Pests and Problems				
53	Bluestar	https://www.amsoniahub.com/threadleaf-blues	Threadleaf Blues	Perennial	Part Sun, Su	2 to 3 feet	2 to 3 feet	Division, Seed	Threadleaf blues	This is a cold-hardy perennial that if you plant it in the fall, it will bloom in the spring. If needed, cut back the stems by up to one-third after blooming.								
54	Borage	https://www.borago-officinalis.com/borage	Borage	Annual, Herb	Part Sun, Su	1 to 3 feet	1 to 3 feet	Seed, Stem Cuttings	Borage grows best in full sun. Borage is drought-tolerant and Borage is a good source of borago oil. The herb plant doesn't require pruning. Pluck single leaves as needed.									
55	Boston Fern	https://www.bougainvillea.com/boston-fern	Boston Fern	Houseplant	Part Sun, Sh	1 to 3 feet	2 to 3 feet	Division	Boston ferns love indoor temperatures typically between 60°F and 75°F. The Boston fern's foliage consists of numerous small, feathery fronds.									
56	Bougainvillea	https://www.bougainvillea.com/bougainvillea	Bougainvillea	Vine	Sun	8 to 20 feet	10 to 40 feet	Stem Cuttings	If you plant bougainvillea in the garden, it will bloom in the fall. Bougainvillea is a climbing plant that can be trained over a trellis or arbor. It is also essential that you water it regularly.									
57	Boxwood	https://www.buxus.com/boxwood	Boxwood	Shrub	Part Sun, Sh	2 to 20 feet	2 to 20 feet	Seed, Stem Cuttings	Boxwoods like full sun. It's also essential that you water them regularly. Boxwoods are used in landscaping for their dense, evergreen foliage.									
58	Buckthorn	https://www.rhamnus.com/buckthorn	Buckthorn	Shrub	Part Sun, Su	3 to 16 feet	2 to 15 feet	Seed, Stem Cuttings	Buckthorn prefers full sun. It is also essential that you water it regularly. Buckthorn is a shrub that can be trained over a trellis or arbor.									
59	Buttonbush	https://www.cephalanthus.com/buttonbush	Buttonbush	Shrub	Part Sun, Su	6 to 12 feet	5 to 8 feet	Stem Cuttings	Buttonbushes grow best in full sun. They are also essential that you water them regularly. Buttonbushes are used in landscaping for their large, white flowers.									
60	Cabbage	https://www.brassica-oleracea.com/cabbage	Cabbage	Annual, Vegetable	Part Sun, Su	1 to 3 feet	1 to 3 feet	Seed	Cabbage grows best in full sun. It is also essential that you water it regularly. Cabbage is a heavy feeder. Even when planted in rich soil, it will need a lot of fertilizer.									
61	Calendula	https://www.calendula-officinalis.com/calendula	Calendula	Annual, Perennial	Part Sun, Su	1 to 3 feet	1 to 2 feet	Seed	Calendulas are moderately drought-tolerant. Calendulas are high in vitamin C and are used in traditional medicine. As you grow them, you will find that they are very hardy.									
62	Calibrachoa	https://www.calibrachoa.com/calibrachoa	Calibrachoa	Annual	Sun	6 to 12 inches	12 to 14 inches	Stem Cuttings	Use an all-purpose fertilizer for Calibrachoa. Since it is a perennial, it will bloom in the fall. Recently, Calibrachoa has become an annual in most of the U.S., but it is still a perennial in some areas.									
63	California Poppy	https://www.eschscholzia.com/california-poppy	California Poppy	Annual	Sun	6 to 12 inches	12 to 14 inches	Seed	Sandy or rocky soil. Poppies will grow continually in the garden. Deadheading will encourage more blooms, but leave some spent flowers to provide food for bees.									
64	Camellia	https://www.camellia.com/camellia	Camellia	Shrub	Part Sun, Sh	8 to 20 feet	12 to 20 feet	Seed, Stem Cuttings	The soil for camellias should be moist. Camellias are used in landscaping for their large, waxy leaves and large, white flowers. There are many varieties of camellias.									
65	Canna	https://www.canna.com/canna	Canna, Canna Lily Bulb	Part Sun, Su	2 to 8 feet	1 to 6 feet	Division, Seed	In their native habitat, Cannas prefer humid air and a lot of water. Cannas are used in landscaping for their large, tropical leaves and large, colorful flowers. During the growing season, trim off any dead or damaged leaves.										
66	Cardamom	https://www.lettaria-cardamom.com/cardamom	Cardamom	Herb, Perennial	Part Sun	6 to 15 feet	4 to 10 feet	Division	Cardamom prefers full sun. When growing cardamom outdoors or indoors, you will need to ensure that the temperatures are above 50°F. Water the plant regularly.									
67	Carrot	https://www.daucus-carota.com/carrot	Carrot	Vegetable	Part Sun, Su	1 to 2 feet	3 to 5 inches	Seed	The importance of carrots is that they are a good source of vitamin A. Carrots are used in cooking for their sweet, crunchy texture. Carrots are also used in landscaping for their large, colorful roots.									
68	Castor Bean	https://www.ricinus-communis.com/castor-bean	Castor Bean	Annual, Perennial	Part Sun	3 to 10 feet	2 to 4 feet	Seed	Castor bean is a tropical plant. Because it is a perennial, it will bloom in the fall. You can prune the plant to contain its vigorous growth. Also, castor bean is a good source of ricin.									
69	Catmint	https://www.nepeta-cataria.com/catmint	Catmint	Perennial	Part Sun, Su	6 to 12 inches	12 to 36 inches	Division, Seed	One of the best catmints is Nepeta cataria. The best way to grow catmint is in full sun. The plant commonly planted in most gardens.									
70	Catnip	https://www.nepeta-cataria.com/catnip	Catnip	Herb	Part Sun, Su	1 to 3 feet	18 to 24 inches	Seed, Stem Cuttings	Catnip grows well in full sun. The preferred growing temperature is between 60°F and 75°F. Fertilizer is not needed. Pruning is a good idea to keep catnip from spreading throughout the garden.									
71	Celosia	https://www.celosia.com/celosia	Celosia	Annual	Sun	6 to 12 inches	6 to 18 inches	Leaf Cuttings	Celosia flourishes in full sun. Celosia plants love the heat and are used in landscaping for their large, colorful flowers. Apply a general fertilizer to the plant.									
72	Chamomile	https://www.chamaemelum-nobile.com/chamomile	Chamomile	Annual, Herb	Part Sun, Su	3 to 24 inches	10 to 12 inches	Division, Seed	Chamomile does best in full sun. Once established, chamomile is a low-maintenance plant. Both German Chamomile and English Chamomile are used in traditional medicine. When chamomile becomes spindly or leggy and flowers are small, it is time to divide it.									

Exceptions are also handled when the elements are not found.



The code uses methods to manage tab switching, opening, and closing. Finally, the program quits the WebDriver.

```
private static void openLinkInNewTab(WebDriver driver, String linkToOpen) {
    // Open the link in a new tab using JavaScript
    ((ChromeDriver) driver).executeScript("window.open('" + linkToOpen +
    "','_blank');");
}

private static void switchToNewTab(WebDriver driver) {
    // Switch to the new tab
    ArrayList<String> tabs = new ArrayList<>(driver.getWindowHandles());
    driver.switchTo().window(tabs.get(1));
}

private static void closeCurrentTab(WebDriver driver) {
    // Close the current tab
    driver.close();
    ArrayList<String> tabs = new ArrayList<>(driver.getWindowHandles());
    //Go Back to the main tab
    driver.switchTo().window(tabs.get(0));
}
```

Task 3 : Use advanced Selenium commands, such as waiting for elements to load or handling pop-up windows

This Java program employs Selenium WebDriver to automate the process of sharing a specific plant entry, Baby's Breath, from the Better Homes & Gardens plant dictionary website on Facebook. It begins by navigating to the desired plant's page and clicking on the "Share on Facebook" link. After clicking, it

waits for the popup window to appear, switches to the popup window, and enters the Facebook login credentials (username and password) in the appropriate input fields. The program then proceeds to fill in a textarea with a custom message, simulating the user's interaction on the Facebook sharing popup. Finally, it locates and clicks the button to confirm the post. Each interaction is followed by a brief sleep to allow time for the page to load or for the user actions to take effect. After completing the process, the WebDriver is closed.

```
public static void main(String[] args) throws InterruptedException {
    // Set the path to the location where ChromeDriver executable is stored
    System.setProperty("webdriver.chrome.driver",
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-
win64/chromedriver.exe");

    // Create ChromeOptions
    ChromeOptions options = new ChromeOptions();

    // Add the start-maximized argument
    options.addArguments("--start-maximized");

    // Create a new instance of the Chrome driver with the configured
ChromeOptions
    WebDriver driver = new ChromeDriver(options);

    // Navigate to the website
    driver.get("https://www.bhg.com/gardening/plant-
dictionary/perennial/babys-breath/");
    Thread.sleep(5000);

    // Click on the facebook link to share Baby's breath on post
    WebElement shareOnFacebook =
driver.findElement(By.cssSelector("span[title='Share on Facebook']"));
    shareOnFacebook.click();

    // Wait for the popup window to be present
    WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10));
// Adjust the timeout as needed
    wait.until(ExpectedConditions.numberOfWindowsToBe(2)); // Assuming there
are two windows - the main window and the popup

    // Switch to the popup window
    for (String windowHandle : driver.getWindowHandles()) {
        driver.switchTo().window(windowHandle);
    }

    // Now I am in the popup window, wait for an element on the popup page to
be present
    // Locate the username input field by its ID attribute
    WebElement usernameField =
wait.until(ExpectedConditions.presenceOfElementLocated(By.id("email")));
    // Enter the username
    usernameField.sendKeys("testppxx99@gmail.com");

    // Locate the password input field by its ID attribute
    WebElement passwordField = driver.findElement(By.id("pass"));
    // Enter the password
```

```

passwordField.sendKeys("Password123!@#");
Thread.sleep(5000);

// Click on the login button
WebElement loginButton = driver.findElement(By.id("loginbutton"));
loginButton.click();
Thread.sleep(5000);

//Enter some details about your post. Locate the textarea by its ID
attribute
WebElement textarea =
driver.findElement(By.cssSelector("textarea[name='xhpc_message_text']"));
// Enter text into the textarea
textarea.sendKeys("Baby's Breath is my favorite flower");
Thread.sleep(5000);

// Locate the button by its ID attribute
WebElement postButton = driver.findElement(By.name("__CONFIRM__"));
postButton.click();

Thread.sleep(5000);

driver.quit();
}

```

The WebDriverWait is set to a timeout of 10 seconds, allowing the script to wait for the appearance of a second window, typically representing the popup. Once the popup is present, the code iterates through the available window handles and switches the WebDriver context to the popup window. Subsequently, it continues to wait until an element with the ID attribute "email" (representing the username input field in this context) becomes present in the popup window. This ensures that the WebDriver performs actions on elements within the popup only after it has fully loaded, providing a robust and synchronized automation process. Adjustments to the timeout duration can be made based on specific webpage loading times. In order to wait for the elements to load we are going to perform the below operations.

```

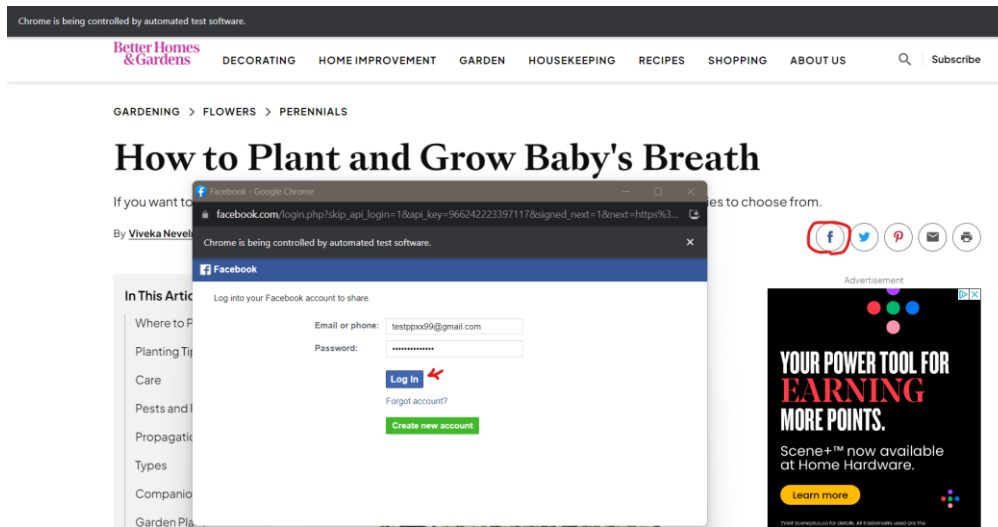
// Wait for the popup window to be present
WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10)); //
Adjust the timeout as needed
wait.until(ExpectedConditions.numberOfWindowsToBe(2)); // Assuming there are
two windows - the main window and the popup

// Switch to the popup window
for (String windowHandle : driver.getWindowHandles()) {
    driver.switchTo().window(windowHandle);
}

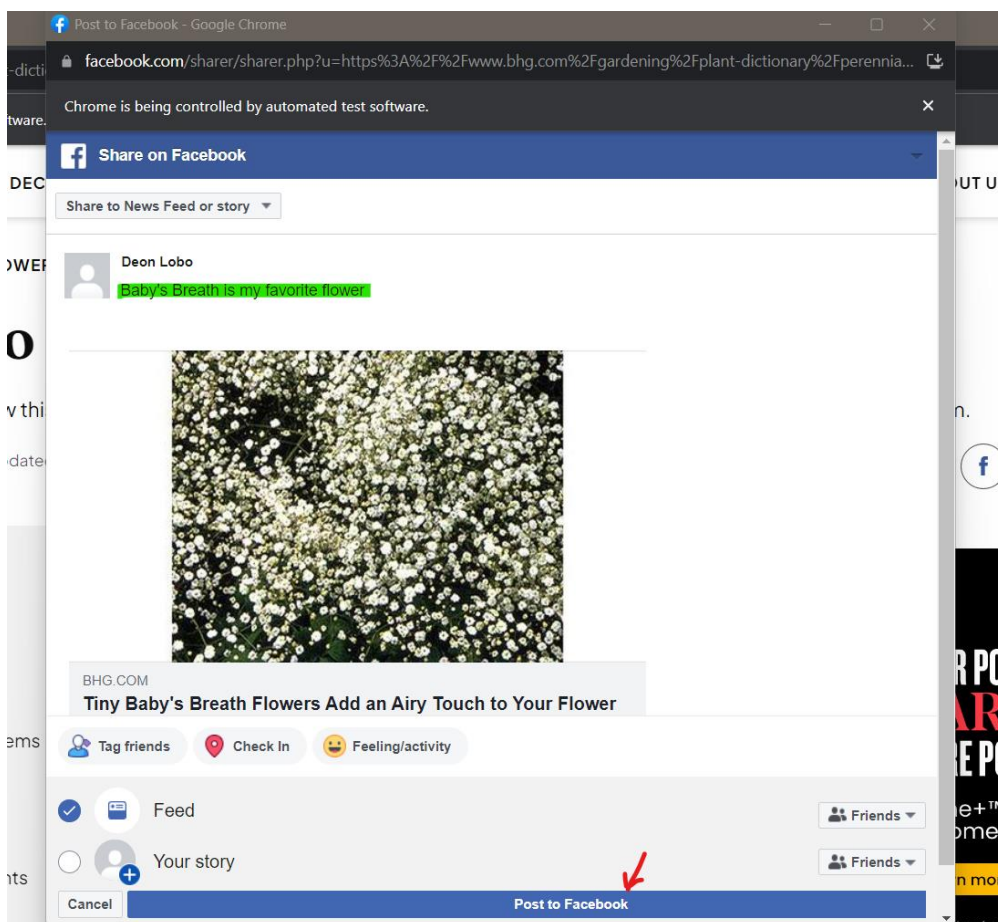
// Now I am in the popup window, wait for an element on the popup page to be
present
// Locate the username input field by its ID attribute
WebElement usernameField =
wait.until(ExpectedConditions.presenceOfElementLocated(By.id("email")));

```

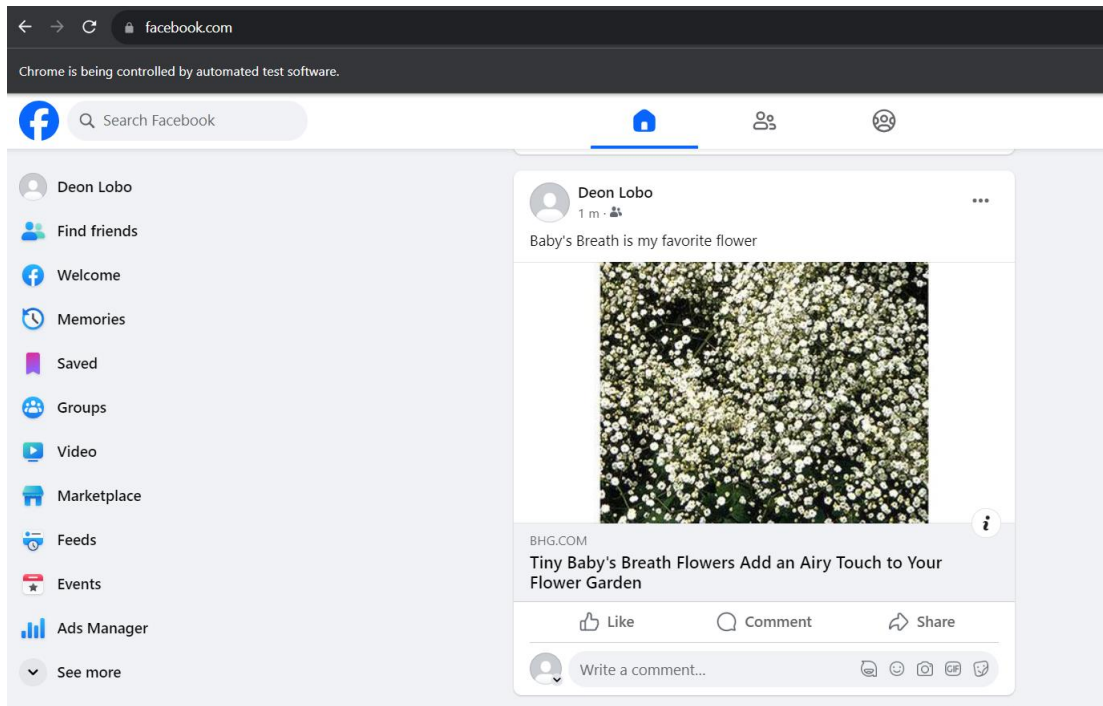
Click on the “Share to Facebook icon” while on the Baby's Breath page to share Baby's Breath on facebook. Then log in to the Facebook account.



Enter post description in the text box, in my case I added “Baby's Breath is my favorite flower”. Then click on “Post to Facebook” button, which will share the post about Baby’s breath on facebook.



If we check the posts on Facebook we see that “Baby’s breath” has been successfully posted on Facebook.



Source code of Task 1

```
package selenium;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.interactions.Actions;
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;
import org.openqa.selenium.chrome.ChromeOptions;

import java.io.BufferedWriter;
import java.io.FileWriter;
import java.io.IOException;
import java.time.Duration;
import java.util.List;

public class Task1 {
    public static void main(String[] args) throws InterruptedException {
        // Set the path to the location where ChromeDriver executable is stored
        System.setProperty("webdriver.chrome.driver",
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-win64/chromedriver.exe");

        // Create ChromeOptions
        ChromeOptions options = new ChromeOptions();
```

```

// Add the start-maximized argument
options.addArguments("--start-maximized");

// Create a new instance of the Chrome driver with the configured
ChromeOptions
WebDriver driver = new ChromeDriver(options);

// Navigate to the website
driver.get("https://www.bhg.com/gardening/plant-dictionary/");
Thread.sleep(5000);

// Find and interact with various elements on the page

// Phase 1: Click on a link
WebElement learnMoreLink = driver.findElement(By.linkText("Baby's Breath"));
learnMoreLink.click();
Thread.sleep(5000);

// Phase 2: Interact with dropdown menu
// Find the "Garden" Dropdown menu using its XPath
WebElement decoratingLink = driver.findElement(By.xpath("//*[@id=\"header-nav_1-0\"]/div[1]/ul/li[3]/a"));

// Create an instance of the Actions class
Actions actions = new Actions(driver);

// Perform the mouse hover over the "Garden" dropdown menu
actions.moveToElement(decoratingLink).perform();
Thread.sleep(5000);

// Clicking on the "Plant Encyclopedia" link under "Garden" dropdown menu link
this will take us to the starting page "https://www.bhg.com/gardening/plant-
dictionary/"
WebElement subMenuLink = driver.findElement(By.xpath("//*[@id=\"header-nav_1-
0\"]/div[1]/ul/li[3]/ul/li[11]/a"));
subMenuLink.click();
Thread.sleep(5000);

// Phase 3: Fill in a text box
WebElement searchBox = driver.findElement(By.id("search-box__search-input"));
searchBox.sendKeys("Roses");
Thread.sleep(5000);

// Phase 4: Click on the "Go" button which gives results for "Roses"
WebElement searchButton = driver.findElement(By.xpath("//*[@id=\"search-box_1-
0\"]/form/div/button[1]"));
searchButton.click();
Thread.sleep(5000);

// Phase 5: Extract text from an element
// Go to plant dictionary url
driver.get("https://www.bhg.com/gardening/plant-dictionary/");
// Find all the <a> elements within the specified div
// Find all elements with the class name "alphabetical-list__group"
List<WebElement> divElements = driver.findElements(By.className("alphabetical-
list__group"));

try (BufferedWriter writer = new BufferedWriter(new
FileWriter("Task1_Plant_NamesAndLink.csv"))) {
    // Write CSV header
    writer.write("Text,Href");
    writer.newLine();
    for (WebElement divElement : divElements) {

```

```

        List<WebElement> aElements = divElement.findElements(By.tagName("a"));

        // Iterate through each <a> element
        for (WebElement aElement : aElements) {
            // Get the text and href value
            String text = aElement.getText();
            String hrefLink = aElement.getAttribute("href");

            // Write data to CSV
            writer.write(text + "," + hrefLink);
            writer.newLine();
        }
    } catch (IOException e) {
        e.printStackTrace();
    }

    // Close the browser
    driver.quit();
}
}

```

Source code of Task 2

```

package selenium;

import org.openqa.selenium.*;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.chrome.ChromeOptions;
import org.openqa.selenium.interactions.Actions;

import java.io.BufferedWriter;
import java.io.FileWriter;
import java.io.IOException;
import java.util.ArrayList;
import java.util.Arrays;
import java.util.List;
import java.util.Objects;

public class Task2 {

    public static void main(String[] args) throws InterruptedException {
        // Set the path to the location where ChromeDriver executable is stored
        System.setProperty("webdriver.chrome.driver",
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-win64/chromedriver.exe");

        // Create ChromeOptions
        ChromeOptions options = new ChromeOptions();

        // Add the start-maximized argument
        options.addArguments("--start-maximized");

        // Create a new instance of the Chrome driver with the configured
        // ChromeOptions
        WebDriver driver = new ChromeDriver(options);

        // Navigate to the website
        driver.get("https://www.bhg.com/gardening/plant-dictionary/");
        Thread.sleep(5000);

        List<WebElement> divElements = driver.findElements(By.className("alphabetical-
list_group"));
    }
}

```

```

        try (BufferedWriter writer = new BufferedWriter(new
FileWriter("Task2_Plants_Scrapping.csv"))) {
            // Write CSV header
            writer.write("Text,Href,Genus Name,Common Name,Plant
Type,Light,Height,Width,Propagation,Soil and Water,Temperature and
Humidity,Fertilizer,Pruning,Pests and Problems");
            writer.newLine();
            for (WebElement divElement : divElements) {
                List<WebElement> aElements = divElement.findElements(By.tagName("a"));

                // Iterate through each <a> element
                for (WebElement aElement : aElements) {
                    // Get the text and href value
                    String plantName = aElement.getText();
                    String hrefLink = aElement.getAttribute("href");
                    extractDataFromMultiplePlants(plantName,hrefLink,writer,driver);
                }
            }
        } catch (IOException e) {
            e.printStackTrace();
        }
        driver.quit();
    }

    private static void extractDataFromMultiplePlants(String plantName, String
hrefLink, BufferedWriter writer, WebDriver driver) throws IOException {
        // Open the link in a new tab
        openLinkInNewTab(driver, hrefLink);

        // Switch to the new tab
        switchToNewTab(driver);

        //First Column is the plant name
        writer.write(plantName);

        //Second column is the link for the page
        writer.write(", "+hrefLink);

        // Find the row with "Genus Name" and handle NoSuchElementException
        for (String fieldName : Arrays.asList("Genus Name","Common Name","Plant
Type","Light","Height","Width","Propagation")) {
            String valueFound = "";
            try {
                WebElement valueNameRow =
driver.findElement(By.xpath("//td[text()=' "+fieldName+"']/following-sibling::td"));
                valueFound = valueNameRow.getText();
            } catch (NoSuchElementException e) {
                // Handle the case where the element is not found
                System.out.println("Element with "+fieldName+" not found for : " +
plantName);
            }
            // Print or write the result
            writer.write(",\"" + valueFound+"\"");
        }

        //Soil and water the plant needs
        // Find the h3 element with the specified conditions
        for (String description : Arrays.asList("Soil and Water","Temperature and
Humidity","Fertilizer","Pruning","Pests and Problems")) {
            try {
                WebElement h3Element =
driver.findElement(By.xpath("//h3[contains(@class, 'mntl-sc-block-subheading') and

```



```

        //span[normalize-space()='"+description+"']"));
        WebElement chosenElement = h3Element.findElement(By.xpath("following-
sibling::p"));
        // Iterate through the p elements and print their text
        while (!Objects.equals(chosenElement.getTagName(), "h3")) {
            if (Objects.equals(chosenElement.getTagName(), "p")) {
                String paragraphText = chosenElement.getText();
                writer.write(",\"" + paragraphText + "\"");
            }
            chosenElement = chosenElement.findElement(By.xpath("following-
sibling::*[1]"));
        }
    } catch (NoSuchElementException e) {
        // Handle the case where the element is not found
        System.out.println("Element not found for : " + plantName);
    }
}
writer.newLine();

// Close the new tab
closeCurrentTab(driver);
}

private static void openLinkInNewTab(WebDriver driver, String linkToOpen) {
    // Open the link in a new tab using JavaScript
    ((ChromeDriver) driver).executeScript("window.open('" + linkToOpen +
    "','_blank');");
}

private static void switchToNewTab(WebDriver driver) {
    // Switch to the new tab
    ArrayList<String> tabs = new ArrayList<>(driver.getWindowHandles());
    driver.switchTo().window(tabs.get(1));
}

private static void closeCurrentTab(WebDriver driver) {
    // Close the current tab
    driver.close();
    ArrayList<String> tabs = new ArrayList<>(driver.getWindowHandles());
    //Go Back to the main tab
    driver.switchTo().window(tabs.get(0));
}
}

```

Source code of Task 3

```

package selenium;

import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.WebElement;
import org.openqa.selenium.chrome.ChromeDriver;
import org.openqa.selenium.chrome.ChromeOptions;
import org.openqa.selenium.support.ui.ExpectedConditions;
import org.openqa.selenium.support.ui.WebDriverWait;

import java.time.Duration;

public class Task3 {
    public static void main(String[] args) throws InterruptedException {

```

```

// Set the path to the location where ChromeDriver executable is stored
System.setProperty("webdriver.chrome.driver",
"C:/Users/deonv/Desktop/ACC/Assignment3/chromedriver-win64/chromedriver.exe");

// Create ChromeOptions
ChromeOptions options = new ChromeOptions();

// Add the start-maximized argument
options.addArguments("--start-maximized");

// Create a new instance of the Chrome driver with the configured
ChromeOptions
WebDriver driver = new ChromeDriver(options);

// Navigate to the website
driver.get("https://www.bhg.com/gardening/plant-dictionary/perennial/babys-
breath/");
Thread.sleep(5000);

// Click on the facebook link to share Baby's breath on post
WebElement shareOnFacebook =
driver.findElement(By.cssSelector("span[title='Share on Facebook']"));
shareOnFacebook.click();

// Wait for the popup window to be present
WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10)); //
Adjust the timeout as needed
wait.until(ExpectedConditions.numberOfWindowsToBe(2)); // Assuming there are
two windows - the main window and the popup

// Switch to the popup window
for (String windowHandle : driver.getWindowHandles()) {
    driver.switchTo().window(windowHandle);
}

// Now I am in the popup window, wait for an element on the popup page to be
present
// Locate the username input field by its ID attribute
WebElement usernameField =
wait.until(ExpectedConditions.presenceOfElementLocated(By.id("email")));
// Enter the username
usernameField.sendKeys("testppxx99@gmail.com");

// Locate the password input field by its ID attribute
WebElement passwordField = driver.findElement(By.id("pass"));
// Enter the password
passwordField.sendKeys("Password123!@#");
Thread.sleep(5000);

// Click on the login button
WebElement loginButton = driver.findElement(By.id("loginbutton"));
loginButton.click();
Thread.sleep(5000);

//Enter some deatils about your post. Locate the textarea by its ID attribute
WebElement textarea =
driver.findElement(By.cssSelector("textarea[name='xhpc_message_text']"));
// Enter text into the textarea
textarea.sendKeys("Baby's Breath is my favorite flower");
Thread.sleep(5000);

// Locate the button by its ID attribute
WebElement postButton = driver.findElement(By.name("_CONFIRM_"));

```

```
        postButton.click();  
  
        Thread.sleep(5000);  
  
        driver.quit();  
    }  
}
```