

Assignment 1

Web Scraping Report

Website Information

Koodo Mobile

Website: <https://www.koodomobile.com/en>

Koodo Mobile is a Canadian mobile flanker brand started by Telus in 2008. This website offers various mobile phones and plans to its customers. Koodo is known for providing affordable and flexible mobile services without fixed-term contracts, appealing to a wide range of customers looking for reliable yet budget-friendly options.

Task 1 :

1. Opening the Website:

I initialized the Selenium WebDriver for Chrome and opened the Koodo Mobile website.

2. Interacting with Elements:

I located and interacted with the dropdown menu to navigate to the "Phones" section using Selenium commands.

3. Extracting Data:

I extracted phone details such as names, rates, and images from the webpage using the `findElements` and `findElement` methods provided by Selenium.

4. Saving Data:

I saved the extracted data into a CSV file using the `FileWriter` class.

In this image, I am setting up WebDriver and utilizing the command `'driver.get'` to navigate to the Koodo Mobile homepage. Afterward, I'm waiting for elements to load, interacting with the dropdown menu, and finally extracting phone details.

```

public class Main {
    public static void main(String[] args) throws IOException {
        // Set the path for the ChromeDriver executable
        System.setProperty("webdriver.chrome.driver", "C:/chromedriver/chromedriver.exe");

        // Initialize a new WebDriver instance using ChromeDriver
        WebDriver driver = new ChromeDriver();

        // Navigate to the Koodo Mobile website
        driver.get("https://www.koodomobile.com/en");
        WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10));

        // Define the path for the output CSV file and delete it if it already exists
        Path file = Paths.get( first: "C:/Users/sanja/OneDrive/Desktop/Koodo.csv");
        Files.deleteIfExists(file);
        System.out.println("File deleted successfully.");

        // Interact with the dropdown menu to navigate to the Phones section
        WebElement DropdownPhone = wait.until(ExpectedConditions.visibilityOfElementLocated(By.cssSelector(".header__menu-item-button")));
        DropdownPhone.click();
        WebElement phone = driver.findElement(By.cssSelector("li[data-test='subMenuItem0']"));
        phone.click();

        // Extract phone details
        List<WebElement> phones = driver.findElements(By.cssSelector(".sc-c64e8282-0.iLWKoL"));

        String filePath = "C:/Users/sanja/OneDrive/Desktop/Koodo.csv";
        try (FileWriter fileWriter = new FileWriter(filePath, append: true)) {
            fileWriter.append("Phones, Rates, Images\n\n");
        }
    }
}

```

Figure 1 : opening the web browser using Selenium.

Task 2 :

1. Interacting with the Dropdown Menu:

I used Selenium commands to click on the dropdown menu and navigate to both the "Phones" and "Plans" sections under the "Shop" category.

2. Extracting Data from Multiple Pages:

I extracted both phone and plan details from their respective pages and appended the data to the same CSV file to combine the results.

```

// Extract phone details
List<WebElement> phones = driver.findElements(By.cssSelector(".sc-c64e8282-0.iLWKoL"));

String filePath = "C:/Users/sanja/OneDrive/Desktop/Koodo.csv";
try (FileWriter fileWriter = new FileWriter(filePath, append: true)) {
    fileWriter.append("Phones, Rates, Images\n\n");

    for (WebElement phoneitem : phones) {
        String phonename = phoneitem.findElement(By.cssSelector("[class='css-1rynq56']")).getText().replaceAll(regex: "\\s+", replacement: " ").trim();
        String model = phoneitem.findElement(By.cssSelector("[data-media='rnmq-245e82d3 rnmq-8ac0ab7a rnmq-2568a35c rnmq-fcb13a46 rnmq-6d6ae753']")).get
        String rate = phoneitem.findElement(By.cssSelector(".PriceLockup__PriceTextContainer-components-web__sc-1x6duay-6.gIneyq")).getText().replaceAll
        String imageUrl = phoneitem.findElement(By.cssSelector("picture")).findElement(By.cssSelector("img")).getAttribute( name: "src");

        // Write phone details to the CSV file
        fileWriter.write( str: phonename + " " + model + " " + rate + " " + imageUrl + "\n");
    }
}

```

Figure 2 : Extracting Data from “Phones” page.

1. **phonename**: The name of the phone.
2. **model**: The model of the phone.
3. **rate**: The rate of the phone.
4. **imageUrl**: The URL of the image of the phone.

```
try (FileWriter fileWriter = new FileWriter(filePath, append, true)) {

    // Extract plan details
    List<WebElement> plans = driver.findElements(By.cssSelector(".sc-cPiKLX.bWWNcz"));
    fileWriter.append("\n\n\n\n\n\nPrices, Plans, Details\n\n");
    for (WebElement planitem : plans) {
        // Get the plan name
        String prices = planitem.findElement(By.cssSelector(".PriceLockup__PriceLockupContainer-components-web__sc-1x6duay-0.fqMdJw")).getText().replaceAll(
        String data = planitem.findElement(By.cssSelector(".sc-eDPEuL.sc-eIdPxx.ejyAQJ.iZsFvQ")).findElement(By.cssSelector(".css-175oi2n.r-eqz5dr")).getTex
        String details = planitem.findElement(By.cssSelector(".Paragraph__StyledParagraph-components-web__sc-1bg9r8p-0.dFAHhH")).getText().replaceAll( regex:

        // Write plan details to the CSV file
        if (!prices.equals("") || !data.equals("") || !details.equals("")) {
            fileWriter.write( str: prices + "," + data + "," + details + "\n");
        }
    }
}
```

Figure 3 : Extracting Data from “Plans” page.

1. **prices**: The prices of the plan.
2. **data**: The data details of the plan.
3. **details**: Other details of the plan.

```
String filePath = "C:/Users/sanja/OneDrive/Desktop/Koodg.csv";
try (FileWriter fileWriter = new FileWriter(filePath, append, true)) {
    fileWriter.append("Phones, Rates, Images\n\n");

    for (WebElement phoneitem : phones) {

        String phonename = phoneitem.findElement(By.cssSelector("[class='css-1ryng56']")).getText().replaceAll( regex: "\\s+", replacement: " ").trim();
        String model = phoneitem.findElement(By.cssSelector("[data-media='rnmq-265e82d3 rnmq-8ac0ab7a rnmq-2568a35c rnmq-fcb13a46 rnmq-6d6ae753']")).get
        String rate = phoneitem.findElement(By.cssSelector(".PriceLockup__PriceTextContainer-components-web__sc-1x6duay-6.gIneyq")).getText().replaceAll
        String imageUrl = phoneitem.findElement(By.cssSelector("picture")).findElement(By.cssSelector("img")).getAttribute( name: "src");

        // Write phone details to the CSV file
        fileWriter.write( str: phonename + " " + model + "," + rate + "," + imageUrl + "\n");
    }
}
```

Figure 4 : FileWriter

In my script, I utilized ‘FileWriter’ to manage writing operations to a CSV file. Firstly, a FileWriter object (‘fileWriter’) is created by opening a file for writing, with the file path specified as ‘filePath’. Subsequently, the ‘append()’ method is employed to add data to the file, while ‘write()’ is utilized to write each line of data. Finally, the file writer is closed using ‘close()’.

Task 3 :

Waiting for Elements to Load:

I used the `WebDriverWait` class in Selenium to dynamically wait for elements to reach a specific state before proceeding. This is crucial for handling dynamic content or delayed loading. In my code, I set a 10-second timeout to wait for the dropdown menu button's visibility. This duration ensures flexibility in handling varying loading times. I used `ExpectedConditions`, which offers various conditions like `visibilityOfElementLocated`, to wait for an element to be visible. This ensures reliable interaction with fully loaded elements. By using `WebDriverWait` with `ExpectedConditions`, my script waits for elements to fully load before interacting with them. This makes the scraping process more reliable.

```
driver.get("https://www.koodumobile.com/en");
WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(10));

// Define the path for the output CSV file and delete it if it already exists
Path file = Paths.get("C:/Users/sanja/OneDrive/Desktop/Koodu.csv");
Files.deleteIfExists(file);
System.out.println("File deleted successfully.");

// Interact with the dropdown menu to navigate to the Phones section
WebElement DropdownPhone = wait.until(ExpectedConditions.visibilityOfElementLocated(By.cssSelector(".header__menu-item-button")));
DropdownPhone.click();
```

Figure 5 : Waiting for elements to load

Outputs:

```
Phone name : New Pixel 8a
Rate : $ 29 .33 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/4chsR68ZJ6ScenKJJP6UBa/36a64726983bf5d1c6934b2a607c6cd8/Pixel_6a_Obsidian_Frontback.png?w=324&q=80
Phone name : New moto g 5G - 2024
Rate : $ 9 .38 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/3svxPxc0JQeJ06xJENM6x2/152d80f9ec50b0d6e0d3af9014a95a2e/CAT_-_Moto65G_-_Sage_Green.png?w=324&q=80
Phone name : Bonus Samsung Galaxy Buds FE Galaxy A35 5G
Rate : $ 22 .08 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/5mQD6k77hXLFZpYKf9li6P/c817cd500eb47b5b21f790b555ffe6ca/A35_1000x785.png?w=324&q=80
Phone name : Samsung Galaxy S23 FE
Rate : $ 36 .25 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/1YSA7gZLpsdLggopIypYXm/63376b618d40ebb382dc89f023452b35/SM-S711_GalaxyS23FE_Front_Graphite.png?w=324&q=80
Phone name : Samsung Galaxy S24
Rate : $ 25 .83 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/I0IsNDIkTKvxdIUvgSr6L/ad455f18a76c4d2fe3ee5bf51b92e7d1/galaxy_s24_onyxblack_frontback.png?w=324&q=80
Phone name : Samsung Galaxy S24+
Rate : $ 33 .00 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/7u7JpyNKyS0dkTI8oEops6/70435d6cf07ecb2adbade2e468dfe55/galaxy_s24_plus_onyxblack_frontback.png?w=324&q=80
Phone name : Samsung Galaxy S24 Ultra
Rate : $ 33 .00 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/1AwWrvy88smuRU2HEjE9IF/b09b62c372fecda657f97d1a254d03e1/CAT_E3_TitaniumBlack_1_.png?w=324&q=80
Phone name : Samsung Galaxy A15 5G
Rate :
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/tt0TS80keYZuCyC0Cv62/371c21b70dba75ff1b1cd4f29785be7b/galaxy_a15_blueblack_frontback.png?w=324&q=80
Phone name : Google Pixel 8
Rate : $ 16 .29 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/2o0K7bCnh4i8h6jyXk0fu8/c09cb15139149a1f873e822846c75cd8/Pixel_8_Obsidian_Frontback.png?w=324&q=80
Phone name : Google Pixel 8 Pro
Rate : $ 31 .83 /mo.
Image URL : https://images.ctfassets.net/evnrpfa1vdk4/69J4M8WZcPPzpxUHNjpz7i/f5768a3a780aeaaSecacc499864eeec34/Google_Pixel_8_Pro_Obsidian_Frontback.png?w=324&q=80
Phone name : Google Pixel 7
```

Figure 6 : output of page 1

Price : \$ 30 .00 per month
 Data : Pay-per-use data
 Details : Unlimited Canada-wide minutes
 Price : \$ 34 .00 per month
 Data : 20 GB 4G speed
 Details : Pick 1 Free Perk from options like Premium Voicemail
 Price : \$ 39 .00 per month
 Data : 40 GB 4G speed
 Details : Pick 1 Free Perk from options like Rollover Data
 Price : \$ 44 .00 per month
 Data : 50 GB 4G speed
 Details : Pick 1 Free Perk from options like Unlimited Long Distance Pack
 Price : \$ 15 .00 per month
 Data : 250 MB 3G speed
 Details : 100 Canada-wide minutes with unlimited incoming minutes
 Price : \$ 35 .00 per month
 Data : 3 GB 3G speed
 Details : Unlimited Canada-wide minutes

Figure 7 : Output of page 2

Phones	Rates	Images
1 New Pixel 8a	\$29.33 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/4cHsRG8ZJ6SCenKW/PUba/36a64726983bf5d1c6934b2a607c6cd8/Pixel_6a_Obsidian_Frontback.png?w=324&q=
4 New moto g 5G - 2024	\$9.38 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/3swPxcOJQ06uJENMGx2/152d80f9ec50b0d6e03af9014a95a2e/CAT_-_MotoG5G_-_Sage_Green.png?w=324&q=
5 Bonus Samsung Galaxy Buds FE Galaxy A35 5G	\$22.08 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/5mQD6k77hXLFzPvYF9li6P/c817cd500eb47b5b21f790b555fe6ca/A35_1000x785.png?w=324&q=80
6 Samsung Galaxy S23 FE	\$36.25 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/1YSA7ZLpdlggpplypYXm/65376b618404ebb382dc89025352b35/SM-S711_GalaxyS23FE_Front_Graphite.png?w=
7 Samsung Galaxy S24	\$25.83 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/1AwWvYy88smuRU2HeJ9f/t09b62c372lec405797971a254d03e1/CAT_E3_TitaniumBlack_1_1.png?w=324&q=80
8 Samsung Galaxy S24+	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/7u7JpyNKyS0dklB0Eops6/70435d6cf07ecb2adbdde2e468dfe55/galaxy_s24_plus_onyxblack_frontback.png?w=324&q=80
9 Samsung Galaxy S24 Ultra	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/1AwWvYy88smuRU2HeJ9f/t09b62c372lec405797971a254d03e1/CAT_E3_TitaniumBlack_1_1.png?w=324&q=80
10 Samsung Galaxy A15 5G	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/10sI8vKdLTKvxdILYgSrG/ad455f18a76c4d2f63ee5bf51b92a7d1/galaxy_s24_onyxblack_frontback.png?w=324&q=80
11 Google Pixel 8	\$16.29 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/2oOKZ8Cn4i8h6jyKxDfu8/c09cb15139149a18736c822846c75cd8/Pixel_8_Pro_Obsidian_Frontback.png?w=324&q=80
12 Google Pixel 8 Pro	\$31.83 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/69iAN8Cn4i8h6jyKxDfu8/c09cb15139149a18736c822846c75cd8/Pixel_8_Pro_Obsidian_Frontback.png?w=324&q=80
13 Google Pixel 7	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/2U6FTI6ZCRRXQwKJl5APH/2d6e6725e3816c5a58d87538650b1eb/pixel7_obsidian_frontback.png?w=324&q=80
14 Motorola moto g 5G (2023)	\$5.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/niql0rNLfNZdS21zzZ/e89e19a260f1f2413958e0557bb42008/2023_Penang_5G_NA_Basic_pack_Basalt_Blue_Fr
15 Motorola moto g play - 2024	\$6.25 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/1nKiaQd207KtC7gDhJGgQa/0220600db12778e8d44d6668012ce0/CAT_-_moto_-_Fogo_4G_NA_BasicPack_Corone
16 Apple iPhone 15	\$35.88 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/30cAsVwgb4Um32y1mVnwW/23e2183f4e7dc9e52f872b765ed23b30/iPhone15_Blue_PDP_Image_Position-1_Caf
17 Apple iPhone 15 Plus	\$42.29 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/6xmg6LFL2qWqU0cSqibehh/7034892ab935816ed883def1a48b36d/iPhone15_Plus_Black_PDP_Image_Position-1_L
18 Apple iPhone 15 Pro	\$45.42 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/6xmg6LFL2qWqU0cSqibehh/7034892ab935816ed883def1a48b36d/iPhone15_Pro_Black_PDP_Image_Position-1_L
19 Apple iPhone 15 Pro Max	\$58.29 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/19ppXPmEmEAWZtB8eBcldJ/94a86c46021984f4a6e7d1ce69363cf4/iPhone_15_Pro_Max_Natural_Titanium_PDP_Image_Po
20 Samsung Galaxy S23+	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/5jJQZVpd4i7z5w0lwWM1/aefe1ef5715e91857fa5bc67e0b7361a/galaxy_s23_black_frontback.png?w=324&q=80
21 Samsung Galaxy S23 Ultra	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/5jJQZVpd4i7z5w0lwWM1/aefe1ef5715e91857fa5bc67e0b7361a/galaxy_s23_black_frontback.png?w=324&q=80
22 Samsung Galaxy XCover6 Pro	\$33.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/3tGNB4v6TnMGoGdXlmhW/ad878793fd25254534b0682a12b672/xcover_6_pro_frontback.png?w=324&q=80
23 Apple iPhone 12	\$25.00 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/3tGNB4v6TnMGoGdXlmhW/ad878793fd25254534b0682a12b672/xcover_6_pro_frontback.png?w=324&q=80
24 Nubia Nubia A75	\$5.75 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/6JslNaWQ3RPy0fyFshHu/ede4af54624921d7e75d31c94b29ad6/Nubia-min_1_nobg.png?w=324&q=80
25 Samsung Galaxy S21 5G	\$12.25 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/43KpVdCbukPGYtB8eBcldJ/2102f7345db40d45ac5c6bcd385164/Samsung_SS21_Pink_Catalog.jpg?w=324&q=80
26 Samsung Galaxy S23	\$21.38 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/43KpVdCbukPGYtB8eBcldJ/2102f7345db40d45ac5c6bcd385164/Samsung_SS21_Pink_Catalog.jpg?w=324&q=80
27 Samsung Galaxy S21 FE 5G	\$11.08 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/43KpVdCbukPGYtB8eBcldJ/2102f7345db40d45ac5c6bcd385164/Samsung_SS21_Pink_Catalog.jpg?w=324&q=80
28 Samsung Galaxy A54 5G	\$13.50 /mo.	https://images.ctfassets.net/evnrpfa1vdk4/16VoCQWdQl85mOCXTHW12/2911156b47c471afa52c11dace07d75/SM-A546_Galaxy_A54_5G_Awesome_Graphi

Figure 8 : CSV file of page 1

Prices	Plans	Details
\$30.00 per month	Pay-per-use data	Unlimited Canada-wide minutes
\$34.00 per month	20 GB 4G speed	Pick 1 Free Perk from options like Premium Voicemail
\$39.00 per month	40 GB 4G speed	Pick 1 Free Perk from options like Rollover Data
\$44.00 per month	50 GB 4G speed	Pick 1 Free Perk from options like Unlimited Long Distance Pack
\$15.00 per month	250 MB 3G speed	100 Canada-wide minutes with unlimited incoming minutes
\$35.00 per month	3 GB 3G speed	Unlimited Canada-wide minutes

Figure 9 : CSV file of page 2

In the outputs image, you can see the phone details from the "Phones" page written in the "Phone Names," "Rates," and "Image URL" columns. The plans from the "Plans" page are written in the "Prices," "Plans," and "Details" columns. Data scraped from both the "Phones" and "Plans" pages is stored in the same CSV file.

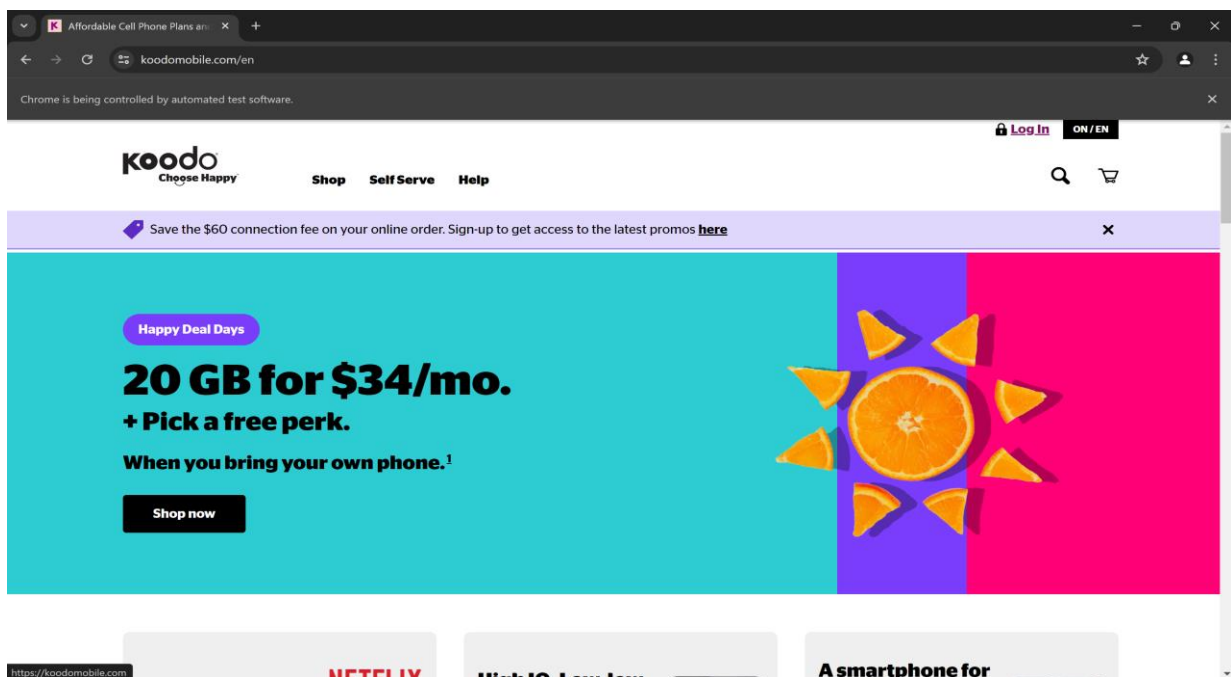


Figure 10 : Homepage of Koodo Mobile

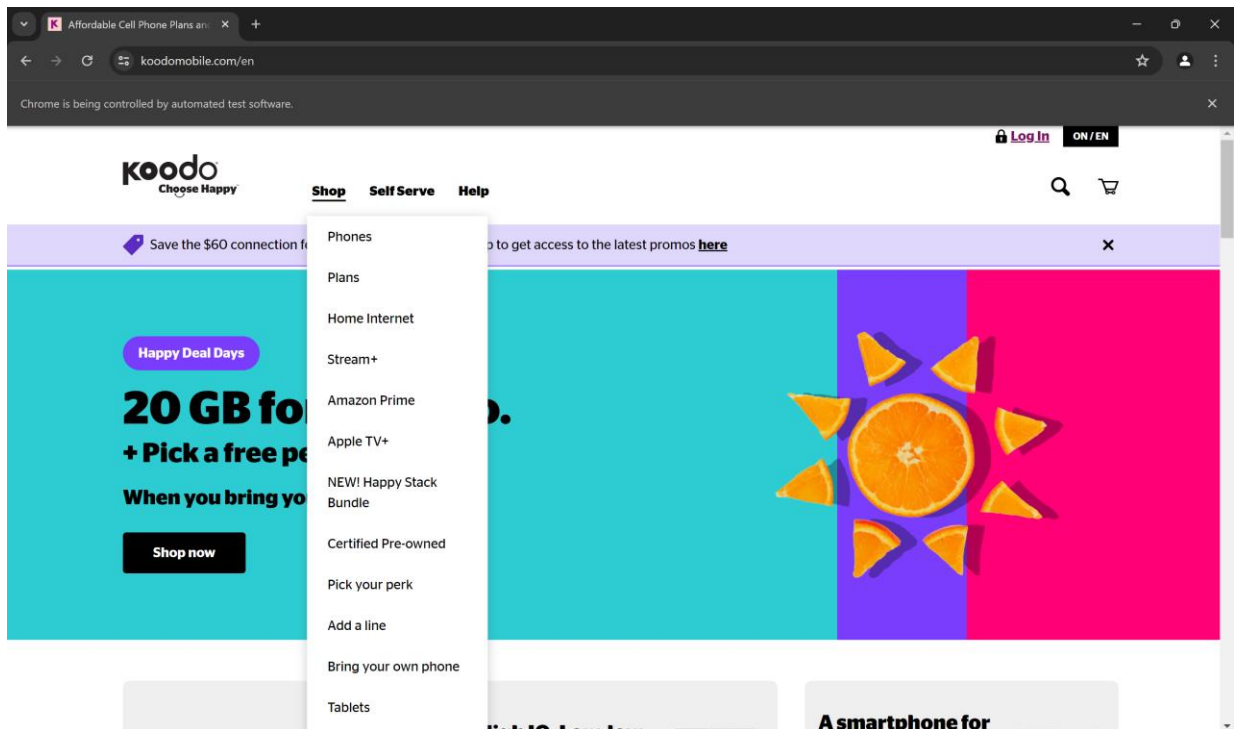


Figure 11 : Dropdown Button

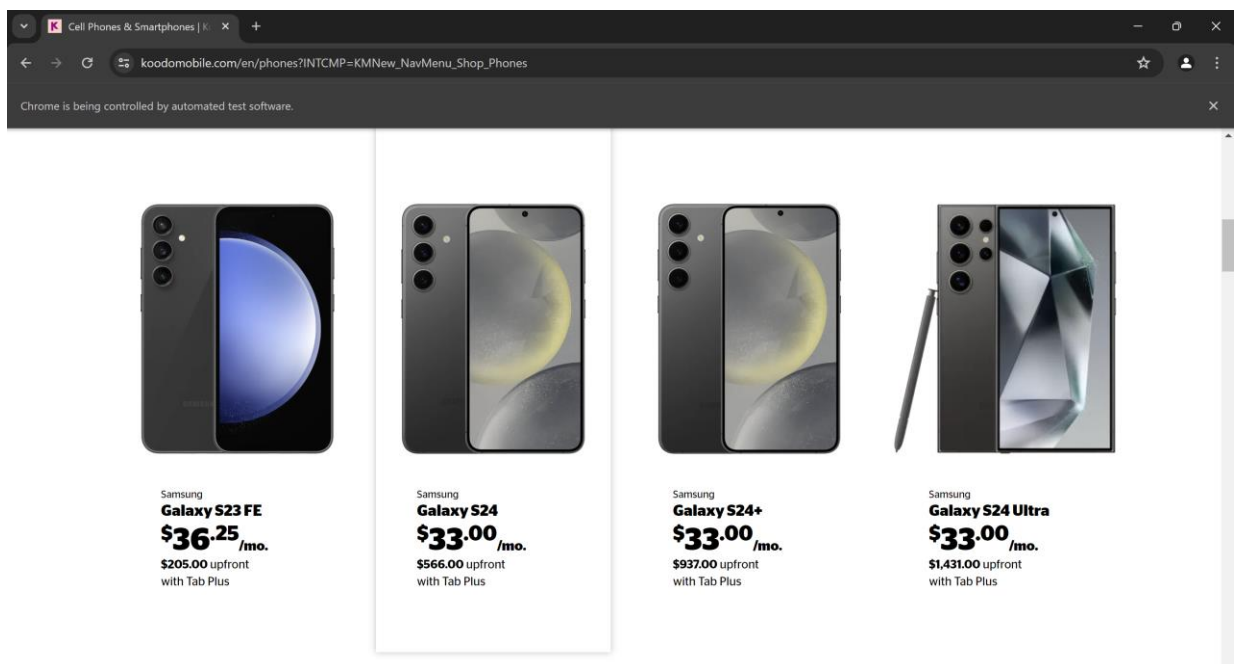


Figure 12 : Phones Page

