ASSIGNMENT 1

Instructions

- Using Visual Studio and Xamarin Forms, develop a cross platform mobile application per the specifications in this assessment.

- After developing the application, select **ONE** mobile platform that you will test your application on (iOS or Android). You are **NOT** required to test on both platforms.

    a. **iOS** apps will be tested on an **iPhone 15** simulator.
    b. **Android** apps will be tested on a **Google Pixel 7** emulator.
    .

- If you are unable to use these emulators on your computer, then please note which emulator you used in the submission comments.

Grading Criteria

- This is an **individual** assessment.
- The majority of grades are assigned based on the correct completion of the required functionality.
- The user interface of your application must be similar to the provided screenshots. You may customize the font sizes and colors per your device; however, the finished application must be reasonably polished, easy to understand, and readable.
- In addition to the required functionality, learners are expected to use the coding conventions demonstrated in class, meaningful variable naming, and clearly organized code. Comments are helpful but not required.

Submission Checklist

For your submission to be graded, you must provide a **zip** file of your project, and a **screen recording** demonstrating the functionality you implemented.

1. Creating Your Project

- When creating your project, name the project: **UtilityBills-firstname**
- Regardless of which platform you are *actually* testing your application on, the project must contain the .Android and .IOS project folders as shown in class.

2. Before you submit your code:

- In Visual Studio, run a **"Build > Clean All"** and "**Build > Clean xxxx**", where xxxx is the name of your project. **Do NOT re-run the application**. Running this command will remove extraneous, compiler generated files from the project.
- After running Build > Clean All and Build > Clean xxx, create a zip file containing all project code.
- Name the project **UtilityBills-firstname.zip**. 7zip or rar files are not accepted.

3. Creating Your Screen Recording

- In the screen recording, demonstrate the app running on an emulator (or real device) and the functionalities you implemented.
- During the screen recording, you must verbally narrate/explain what you are doing while you are doing it (do not assume the instructor will understand what you are doing simply by watching you click things on the screen)
- You are also required to explain your code.
- Max 10 mins

4. In the assignment dropbox:

- In the submission comments, note which mobile platform, your application is designed to be run on.
- **Submit your zip file and screen recording** to the dropbox
- If your screen recording is too large for the dropbox, then upload your screen recording to **OneDrive** and ensure that the link is set to: "Anyone with the link can view". Paste a link to the recording in the **submission comments**.

Academic Integrity

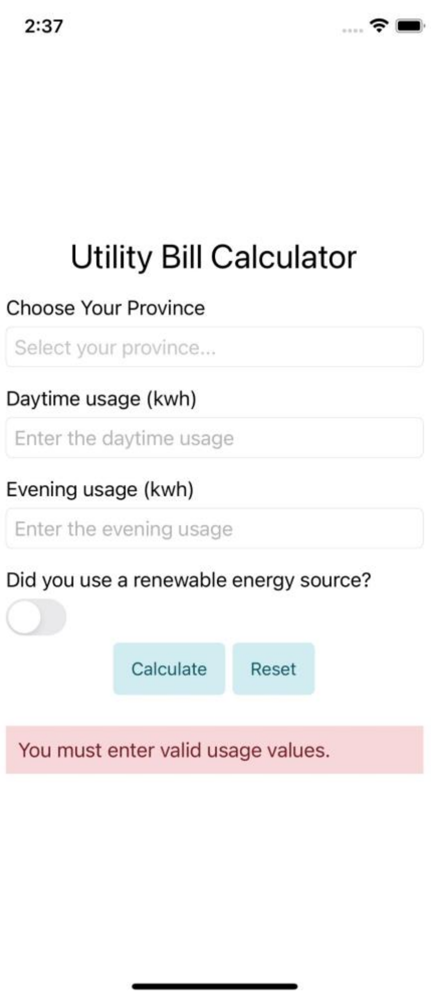
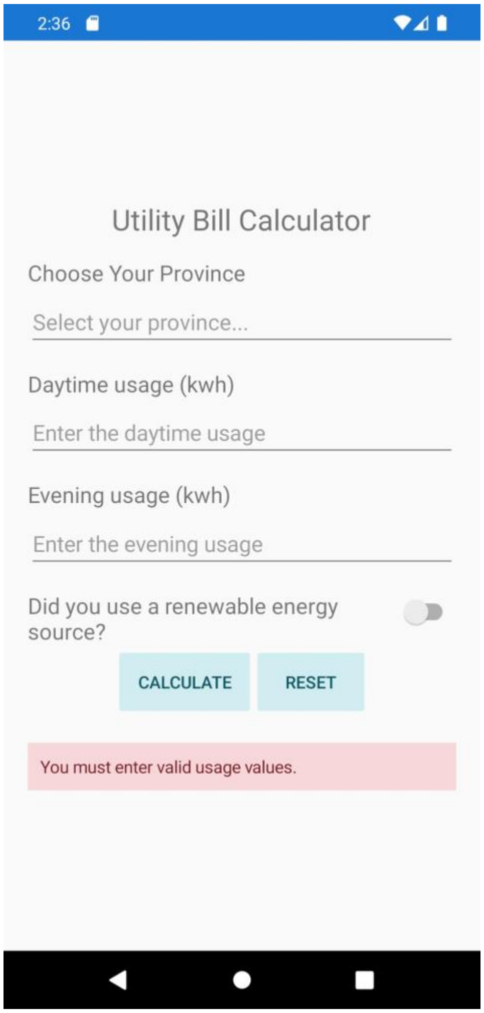
- This is an individual assessment.
- Permitted activities: Usage of Internet to search for syntax only; usage of course materials.
- Not permitted:
  - Communication with others (both inside and outside the class)
  - Discussion of solution or approaches with others, sharing/using a "reference" from someone
  - Searching the internet for full or partial solutions
  - Sharing of resources, including links, computers, accounts

PROBLEM DESCRIPTION

Build a **single screen** application that enables the user to calculate the cost of their electricity bill.

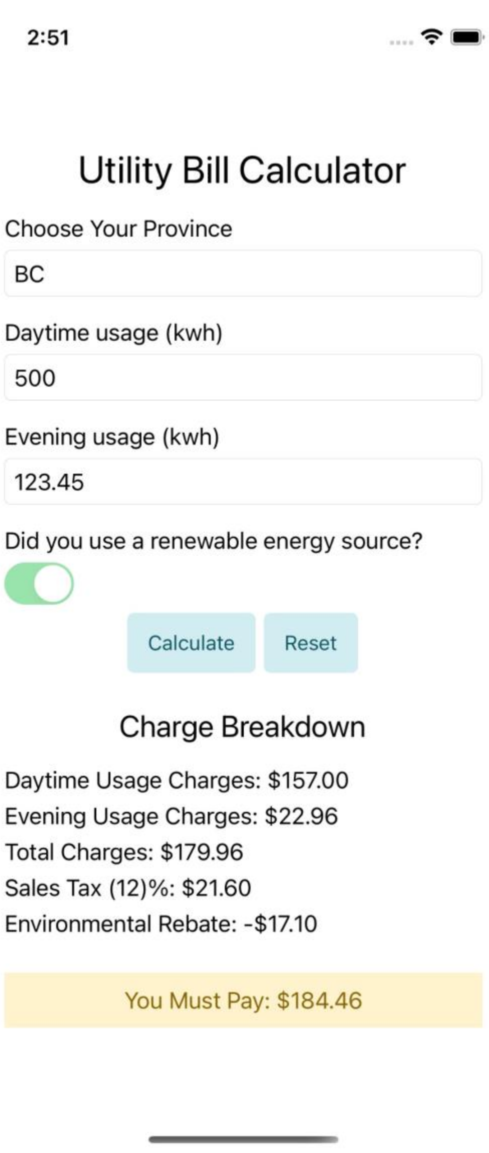
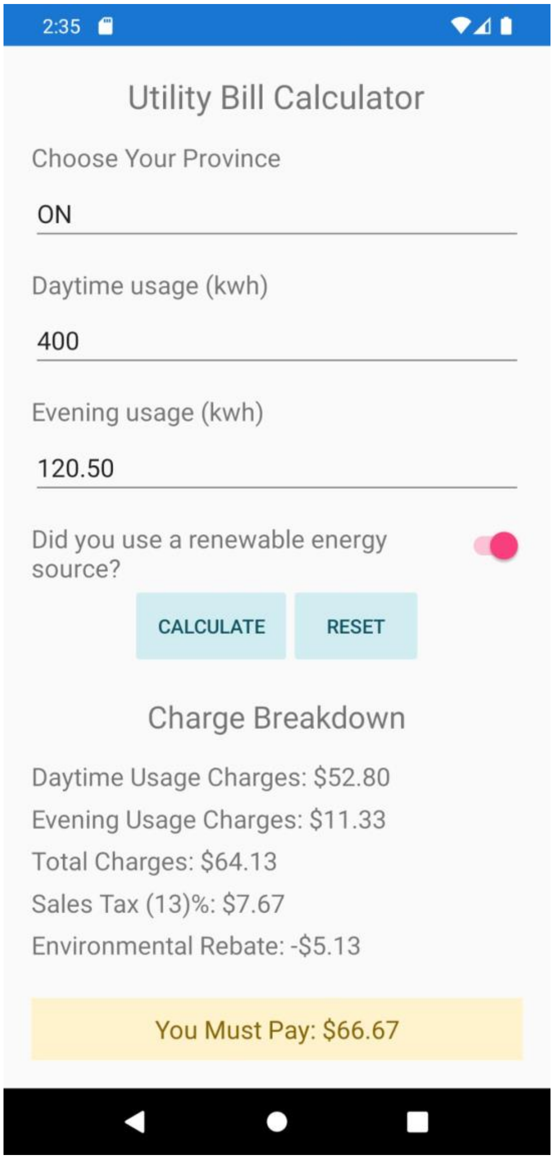
Sample UI:

- The user interface provides fields for the user to fill in information about their electricity charges.
- Appropriate keyboard types must be used for form fields.
- Regardless of which platform you are developing for, all layout files must include code to account for the iOS safe area.

iPhone	Android
 2:37 Utility Bill Calculator Choose Your Province Select your province... Daytime usage (kwh) Enter the daytime usage Evening usage (kwh) Enter the evening usage Did you use a renewable energy source? Calculate Reset You must enter valid usage values.	 2:36 Utility Bill Calculator Choose Your Province Select your province... Daytime usage (kwh) Enter the daytime usage Evening usage (kwh) Enter the evening usage Did you use a renewable energy source? CALCULATE RESET You must enter valid usage values.

- Pressing **Calculate**, displays a receipt showing the amount the user must pay.

- Pressing **Reset** returns the UI to its default state (all form fields are cleared/reset to default values, error messages hidden, receipt is hidden)

iPhone	Android
 2:51 Utility Bill Calculator Choose Your Province: BC Daytime usage (kwh): 500 Evening usage (kwh): 123.45 Did you use a renewable energy source? ● Calculate Reset Charge Breakdown Daytime Usage Charges: $157.00 Evening Usage Charges: $22.96 Total Charges: $179.96 Sales Tax (12)%: $21.60 Environmental Rebate: -$17.10 You Must Pay: $184.46	 2:35 Utility Bill Calculator Choose Your Province: ON Daytime usage (kwh): 400 Evening usage (kwh): 120.50 Did you use a renewable energy source? ● CALCULATE RESET Charge Breakdown Daytime Usage Charges: $52.80 Evening Usage Charges: $11.33 Total Charges: $64.13 Sales Tax (13)%: $7.67 Environmental Rebate: -$5.13 You Must Pay: $66.67

Note: The screenshots are just for your reference. Values shown may or may not be real calculations.

1. Calculation of Monthly Bill

The formula for calculating the user's electricity bill is:

electricity usage charges + sales tax - environment rebate.

Electricity usage charges are defined as the *total cost* of the electricity used by the person. The cost of the electricity depends on the time of day. The current rates are:

- Daytime usage: $0.314 per kwh
- Evening usage: $0.186 per kwh

Sales tax is applied to the total electricity usage charges. The tax rate is based on the province the user lives in:

- Alberta (AB): 0%
- British Columbia (BC): 12%
- Ontario (ON): 13%
- Newfoundland & Labrador (NL): 15%

The user is eligible for an environmental rebate if they use a renewable energy source. The rebate amount is calculated as 9.5% of the total usage charges.

- Note: In this application, residents of British Columbia can *only* use renewable energy sources. Thus, residents of BC will always have an environmental rebate applied to their electricity bill.

Example Calculation

Suppose the user lives in BC and their monthly electricity usage is: 500 kwh hours during the day, and 123.45 kwh in the evening.

The breakdown of their electricity bill (rounded to 2 decimal points) is:

- Daytime usage charge: $157.00 ($0.314 x 500 = 157.00)
- Evening usage charge: $22.96 ($0.186 x 123.45 = 22.9617)
- **Total usage charge: $179.96** (daytime + evening charge = 179.9617)
- Sales Tax (12%): $21.60 ($179.9617 x 0.12 = 21.5954)
- Environmental rebate: -$17.10 ($179.9617 x 0.095 = 17.0963)

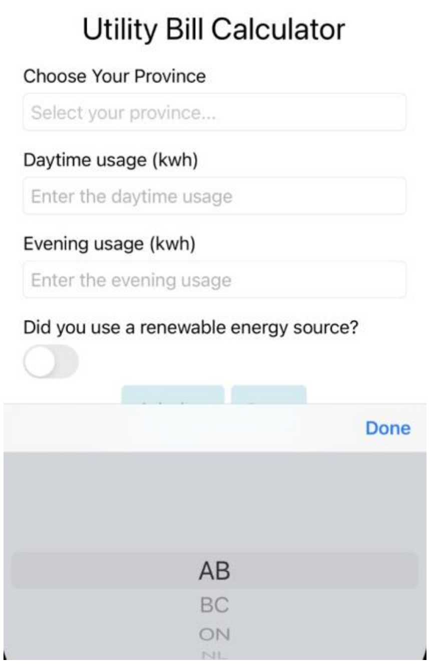
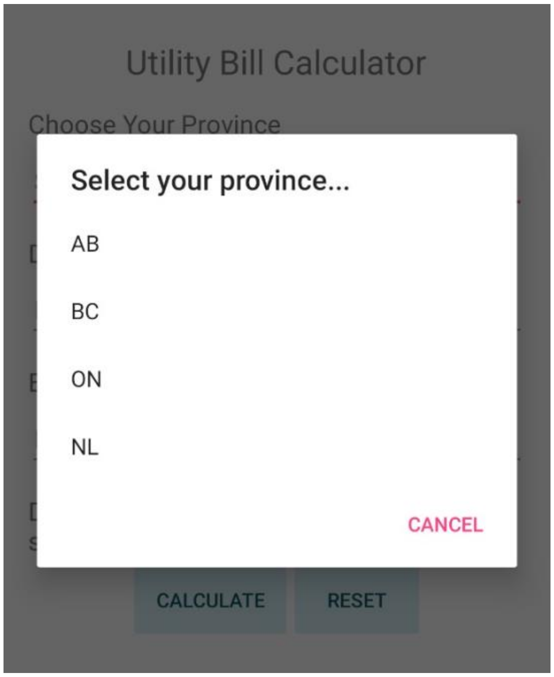
- **Total Bill Amount: $184.46** (Total usage + sales tax - rebate = $184.4608)

2. User Interface

1. When the application loads, present the required labels, picker, textboxes, switch, and buttons.

2. The picker must display the list of provinces.

- By default, **no province** is selected.
- An example of what the picker will look like on different platforms is shown below:

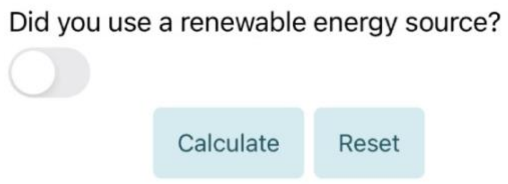
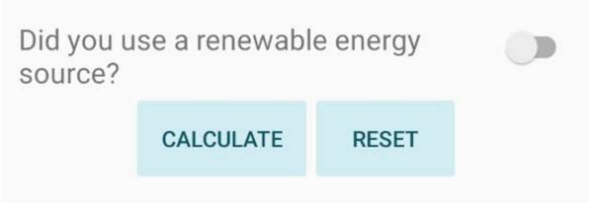
IOS	Android
 Utility Bill Calculator Choose Your Province Select your province... Daytime usage (kwh) Enter the daytime usage Evening usage (kwh) Enter the evening usage Did you use a renewable energy source? Done AB BC ON NL	 Utility Bill Calculator Choose Your Province Select your province... AB BC ON NL CANCEL CALCULATE RESET

3. The textboxes are used by the person to enter their electricity usage in the **day** and **evening**
   - Textboxes must use the appropriate **keyboard type**.

4. The **switch** is used to indicate if the person was using a *renewable* energy source. ● By default, the switch is set to OFF.

   - **If the selected province is BC, then the switch should automatically be set to ON and disabled (ie: BC users cannot turn the switch off)**

- On Android devices, the label and switch should be aligned **horizontally**. On all other devices, the label and switch are aligned **vertically**. NOTE: It does NOT matter which emulator you have installed on your computer - your code must be written to support all devices per this requirement.

iOS	Android
 Did you use a renewable energy source? 	 Did you use a renewable energy source?

5. When the user taps the **Calculate** button, the application should calculate and display the breakdown of their bill in the UI. The user interface must clearly show all parts of the calculation (see screenshots for examples)

   Prior to performing any calculations, the application must validate the form fields:
   a. If the province, day, or evening fields are empty/not selected, display an appropriate error message.
   b. If the day or evening fields do NOT contain numbers, display an error message.

6. When the user taps the **Reset** button, the application must clear/reset all pickers, text boxes, and switches. Any error messages or displayed calculations must be hidden.

7. You may customize the colors and font size of the buttons and labels; however, the final UI design must be easily readable and organized.

3. Implementation Guidelines

1. Layout files should be written using XAML syntax (do not use MAUI.NET)

2. Code behind should be written with standard C#. Variables must be declared using explicit variable declaration, ie: int x = 25; not var x = 25;

3. Regardless of which platform you are developing for, all layout files must include code to account for the iOS safe area.

END OF ASSESSMENT