Numeric Data Types

Goal

Use various numeric value types and coercion to solve a simple mathematical application.

Scenario

Create a VI that calculates the price of a meal in a restaurant. The inputs include the number and types of dishes ordered, and the tax percentage. The program asks the user to input the type of meal. The program then calculates the total amount of the meal.

Design

The finished VI is shown in Figure 1.

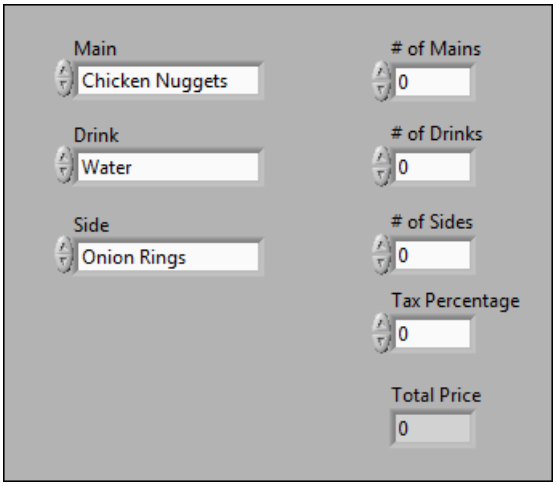

Figure 1. Finished Meal Calculator.vi Front Panel

Implementation

The folder where you need to save this exercise is here: `<NI eLearning>\LV Core 1\Understanding Data Types\Exercise`.

1. Open a blank VI.
2. Place three enum controls on the front panel, as shown in Figure 1.
   - ❑ Rename the controls to `Main, Drink, Side` respectively.
   - ❑ Right-click the Main enum control and select **Edit Items**.

- ❑ Click **Insert** and type `Chicken Nuggets` in the item.
- ❑ Press <Enter> to add a new item and type `Chicken Sandwich` as shown in Figure 2.
- ❑ Click **OK**.

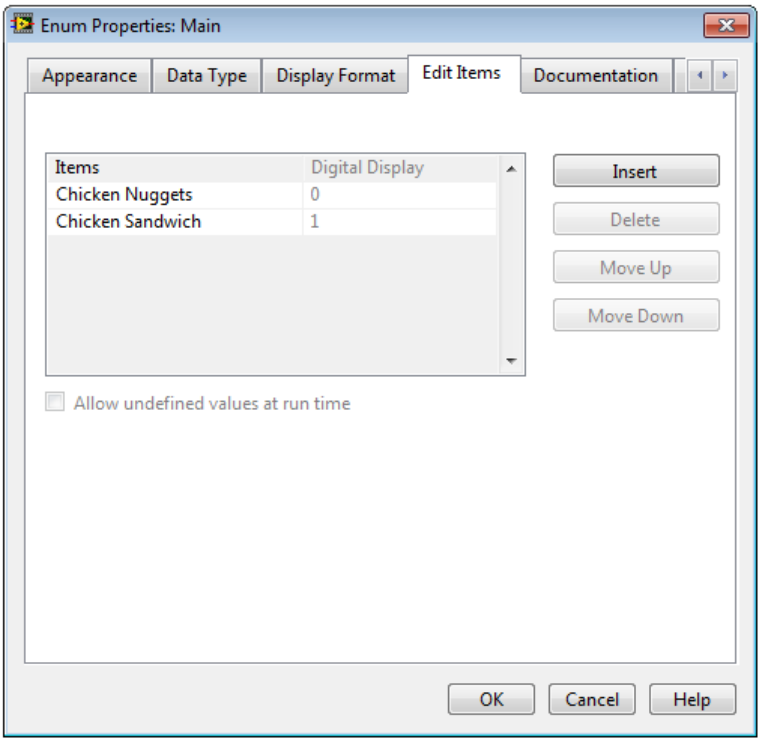

Figure 2. Enum Properties Edit Item Dialog Box

3. Repeat step 2 for the Drink enum control, with the items: `Water` and `Juice`.
4. Repeat step 2 for the Side enum control, with the items: `Onion Rings` and `Salad`.
5. Add a numeric control to the front panel and rename it `# of Mains`.
6. Repeat step 5 for the `# of Drinks` numeric control, the `# of Sides` numeric control, and the `Tax Percentage` numeric control.
   - ❑ Right-click the # of Mains control and select **Representation»I32**. Repeat this for the # of Drinks and # of Sides controls.

7. Create a numeric indicator.

   ❑ Name the indicator `Total Price`.

   ❑ Right-click the indicator and select **Properties**.

   ❑ Select the **Display Format** tab.

   ❑ Change Digits to `2` and Precision Type to `Digits of precision`.

   ❑ Click **OK**.

Complete the following steps to create the block diagram as shown in Figure 3.

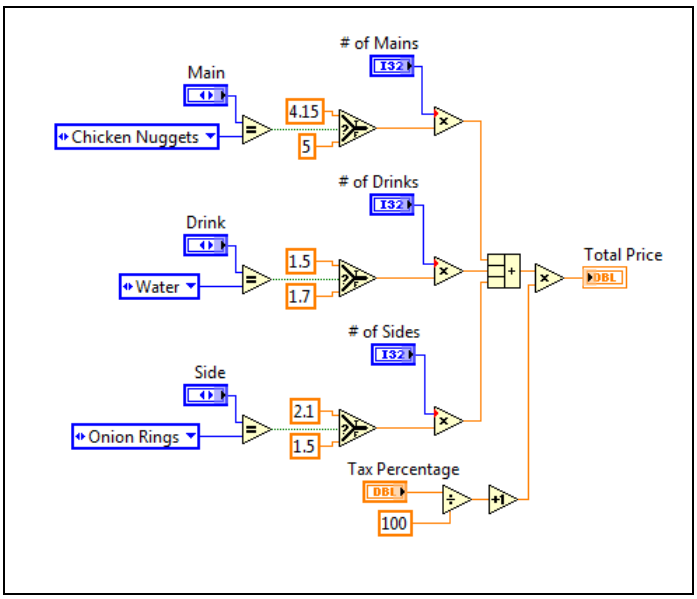

Figure 3. Meal Calculator.vi Block Diagram

8. Determine which option is selected in the Main enum control.

   ❑ Add an **Equal?** function to the block diagram.

   ❑ Wire the Main Enum control to the x input of the Equal? function.

   ❑ Right-click the y input of the Equal? function and select **Create» Constant**.

9. Select the price for the item selected.

- ❑ Add a **Select** function to the block diagram.
- ❑ Wire the output of the Equal? function to the s input of the Select function.
- ❑ Create two numeric constants with values, as shown in Figure 3.
- ❑ Wire the numeric constants to the t input and f input of the Select function.

- ❑ Add a **Multiply** function and wire the # of Mains control to the x input of the Multiply function.
- ❑ Wire the output of the Select function to the y input of the Multiply function.

10. Repeat step 8 and 9, for the Drink enum control and the Side enum control.

11. Add the entire outcome.

- ❑ Add a **Compound Arithmetic** function to the block diagram.
- ❑ Change the arithmetic mode by right-clicking on the function and selecting **Change Mode»Add**.
- ❑ Make three available inputs on the Compound Arithmetic function by dragging down the bottom border to enlarge the function.
- ❑ Connect each output from the Multiply functions to the inputs of the Compound Arithmetic function.

12. Add the tax.

- ❑ Add a **Divide** function to the block diagram.
- ❑ Wire the Tax Percentage control to the x input of the Divide function.
- ❑ Right-click the y input of the Divide function and select **Create» Constant**.
- ❑ Enter the value `100`.

- ❑ Add an **Increment** function to the block diagram.

- ❑ Wire the output of the Divide function to the x input of the Increment function.

- ❑ Add another **Multiply** function to the block diagram and wire the output of the Compound Arithmetic function to the x input of the Multiply function.

- ❑ Wire the output of the Increment function to the y input of the Multiply function.

13. Wire the output of the Multiply function to the Total Price indicator.

14. Save the VI.

    - ❑ Select **File»Save**.

    - ❑ Save the VI as `Meal Calculator.vi` in the `<Exercise>` directory.

Test

1. Make some meal selections, enter the quantities for each selection, and then enter the tax percentage.

2. Click the **Run** button.

3. Compare your VI to the provided solution VI.

4. Close the VI when you are finished.

End of Exercise

Notes