## Chapter 4 Programming Project

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**IDE used**: X Visual Studio Replit

**URL to GitHub repository**:

**Project 1. Days in a Month**

Write a program that asks the user to enter the month (letting the user enter an integer in the range of 1 through 12) and the year. The program should then display the number of days in that month. Use the following criteria to identify leap years:

1. Determine whether the year is divisible by 100. If it is, then it is a leap year if and only if it is divisible by 400. For example, 2000 is a leap year but 2100 is not.
2. If the year is not divisible by 100, then it is a leap year if and only if it is divisible by 4. For example, 2008 is a leap year but 2009 is not.

Here is a sample run of the program:

**Enter a month (1–12): 2 Enter**

**Enter a year: 2008 Enter**

**29 days**

*Input Validation: Make sure the month is between 1 and 12.*

**Branch Name in GitHub repository**:

**Design Details** (algorithm, structure chart, flowchart, and/or pseudocode):

**Reflection:**

1. What did you find most challenging with this program?
2. What problems did you encounter and how did you solve them?
3. What did you learn from writing this program?

**Program 2. Shipping Charges**

**Instructions:**

The Fast Freight Shipping Company charges the following rates:

|  |  |
| --- | --- |
| **Weight of Package (in Kilograms)** | **Rate per 500 Miles Shipped** |
| 2 kg or less | $1.10 |
| Over 2 kg but not more than 6 kg | $2.20 |
| Over 6 kg but not more than 10 kg | $3.70 |
| Over 10 kg but not more than 20 kg | $4.80 |

Write a program that asks for the weight of the package and the distance it is to be shipped, then displays the charges.

*Input Validation: Do not accept values of 0 or less for the weight of the package. Do not accept weights of more than 20 kg (this is the maximum weight the company will ship). Do not accept distances of less than 10 miles or more than 3,000 miles. These are the company’s minimum and maximum shipping distances.*

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**Project 3.** **Geometry Calculator**

**Instructions:**

Write a program that displays the following menu:

**Geometry Calculator**

**1. Calculate the Area of a Circle**

**2. Calculate the Area of a Rectangle**

**3. Calculate the Area of a Triangle**

**4. Quit**

**Enter your choice (1–4):**

If the user enters 1, the program should ask for the radius of the circle then display its area. Use the following formula: *area* = π*r*2. Use 3.14159 for 3.14159π and the radius of the circle for *r*. If the user enters 2, the program should ask for the length and width of the rectangle, then display the rectangle’s area. Use the following formula: **area = length \* width**. If the user enters 3, the program should ask for the length of the triangle’s base and its height, then display its area. Use the following formula: **area = base \* height \* .5**. If the user enters 4, the program should end.

*Input Validation: Display an error message if the user enters a number outside the range of 1 through 4 when selecting an item from the menu. Do not accept negative values for the circle’s radius, the rectangle’s length or width, or the triangle’s base or height.*

**Branch Name in GitHub repository**:

**Design Details** (algorithm, structure chart, flowchart, and/or pseudocode):

**Reflection:**

1. What did you find most challenging with this program?
2. What problems did you encounter and how did you solve them?
3. What did you learn from writing this program?