Chapter 5 Programming Project

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IDE used: X Visual Studio Replit

URL to GitHub repository: https://github.com/pistachiosparkle/AA-CS-Class

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Program 1. Population

Write a program that will predict the size of a population of organisms. The program should ask the user for the starting number of organisms, their average daily population increase (as a percentage), and the number of days they will multiply. A loop should display the size of the population for each day.

Input Validation: Do not accept a number less than 2 for the starting size of the population. Do not accept a negative number for average daily population increase. Do not accept a number less than 1 for the number of days they will multiply.

Branch Name in GitHub repository: https://github.com/pistachiosparkle/AA-CS-Class/blob/main/Chapter%205%20Program%201.cpp

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

(1) Get user input and validate it, making sure population is at least 2. User inputs the average daily population increase as a percentage. User inputs the number of days they will multiply.

(2) Convert percentage to decimal

(3) Display initial population

(4) Loop to calculate the population for each day

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. Student Lineup

A teacher has asked all her students to line up according to their first name. For example, in one class Amy will be at the front of the line, and Yolanda will be at the end. Write a program that reads the student names from the file LineUp.txt. The program should read names from the file until there is no more data to read. Once all the names have been read, it reports the number of students in the class, which student would be at the front of the line, and which one would be at the end of the line. You may assume that no two students have the same name.

Branch Name in GitHub repository: https://github.com/pistachiosparkle/AA-CS-Class/blob/main/Chapter%205%20Program%202.cpp

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

Reflection:

1. What did you find most challenging with this program?

When I tried to look at the data files it says page not found? I guess I don't need this information to complete the program? I'm a little confused at this point.

2. What problems did you encounter and how did you solve them?

3. What did you learn from writing this program?

Program 3. Population Bar Chart

Write a program that produces a bar chart for the population growth of a town. The data is stored in intervals over the past several years, with the year and the population for that year (rounded to the nearest 1,000 people) in each line of the file. A test data file called People.txt has been provided. The test file represents six 20-year intervals, but your program should be able to process any number of years and any interval. Also, do not assume that the data file will always be called People.txt.

The program should ask for the name of the town and the name of the data file. The program should open the file and verify that it has opened with no errors. Then the program should read the year and the population figure and display the year and population on a bar chart. For each year, it should display the year and a bar consisting of one asterisk for each 1,000 people.

Here is an example of how the chart might begin:

```
My Town Population Growth
(each * represents 1,000 people)
1900 **
1920 ****
1940 *****
```

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 4. Patterns

Write a program that uses a loop to display Pattern A below, followed by another loop that displays Pattern B.

Pattern A	Pattern B
+	++++++++++
++	+++++++++
+++	++++++++
++++	+++++++
+++++	++++++
++++++	+++++
+++++++	++++
++++++++	+++
+++++++++	++
++++++++++	+

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 5. Random Number Guessing Game

Write a program that generates a random number and asks the user to guess what the number is. If the user's guess is higher than the random number, the program should display "Too high, try again." If the user's guess is lower than the random number, the program should display "Too low, try again." The program should use a loop that repeats until the user correctly guesses the random number. Make the program keep a count of the number of guesses the user makes. When the user correctly guesses the random number, the program should display the number of guesses.

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?