|  |  |
| --- | --- |
| Drive Full Name | Oreoluwa Adebusoye |
| Partner Full Name | Jose Carrillo |
| Student ID | 1883626 |

Reflection

The objective of this lab was to create a program that calculates the expected population of a country based on rates of births, deaths, and immigration over a specified number of years. This exercise was designed to enhance my skills in input/output handling, mathematical calculations, algorithm development, and implementing decision-making logic using if-else statements.

To solve the problem, I followed several key steps. First, I prompted the user for essential input values: the birth rate, death rate, immigration rate (all in seconds), the current population, and the number of years into the future for which they wanted to estimate the population. After gathering the inputs, I calculated the total number of seconds for the specified number of years. Next, I determined the net change in population per second by subtracting the death rate and adding the birth and immigration rates. By multiplying this net change by the total seconds over the specified years, I arrived at the total population change. Finally, I used an if-else statement to check whether the total change was positive or negative and output the expected future population, rounded to the nearest integer, along with an indication of whether the population had increased or decreased.

My results aligned with my expectations. After running the calculations, I found the output to be reasonable given the input rates. I tested the program with various scenarios, including extreme cases such as very high birth rates and low death rates, to ensure its robustness. The program consistently produced accurate estimates of the future population, which validated my approach.

Throughout the process, one problem I encountered was ensuring accurate calculations when converting rates from seconds to annual changes. Additionally, figuring out how to navigate PyCharm with a partner posed some initial difficulties. It took time to sync our accounts which slightly slowed our progress. However, I made a concerted effort to follow the first three rules of programming: keeping the code simple, testing early and often, and documenting thoroughly. By structuring the program logically and breaking it down into clear sections for input, processing, and output, I maintained simplicity. I also ran multiple test cases during development to catch any errors early and included comments in the code to explain each section, which facilitated understanding and debugging.

I overcame these challenges through iterative testing and refinement of the calculations, as well as by collaborating closely with my partner. We helped each other navigate PyCharm and brainstorm solutions together, which ultimately clarified our approach. My key takeaway from this lab was the importance of thorough testing and validation in programming. Overall, I believe I achieved the learning objectives of the lab. Working with my partner was a positive experience, as we complemented each other's strengths and effectively communicated throughout the process. This collaborative effort enhanced my understanding and made the problem-solving experience more enjoyable.