INF-1100: Introduction to programming and computer behavior
Assignment 1 report

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Introduction

In this assignment the objective was to get a basic understanding of the C or C++ programing language and consisted of 6 unique and individual tasks. I am going to talk about how I managed to solve the different tasks, some problems I encountered on this path, and some things I found interesting.

Technical Background

Since this assignment focused on getting a basic understanding of the C or C++ programing language, each individual task gave hints on what to read up on to get us on the right path. In entirety the assignment consisted of understanding functions and a small collection of tools you can use to write a program and how to use them properly. These are some examples of different tools I used throughout the assignment: "if statements" and the different conditions that follows it, "loops" in the form of "while loops" and "for loops", and in some cases "nested loops" which is a loop inside another loop, logical and bitwise operations, and the combined use of strings and arrays.

Design and Implementation

In this assignment I have worked on several different functions, all with unique purposes and uses. There was a total of 6 different functions, and I will be talking about each of them individually.

The purpose of the first function in the assignment was to take in two different integers and check which has the greatest value. This is easily done by writing a simple "if statement" and using the greater-than sign between the two integers. Something I also choose to do was adding another "if statement" that checked if the two integers were equal. If they were equal, it would not check which one had the greatest value. For this function the major problem was to wrap my head around how you are supposed to call functions and get a result out of it.

The second functions task was to print a triangle by using the asterisk symbol "*". My approach to this was to use a "while loop" inside another "while loop" creating a "nested loop". It took some time figuring out how to get it to print correctly, but with enough trial and error I got it to work as intended.

The objective of the third function was to take two integers and check if a number has a given prime factor and return 1 if the number had a prime factor, or 0 if it did not. This is done by using the modulo operator, which returns the remainder of a division. If the remainder of the division is zero, it is a prime factor. By doing so I added a "if statement" to check if the remainder was zero or not and returning the result. I also added another "if statement" checking if one or two of the integers were zero, since you can't divide zero. The tricky part about this function was understanding the modulo operator and how to use it.

The fourth function was supposed to print out a range of number and check if they were even or odd, and if they had 5 as prime factor. This function also needed to use the third function for checking if 5 was a prime factor. I figured that there were four different outcomes, since the numbers was either even or odd, and 5 was a prime factor or not. Here it got a bit complicated because I ended up using a three "if statements" inside a "for loop" and it was hard keeping track of which what each outcome was supposed to print. But again, with enough trial and error I got the right result.

The task of the fifth function was to find the most significant set bit and return the position of this bit. I spent some time trying to make sense out of this sentence and read a lot about bits and how to manage them. After understanding this, it was easy enough. I wrote a single "while loop" checking if the number was 1, if not, it would shift the bits to that number one position to the right, so that it eventually would end up as 1. I also counted how many times it would shift the positions, and this would be the position of the most significant set bit. Something I found interesting was that shifting the bits 1 position to the right was the same as dividing the number by 2 and remove the decimals. I didn't choose to use this method as I thought that it was harder to make sense of.

The purpose of the sixth and last function was to reverse the content of a string. This was by far the hardest, since you had to use a new library that had the tools to use strings and arrays. This meant that it was a lot of new information to get a hold of before getting anything to work. My solution to this task was that I had to copy the original string, so that I had to identical strings. Then I wrote a "for loop" that changed the first letter of the original string, to the last letter in the second identical string. And do the same thing to the second letter so that it was changed to the second to last letter in the copied string. This proses would repeat, until the original string was reversed.

Conclusion

To sum up, this assignment consisted of 6 individual tasks and was meant to get e basic understanding of the C or C++ programing language, which I think it did well. I managed to complete all the tasks with enough reading and studying, and trial and error.

References

Task 1, 2, 3, 4

(Engineer4Free, 2012)

(Free, 2020)

(Kulyyev, 2017)

(MrCppHelp, 2010)

(ProgrammingKnowledge, 2014)

(Velcode, 2020)

Task 5

(Bitwise operations in C, 2021)

(GeeksforGeeks, 2021)

Task 6

(Cherno, Arrays in C++, 2017)

(Cherno, How Strings Work in C++ (and how to use them), 2017)

(Cherno, POINTERS in C++, 2017)

(nihalkumar703, 2021)