Dear Mr. Watchorn,

I am writing to provide an overview of the work I've recently completed using the C programming language, along with the rationale for my decisions, outcomes, and conclusions derived from the exercise.

**Executive Summary**

I have successfully completed the task of implementing a C program using the JetBrains CLion IDE on my computer with an AMD Ryzen processor. The work involved an initial program that personalized a "Hello, World!" statement (part 4a) and a mathematical problem calculating the surface area of a sphere using floating-point numbers (part 7). The output of both programs has been successfully achieved.

**Discussion**

The primary decisions revolved around the principles of documentation, modularity, and style in programming.

Documentation: Throughout the coding process, I ensured that comments were present to describe the purpose and functionality of various parts of the code. The comments act as clear markers for different sections of the program and explain the logic behind the code.

Modularity: I divided the tasks into separate, distinct sections to ensure that each piece of the program has its own responsibility. This modular approach simplifies the debugging and testing process and enhances the readability of the code.

Style: I followed the common stylistic conventions of the C language to maintain code readability and consistency. This includes the use of lowercase letters for variable names, space around operators, and a new line for each statement and declaration.

In part 4a, I chose to display a statement related to the 'unsigned int' format character in C, highlighting an important data type concept unique to C. For part 7, I selected a task that involved a real-world problem (calculating the surface area of a sphere) to demonstrate the practical application of floating-point arithmetic. The variables 'radius' and 'surfaceArea' are declared as 'float'. In C, the 'float' data type is used to store single-precision floating-point values.

1. Compiler & Resultant File: I utilized CMake as my compiler within Lion. The compiler's role is pivotal in the development process as it converts the high-level C code into a low-level language (machine code) that our processor can understand. The resultant file, known as an object file, can be further linked to generate an executable program.
2. Code Familiarities & Unfamiliarities: Two aspects of the C code appeared familiar to me because of my MATLAB experience: firstly, the usage of the ‘printf’ function, which resembles MATLAB’s ‘disp’ function for output display, and secondly, the termination of each statement with a semi-colon, a syntax rule common to both languages. Conversely, the need for explicit declaration of data types and the inclusion of a 'main' function as the entry point of the program are unique aspects to C that I will need to research further.
3. Include Statement & Variable Data Types: The #include <stdio.h> at the beginning of the program is an 'include' statement, which adds the standard input/output library to our program. This library gives us access to various functions, such as ‘printf’, for performing input/output operations.

**Outcomes**

In part 4a, the program successfully printed the statement: "The unsigned int format character is '%%u'.".

For part 7, the program successfully calculated and printed the surface area of a sphere with a radius of 5.96 inches, outputting: "The Surface Area of a Sphere with a radius of 5.96 is 446.15."

**Conclusion**

This exercise provided me with invaluable insights into the foundational elements of C programming. While recognizing the similarities with MATLAB, I also appreciated the unique aspects of C that enhance its versatility and efficiency. My understanding of compilers, the 'include' statement, variable data types, and other C-specific features was significantly enriched.

In moving forward, I am eager to explore more complex aspects of C programming, such as dynamic memory management and data structures. The strong foundation built through this exercise will undoubtedly facilitate my understanding of these advanced topics.

Attached to this email is an image showcasing the successful execution of the programs. Any feedback or further guidance would be immensely appreciated.

Best regards,

Michael Dekoski

Attachments

A screenshot of a computer

Description automatically generated with medium confidence

Attachment 1: The successful completion of the programs.