Session 2: PROS and C Programming Basics

Basic Structure of a C program

- Explanation of the main function, and its significance in a C program. We will discuss how all program execution in C starts from our main function.

- Review how to properly indent, space, and format code properly for readability and consistency.

- Give basic explanation of header, i.e. what does #include <stdio.h> mean. Header files are files with a '.h' extension and contains code that we can import into our current file. It is useful for code organization and readability.

Discussion

- Where does the code execution begin in a C program?

- What is a header file, and give an example of when you would use it.

Demo

- Have students write setup for C program, basically a hello world program with the correct syntax, formatting, and spacing.

Variables in C: Types and Operators

- Everything in a computer is just represented as 1s and 0s

- C has various operators such as +, -, *, //, /, %

- In C, we categorize data into different "types" based on the kind of information they hold. int for integer, float for decimals, char for letters, etc.

Discussion

- Imagine a robot is reading vision sensor data as input, and you want to store the data into a variable. How do you think the data is represented, and what should the type be of the variable?

- What are the different uses for int, char, and float variables?

- What is the difference between the /, //, and % operators?

Demo

- C program showing different types of variable assignments and operators, as well as snippet of PROS opcontrol function that makes use of void and int variables.

- Show how arithmetic operations are evaluated in C, difference between / and //, and common uses of %

Compiling C Programs

- Compiling converts human-readable C code into machine code, allowing computers to execute it directly.

Why Compile?

- Performance: Compiled code runs quickly and efficiently

- Portability: C code can be compiled for many different systems

- Other languages like Python use an interpreter, which translates and runs code line by line. Execution is quick, but less efficient.

Demo

- Live demonstration of compiling a C program, from writing the code to execution of the compiled output.

Homework

- Within main(), write code that will compute area of a triangle by declaring variables, and using appropriate arithmetic operations. Try to experiment using float and int, as well as / vs //.