Intro to C++ for FRC: Lesson 2

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https://github.com/JoelKueh/frc-cpp

Contents

Review: Programming as Math

- As stated in the last lesson, we can model mathematical functions in code.
  - We take functions that we want to replicate and turn them into steps.
  - We then take those steps and translate them into code.
- We have access to more features in code than just pure mathematical functions.
  - We can manipulate data (variables).
  - We can respond to events and check conditions (if statements).

Variables: Working with Data

- One of the most powerful tools a computer provides is the ability to manipulate data.
- Results of calculations can be saved for later in “variables”.
- In C++, the basic variable types are as follows
  - Integer (int): Stores integer data (..., −2, −1, 0, 1, 2, ...)
  - Float (float): Stores decimal data[1]
  - Character (char): Stores a single character (‘a’, ‘B’, ‘Z’, ‘x’, ...)
- You can define a variable by specifying it’s type, then giving it a name.
  - See the next slide for an example.

[1]Float stands for floating point. Think about how you might wright a decimal number on paper, you write a sequence of numbers (e.g. 321543) and then choose where you want the decimal place to go (e.g. 32.1543 or 32154.3). The decimal point can go anywhere in the number, it is “floating”.

Variables: Declaration and Initialization

- You can declare variables like this.

```
int integer_variable;
float decimal_variable;
char single_character;
```

- You can also give varaibles a default (inital) value like this.

```
int integer_variable = 15;       // Assign the integer 15
float decimal_variable = 13.2;   // Assign the decimal 13.2
char single_character = 'c';     // Assign the character 'c'.
```

- After a variable is declared, you can set its value using ‘=’

```
integer_variable = 18;
```

Exercise 1: Basic Variable Usage

Give it a shot, what do you think the variable “a” will be at the end of this segment.

```
int a = 1;
int b = 2;
int c = 3;

a = b;
b = c;
a = b;
```

If you said `a == 3` you'd be right.

Conditions: If Statments