## Worksheet 2

The three built-in types in Java are

1. int, for integer,

2. boolean, for boolean with two states true or false, and

3. double, for a double precision floating-point number.

Additional data types that can often be found in Java, as well as many other programming languages, are String and float. A String consists of a series of characters encompassed in double quotes. These can be seen in the COM port and robot name variables used for connecting to LocoXtreme. A float is a single precision floating-point number. When defining raw numbers, either in logic or as the value of a variable, if it is a float, the “f” symbol is needed at the end of the number, such as “100.0f”.

1. **In the temperature conversion equations, raw floating point numbers were used, indicated by the “f” after the number. Combine use of the “final” keyword and these values to define constants. Define these constants as type float and replace the raw numbers in the equations with the constants.**

In the example file, the RGB color values were stored in integer variables which were used instead of raw values like in the previous lesson. This allows for those values to be updated and used in multiple locations more easily than if new raw values were input in each location.

1. **Create an integer variable for the loop duration time and replace the raw value used in the timed for loop.**

You can enclose a type such as int or double in parenthesis and place it before a number or variable to “cast” that number or variable to the type specified in the parenthesis. For example, if you have a variable “double r = 2.4”, you can call “(int) r” to use the value of r converted to an integer. When you do this, no rounding is performed, the decimal places are simply removed from the number. In this way, “(int) r” is equal to “2”.

1. **If the r, g, and b variables were changed to data types of double, what would you need to change in the code elsewhere?**
2. **Convert all instances of compared values in the temperature if statements into named variables.**

One of the if statements showed use of the “AND” operator, which is symbolized as “&&” in Java. Alternatively, there are other statements like the “OR” operator, symbolized as “||” in Java and the not equals symbol, also shown in the example code, as “!=”. The equal to operator, “==”, is also shown.

1. **How would the AND operator if statement logic change if the && was changed to ||?**
2. **If the temperature value was cast to an int, which if statement would become not achievable?**