# Math 173 Notes　　　　　　　Summer 2019　　　　　　　Regis Smith

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1. A **computer program** is a set of instructions meant to be performed by a computer. **Machine language** is the native language of a computer. Instructions which are meant to be read and edited by humans are **high level**, while instructions which are more easily "understood" by a computer are **low level**.

2. A **compiler** converts high-level code to low-level **object code**. Object code is "linked" to create an **executable file**. (Example: In Microsoft Windows, the icon you "double click" to run a program launches an executable file.)

3. The stream operators `<<` and `>>` are used to transmit data from one one medium to another. We use `<<` with `cout` to write to the console (`cout` stands for "character output") and `>>` with `cin` to read from the keyboard (`cin` stands for "character input").

4. Arithmetic operators $+$, $-$, $\times$, and $\div$ are written `+`, `-`, `*`, `/`, respectively. Parentheses is `()`. Unlike in mathematics, multiplication is not implicit (so you have to write `2*(1+3)` instead of `2(1+3)`). Moreover, you can not use brackets `[]` or braces `{}` as parentheses. Operator precedence ("order of operations") is the same as in mathematics ("PEMDAS"). There is no exponentiation operator, but an equivalent function is defined separately.

5. A **string** is a sequence of characters. In C++, double quotes are used to delimit strings. Some characters are represented using "escape sequences", such as `\n` for the newline character.

6. Variables in C++ are used to store data. All variables have a "type", such as `int` for integers, `double` for decimal numbers, and `string` for strings.

7. Variables are declared by giving their type followed by their name. For example,
   ```
   string name;
   ```
   or
   ```
   double temp;
   ```
   Rule: Variables must be declared (or defined) before they are used.

8. Lab: Write a program which converts Celcius temperatures to Fahrenheit. Use the formula

$$F = \frac{9}{5}C + 32.$$

```
#include<iostream>
using namespace std;
int main()
{
  cout << "Enter a Celsius temperature:  ";
  double temp;
  cin >> temp;
  cout << "The equivalent in Fahrenheit is "
      << 9.0/5.0*temp + 32.0 << " degrees.\n";
}
```