Functions

A mathematical function such as $f(x) = x^2 + 1$, means that $f(x)$ computes a value equivalent to the square of `x` plus one. For any value `x`, you can compute the value of the function by applying the formula; thus $f(3)$ is $3^2 + 1$, or `10`.

In C++ a **function** is a block of code that has been given a name. To run that code, you **call the function**. To call a function in C++, you write the name of the function, followed by a list of **arguments** in parentheses. Here is a call to the function named *f*, passing the argument `3`:

```
1 | cout << f(3) << endl;
```

We can **implement** the function $f(x)$ in C++ like this:

```
1 | double f(double x)
2 | {
3 |   return x * x + 1;
4 | }
```

When called, the function copies the data supplied as arguments into the appropriate **parameter variables** (`x` in this example), and then executes the code in its body. When finished, control returns to the point in the code from which the call was made.

The operation of going back to the calling program is called **returning** from the function. A function often passes a value back to its caller. This is called **returning a value**