

CHAPTER 3: CONTROL FLOW

The control flow statements of a language specify the order in which computations are done. We have already met the most common control flow constructions of C in earlier examples; here we will complete the set, and be more precise about the ones discussed before.

3.1 Statements and Blocks

An *expression* such as `x = 0` or `i++` or `printf(...)` becomes a *statement* when it is followed by a semicolon, as in

```
x = 0;
i++;
printf(...);
```

In C, the semicolon is a statement terminator, rather than a separator as it is in Algol-like languages.

The braces `{` and `}` are used to group declarations and statements together into a *compound statement* or *block* so that they are syntactically equivalent to a single statement. The braces that surround the statements of a function are one obvious example; braces around multiple statements after an `if`, `else`, `while` or `for` are another. (Variables can actually be declared inside *any* block; we will talk about this in [Chapter 4](#).) There is never a semicolon after the right brace that ends a block.

Ah C, how do I love thee? Let me count the ways. - Dr. Chuck with homage to [Elizabeth Barrett Browning](#)

The humble [semicolon](#) is why spacing and line-ends do not matter to C and C-like languages. It means we as programmers can focus all of our white space and lines on communicating our intent to humans. This freedom is not an excuse to write obtuse or dense code (see the [Obfuscated Perl Contest](#)) but instead freedom to describe what we mean or use spacing to help us understand our code.

We can take a quick look at how a few other C-like languages treat the semicolon. Java is just like C in that the semicolon terminates statements. Python treats the semicolon as a separator - allowing more than one statement on a single line. But since Python treats the end of line as a statement separator - you generally never use semicolon in Python. But for people like me who automatically add a semicolon when typing code too fast, at least Python ignores the few semicolons I add to my code out of habit. JavaScript treats semicolon as a separator but since JavaScript ignores the end of a line (it is whitespace), semicolons are required when a block of code consists of more than one line. When I write JavaScript, I meticulously include semicolons at the end of all statements because "any good C programmer can write C in any language".