C++ Basics

Object-Oriented Programming
- encapsulation
- inheritance
- polymorphism

C++ Functions

In other languages often referred to as:
- procedures
- methods
- functions
- subprograms
- subroutines

User-defined Identifiers

You will construct names to represent various entities in C++. The rule is simple. A user-defined identifier must start with an underscore or letter, and any remaining characters must be either underscore, letter, or digit. They are case sensitive and have no limit to their length. They may not be keywords or reserved words.
Keywords/Reserved Words

These are words that have predefined meaning in C++ and may not be redefined by the programmer.

Good Programming Practice

When making up a user-defined name for a quantity in your program, use a name that is descriptive of the quantity it represents.

Variables

You can think of a variable as a stored quantity in your program, that is allowed to change as execution of the program proceeds.

All variables in a C++ program must be defined before they are "used" or "referenced" in the program.
Some Standard Variable Types

- short
- int
- long
- float
- double
- long double
- char
- bool

Sample Declarations

When a variable is declared, it is given a "type". This indicates what can be stored in that variable. Examples
- int m, n, p;
- float x, y;
- char a;
- long z, w;

Assignment Statement (=)

The = character in a statement is used to create an assignment statement. For example: a = b + y; (Here the contents of b and y would be added and the result placed into the variable a.) In general the expression on the right is evaluated, and that value is then placed in the variable in the left.)
Other terms

- Literal - “A name for one specific value.”
- Escape Sequences: These are used in quoted strings to specify special characters, which may be printable or unprintable. They begin with \. See page 18 in the text.
- Arithmetic operators: +, -, *, /, %

Integer vs. Floating-Point Division

It is critical that you understand the difference in how division is done when using floating variables and when using integer variables. When integer variables are involved the computed result may not be the same as the algebraic computation would be. For example, 3/5 is 0; 5/3 is 1; However, 5.0/3 is 1.6666...

More terms

- Type casting: static_cast<type>(variable) This is use to “temporarily” change from one type to another. Examples will be given.
- Order of evaluation or “Precedence of operators”. We will discuss the rules.
Console Input/Output

For now, we will take a very simplistic approach. There are two objects to accomplish input and output. They are (with examples):

- `cout << "Hello world" << endl;
- `cout << m << "    " << n << endl;
- `cin >> m >> n >> x >> y;

Newlines

The following accomplish the same thing:

- `cout << "Hello World" << endl;
- `cout << "Hello World
";
- `cout << "Hello World\n";

Notice the presence of the escape sequence `\n` in the latter.

Program Style

Several practices must be followed in creating good and readable programs:

- comments
- indentation
- meaningful variable names
- spacing
Small Exercise

Look at the sample program on page 5:
- Give the name of all functions in the program.
- List all variables and their types.
- List all the literals in the program.
- Find all escape sequences in the program.
- How many semicolons do you see, and what do you think their purpose is?