The Rook's Guide to C++

Kickstarter Backer & Contributor Version

August 1, 2013

Contents

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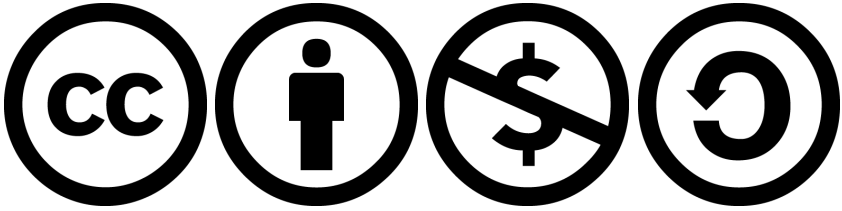

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Funding & Support:

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Andrew Pedley at Depot Square Pizza

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Chapter 1

History

Chapter 2

Sample Program

Chapter 3

Variables

Chapter 4

Constants

Chapter 5

Assignments

Assignments are a way for a user or a programmer to assign a value to a variable. The way we assign a value to a variable in C++ is different from how we might do it in math. In mathematics we are allowed to say that x = 3 or 3 = x, but in C++ the only acceptable way to assign the value of 3 to x is to type x = 3.

The = in the expression x = 3 is known as an **assignment operator**. This allows the program to set a variable's value depending on its type. Here are some examples of setting a value to different types of variables:

```
int x = 4;
```

```
char alpha = 'A';
```

```
string word = "Alpha";
```

```
float y = 3.14;
```

We are able to declare variables and assign a value to those variables immediately by using the assignment operator. When we assign literal values to variables

of type char, the value must be surrounded by single quotes (for example, `'A'`). When we assign values to variables of type `string`, the literal value must be surrounded by double quotes (for example, `"Alpha"`). We do not have to initialize the values of the variables, however. We can set them later in the code like this:

```
int myVal;
//some code
myVal = 0;
```

In all of the lines of code in this section where a variable is set using the assignment operator, the "thing that is being given a value" is known as an **lvalue**, and the expression on the right that is being stored in the variable is known as the **rvalue**. Literals such as `'A'` or 3 can never be an lvalue. Aside from literals, the rvalue can consist of other variables, like this:

```
myVal = myVal2;
```

Even though `myVal2` is a variable, we are only using the *value stored in the variable*, not the variable itself. For example, if `myVal2` had a value of 6, `myVal` would then be assigned to the value 6 with the above code.

We can also store the results of an arithmetic expression in a variable like this:

```
myVal = 5 + 6; //assigns myVal a value of 11
```

But we can't write

```
5 + 6 = myVal; // ERROR!
```

since `5 + 6` doesn't refer to a place where we can store a value. We can also combine arithmetic expressions with variables as an rvalue like this:

```
myVal2 = 6;
myVal = 4 + myVal2;
```

In this case, the variable `myVal` would be assigned a value of `10` because the variable `myVal2` was initialized to a value of 6, and `4 + 6` is `10`. The value

of `myVal2` remains unchanged. Make sure that the variable `myVal`, the variable `myVal2`, and the literal `4` are of the same type. For example, the following code will result in an error:

```
  int myValue = 4;
  int yourVal;
  string myString = "word";

  yourVal = myValue + myString;
  // Adding string to an int is
  // probably not what you meant!
\begin{lstlisting}

When we try to combine different variable types, the
    compiler will get very mad at us.
Some exceptions to this rule are if we try to combine \Code{
    float}s, \Code{int}s, and \Code{double}s.
These types have the ability to be combined (to a certain
    extent) because they are all numeric values.
Both \Code{double}s and \Code{float}s can hold values with a
     decimal point such as \Code{-3.14}, \Code{0.003}, or \
    Code{5.167289} whereas an \Code{int} can only hold round
     values such as \Code{2}, \Code{-18}, or \Code{100}.
    Refer to Chapter \ref{chap_datatypes} for more
    information on converting between data types.



\LevelD{Review Questions}

\LevelD{Homework Questions}

\LevelD{Review Answers}

\LevelD{Homework Answers}

\LevelD{Further Reading}

\begin{itemize}
\item ~
\item ~
\item ~
\end{itemize}


     \LevelC{Input}
      \input{chap_input.tex}
```

```
      \LevelC{Output}]
       \input{chap_output.tex}
      \LevelC{Arithmetic}
       \input{chap_arithmetic.tex}
      \LevelC{Comments}
       \input{chap_comments.tex}
      \LevelC{Data types, conversion}
       \input{chap_datatypes.tex}

% \LevelA{Section 3}
%   \LevelB{Chapters:}
      \LevelC{Conditionals}
       \input{chap_conditionals.tex}
      \LevelC{Strings}
       \input{chap_strings.tex}
      \LevelC{Loops}
       \label{chap_loops}
       \input{chap_loops.tex}
      \LevelC{Arrays}
       \input{chap_arrays.tex}
      \LevelC{Blocks, Functions, and Scope}
       \input{chap_functions.tex}
      \LevelC{Problem Solving}
       \input{chap_problems.tex}
      \LevelC{Testing}
       \input{chap_testing.tex}

% \LevelA{Section 4}
%   \LevelB{Chapters}
      \LevelC{Preprocessor}
       \input{chap_preproc.tex}
      \LevelC{Advanced Arithmetic}
       \input{chap_advancedarith.tex}
      \LevelC{File I/O}
       \input{chap_file_io.tex}
      \LevelC{Pointers}
       \input{chap_pointers.tex}
      \LevelC{Dynamic Data}
       \input{chap_dynamic.tex}

  \Comment{ % LevelX comment.

  \LevelA{}
    \LevelB{}
      \LevelC{}
      \LevelC{}
      \LevelC{}
```