C++ Weekend Crash Course

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A 43-year-old father and husband, lives and works in Greenville, Texas as a programmer both at work and at play when he's not riding his bicycle or hauling his son to Tae Kwon Do events.

to my wonderful new nieces, Christa and Sarah

Preface

C++ *Weekend Crash Course* teaches the reader C++ in one admittedly busy weekend: 30 sessions of a half-hour each, for 15 hours stretching from Friday evening to Sunday afternoon. At the end of each part of the book, you'll get a chance to pause, reflect, and review what you've just learned before pushing on through the rest. Good luck!

What is C++?

C++ is the most popular programming language in use today. C++ is used in applications from the micro-programs that drive your microwave oven, your clothes washer and your TV up through the huge, hardcore programs that control nuclear missiles and Mars rockets — heh, you can't blame the Mars rockets on C++.

In the late 1980s C began to show signs of age. For one, C does not support the object-oriented programming style. At the time, the object-oriented wave was taking the world by storm. Employers were throwing money at object-oriented programmers. All you had to do was work the phrase "new paradigm" into the conversation in order to gather a crowd of admirers.

The problem was that every program worth its salt was written in C (there were a few programs written in Pascal like early versions of Windows, but they don't count — if you are familiar with the earliest versions of Windows, you know why). There was no way that companies were going to rewrite all that code just to ride the object-oriented wave.

Object-oriented concepts had to be grafted onto the existing C language. The result was called C++.

C++ is a superset of C. Any well written C program can be rebuilt with a C++ tool to generate a working program. That meant the companies could upgrade their software in pieces. Existing code could remain in C while new code adopted the extra features of C++.

Fortunately for us, C++ is a standardized language. The American National Standards Institute (ANSI) and International Standards Organization (ISO) agree on what C++ is. They issued a detailed description of the C++ language. This standardized language is often known as ANSI or ISO standard C++ or simply Standard C++.

Standard C++ is not controlled by a single company such as Microsoft (or Sun, for that matter). The Standard C++ community is not held hostage to the whims of any one corporate giant. In addition, companies do not stray. Even Microsoft's Visual C++ holds tightly to the C++ standard.

The programs in *C++ Weekend Crash Course* in can be built using any Standard C++ implementation.

The Object-Oriented Paradigm

Object-oriented programming is not all hype. Object-oriented programming really is a different approach to programming than its predecessor. Object-oriented programs are easier to write and maintain. Object-oriented modules can be reused with greater ease than those written in older styles.

C++ Weekend Crash Course presents more than just the C++ language. You need to learn the object-oriented paradigm in order to make complete use of the power of C++. *C++ Weekend Crash Course* uses C++ examples to teach you the object-oriented view of the world. Anyone who claims to program in C++ without understanding OO concepts is just using C++ as a "better C".

Who

C++ Weekend Crash Course is intended for the beginner through the intermediate reader.

This book serves the beginner by not assuming any knowledge of programming or programming concepts. The first few lessons go over real-world, non-techie explanations of what programming is.

This book is also great for the home programmer. The multiple examples demonstrate programming techniques used in modern, high speed programs.

The serious programmer or student needs C++ in his quiver of programming skills. The ability to speak knowledgeably of C++ can make the difference between getting that job and not.

What

C++ Weekend Crash Course is more than just a book: it's a complete development package. A CD-ROM containing the famous GNU C++ environment is included with the book.

You need a word processor, such as Microsoft Word, in order to do word processing. Similarly, you need a C++ development environment in order to build and execute programs in C++.

Many readers will already own a programming environment such as Microsoft's ubiquitous Visual C++. For those who do not own a C++ environment already, *C++ Weekend Crash Course* includes the standard GNU C++.

GNU C++ is not some stripped down, limited time program. The GNU C++ package included with the book is a complete, no-holds-barred development environment. *C++ Weekend Crash Course* provides complete instructions on how to install and use both GNU C++ and Visual C++.

How

C++ Weekend Crash Course follows a one-weekend format. Start with Friday evening; conclude Sunday afternoon.

This "One weekend" format is:

- ideal for the student who wants to catch up with the rest of the class,
- ideal for the one-time programmer who wants to brush up on his skills, and
- ideal for anyone who wants to learn C++ while the kids are off at Grandma's house.

Of course, you can proceed through the book at a more leisurely pace, if you prefer. Each section of 4 to 6 lessons can be read independently.

The reader should be able to complete each of 30 sessions in 30 minutes. Time markers in the lesson margin help keep the reader on pace.

Each session is followed by a set of review questions to allow the reader to judge her comprehension of the material. A set of more involved problems is provided at the end of each part to help drive home knowledge gained during the weekend session.

Overview

C++ Weekend Crash Course presents its sessions in groups of 4 to 6 chapters, organized into 6 parts:

Friday evening — Introduction to programming.

This part introduces programming concepts and progresses you through your first program.

Saturday morning — Basic C++

This part covers beginning topics such as statement syntax, operators and basic function.

Saturday afternoon — Structures and pointers.

Here the reader delves the slightly more complicated topic of pointer variables including their application in linked lists, arrays and objects.

Saturday evening — Introduction to object based programming.

This is the jumping-off point — topics such as C++ structures, which form the basis for object-oriented programming are discussed.

Sunday morning — Object-oriented programming.

Here it is — the mother lode. This part delves into both the syntax and the meaning of object-oriented programming.

Sunday afternoon — Wrap up

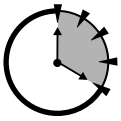
This part wraps up some of the more involved topics such as error handling using exceptions and overloading operators.

Each part ends with a discussion of debugging techniques for finding and removing the inevitable errors from your programs. The level of complexity of these techniques is chosen to match the reader's ability glean from that session.

The appendix includes more involved programming problems for each lesson.

Layout and Features

No one should try to simply power through this material without a break. After each session, and at the end of each part, you'll find some questions to check your knowledge and give you a little practice at exercising your new-found skills. Take a break, grab a snack, refill that coffee mug, and plunge into the next one!



20 Min. To Go

Along the way, you'll find some features of the book to help you keep track of how far along you are, and point out interesting bits of info you shouldn't miss. First, as you're going through each session, check for something like this in the margin:

This icon and others like it let you know how much progress you've made through each session as you go. There are also several icons to point out special tidbits of info for you:

This is a flag to clue you in to an important piece of info you should file away in your head for later.

This gives you helpful advice on the best ways to do things, or a neat little technique that can make your programming go easier.

Don't do this! 'Nuff said.

This highlights information you'll find on the CD-ROM that accompanies this book.

We also occasionally highlight text passages that explain key concepts of C++ syntax, like so:

SYNTAX

A **function** is a logically separate block of C++ code. The function construct has the form:

```
<return type> name(<arguments to the function>)
{
    // ...
    return <expression>;
}
```

Conventions Used in this Book

Aside from the icons you've just seen, such as *Tip*, there are only three conventions in this book:

- To indicate a menu choice, we use the ➪ symbol, as in:

  Choose File ➪ Save Project to save your work.

- To indicate programming code within the body text, we use a special font, like this:

  Likewise, when writing `main()`, I could concentrate on handling the summation returned by `sumSequence()`, while thinking only of what the function did, and not about how it worked.

- To indicate a programming example that's not in the body text, we use this typeface:

```
float fVariable1 = 10.0;
float fVariable2 = (10 / 3) * 3;
fVariable1 == fVariable2;   // are these two equal?
```

What's left?

Nothing. Open your work book to the first page and start the clock. It's Friday evening: you have two days.

Acknowledgments

Writing a book like C++ Weekend Crash Course is a challenge, especially since it's one of the first titles in a new series. I'm pleased to have had the opportunity to help launch a new way to teach readers the basics of programming.

I'd first like to thank Greg Croy, acquisitions editor, for spearheading this new series and selecting me as an author. I'd also like to thank my agent, Claudette Moore, for her work with Greg and me to get this project moving.

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Finally, and most of all, I'd like to thank my family, whose support of my writing makes it all worthwhile.

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