WRITING
Computer
Code

Learn
the
Language
of
Computers!

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Coding Rock Stars

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Code

by Chris Minnick
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CONTENTS

INTRODUCTION

SO, YOU WANT TO GET STARTED WRITING REAL COMPUTER CODE! Maybe you've played with drag-and-drop programming languages or you've done modding in Minecraft, and you're ready for the next level. Great! There are currently more than 500 different languages for coding on computers (which isn't very many, when you consider that there are about 6,500 human languages!). You're about to learn the most popular languages that are used by millions of coders all over the world.

ABOUT THIS BOOK

In this book, you'll learn to use HTML5, CSS3, and JavaScript to create programs for computers. More people have used these three computer-coding languages than any other coding language that's ever been invented. In fact, every single website that you visit makes use of these three languages. That's why we think you've made a great decision by beginning your journey into the world of coding by picking up *Writing Computer Code.*

Computer code is fun and easy to learn. With some determination and a lot of imagination, you'll be creating your very own computer programs in no time!

Just as the only way to become a great athlete or musician is to practice, practice, practice, the only way to become a computer programmer is to write code, write code, write code!

This book is put together as a series of projects with steps for constructing each project from start to finish. The projects also build upon one another, so that by the end of the book you'll have an animated robot that you can control with your mouse and continue to modify and improve long after you finish all the projects.

Here's what you need to do the projects in this book:

» A computer running the Windows, Mac OS X, or Linux operating system

» A web browser, like Chrome, Firefox, or Safari

» An Internet connection

As you work through each project, keep in mind the following:

» Code and web addresses are in monofont. If you're reading this as an ebook, you can click web addresses, like www.dummies.com, to visit that website.

» When you're getting started, the best way to learn is to see how other people do it. For this reason, we've included pictures for every important step in the book, and all our examples are online at http://jsfiddle.net/user/watzthis/fiddles. If you want to check your work, or just copy ours, be sure to look at both of these.

» Every project wraps up with a last look at the project's big ideas in coding. The big ideas consist of codes and concepts you'll find useful for future projects.

» Coding isn't that hard, but it does come with a lot of technical details. If you don't feel like reading all the explanations, just skip ahead to the next code example and try it out.

ABOUT YOU

We already know that you're ready and willing to code. Because you're reading this, we know you're fully qualified and able to get started right away. We don't make many assumptions, but here are the things we wanted to mention upfront:

» **You should be comfortable with using a web browser to visit websites, and with typing on a keyboard.** The

projects in this book won't likely work on a phone or tablet without a keyboard.

» **You're comfortable with very basic math.** We're talking about addition, subtraction, multiplication, and division. We don't require anything very advanced at all, but basic math is an important part of programming.

» **You have the patience and dedication to stick with it and troubleshoot bugs.** We guarantee that programming can be a lot of fun, but we also guarantee that it can be frustrating when you have to track down the one typo or missed command that is making your whole program not work. Stick with it!

That's really all there is to it. If you get stuck, keep in mind that many problems in writing computer code happen simply because of spelling errors or words that you type that a computer can't understand. Proceed slowly and carefully, and you'll do great!

ABOUT THE ICONS

As you read through the projects in this book, you'll see a few icons. The icons point out different things:

Watch out! The Warning icon marks important information that you can use to avoid common pitfalls when coding.

The Remember icon marks concepts you've encountered before and should keep in mind while coding.

The Tip icon marks advice and shortcuts that will help you create code and graphics quickly and easily.

The Fun with Code icon describes how the coding you're doing relates to the bigger picture of computer programming.
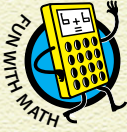
The Fun with Math icon describes the everyday math you use while coding computer programs. Finally, you see how that stuff really is used!

THE FIRST STEP

Once you take your first steps down the road of writing code, the world of computers will open up to you and you'll be able to use your computer to do some pretty amazing things. You'll also join the community of millions of programmers around the world as we shape the web and the future! Congratulations on taking the first step!
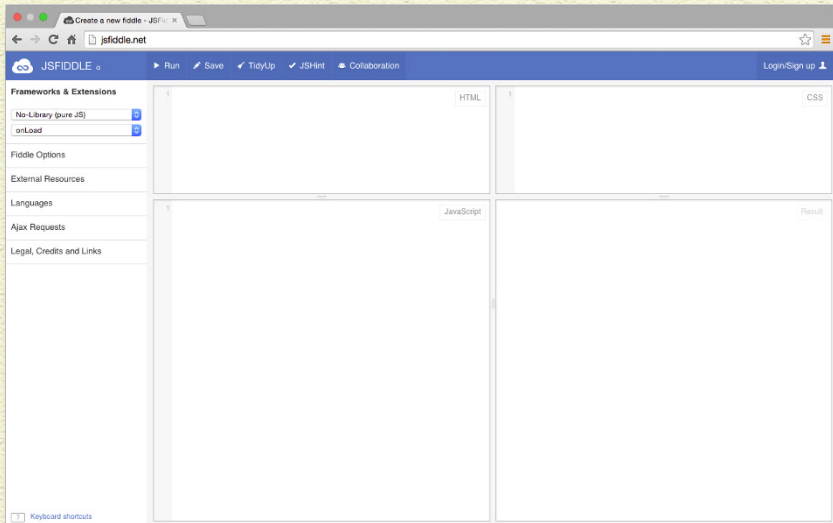
COMPUTERS CAN'T DO THINGS ON THEIR OWN. They need a computer program to tell them what to do, and they need people to write those computer programs. The people who write the code to make computers do all sort of things are called *computer programmers.*

WHAT IS PROGRAMMING?

A *computer program* is a group of instructions that can be understood and followed by a computer. Another name for a computer program is *software. Computer programming,* also known as *coding,* is what we call it when we write these instructions.

Figure 1-1 shows a computer program.

Right now, this computer code may look confusing, but after you've read this book, you'll understand how to read it and even write it yourself!

```html
1  <div id="robot">                                    HTML ⚙
2  <div id="head">
3      <div class="eye" id="righteye"></div>
4      <div class="eye" id="lefteye"></div>
5      <div id="nose"></div>
6      <div id="mouth"></div>
7  </div>
8  <div class="arm" id="rightarm"></div>
9  <div id="body"><p id="message">I Love to Code!</p></div>
```

```javascript
1  var rightEye = document.getElementById("righteye");   JAVASCRIPT ⚙
2  var leftEye = document.getElementById("lefteye");
3  var leftArm = document.getElementById("leftarm");
4
5  rightEye.addEventListener("click", moveUpDown);
6  leftEye.addEventListener("click", moveUpDown);
7  leftArm.addEventListener("click", moveRightLeft);
8
9
10 function moveUpDown(e) {
11   var robotPart = e.target;
12   var top = 0;
13
14   var id = setInterval(frame, 10) // draw every 10ms
15
16   function frame() {
17     robotPart.style.top = top + '%';
18     top++;
19     if (top === 20){
20       clearInterval(id);
21     }
22   }
```

```css
1  body {                                               CSS ⚙
2      font-family: "Comic Sans MS",
   cursive, sans-serif;
3  }
4  p {
5      font-size: 3em;
6  }
7  .eye {
8      background-color:blue;
9      width:30%;
10     height:30%;
11     border-radius: 50%;
12 }
13 .arm {
14     background-color: #cacaca;
15     position: absolute;
16     top: 35%;
17     width: 5%;
18     height: 40%;
19 }
20
21 #head {
22     width:30%;
23     height:30%;
24     border-radius: 15%;
25     background-color: #dadada;
26     position: absolute;
27     left: 32%;
28     top: 5%;
29 }
30 #righteye {
```

Figure 1-1: The computer program you'll make in this book!

The computers of today are much more powerful than ever before. It used to take a whole room of computers to do what we can now do with even the smallest computer. One thing all computers have in common, no matter how powerful, is that they need computer programs to do anything and they need computer programmers to write these programs.

Computer programs help people to do many things, including the following:

» Playing music and videos

» Performing scientific experiments

» Designing cars

» Inventing machines

» Playing games

» Controlling robots

» Guiding satellites and spaceships

» Creating magazines

» Teaching people new things
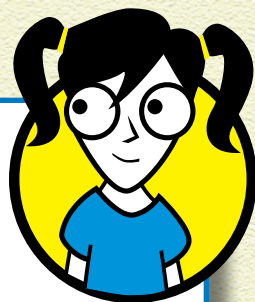
THE WOMEN WHO INVENTED PROGRAMMING

Electronic computers were first invented in the 1930s. But it was in the middle of the 1800s when the first computer program — a set of instructions designed to be carried out by a machine — was written.

The author of the first computer program — and the world's first computer programmer — was a woman named Ada Lovelace. She was a mathematician who lived in England. Ada imagined that computers would be able to do all the things we use computers for today, including working with words, displaying pictures, and playing music. Her unique understanding earned her the nickname "The Enchantress of Numbers." We're guessing your nickname isn't as rad as that.

The computer that Ada Lovelace wrote programs for didn't look anything like the computers of today. Instead of a plug or battery, it had a crank! Check out this photograph of Charles Babbage's Difference Engine, one of the very first computers.

(continued)
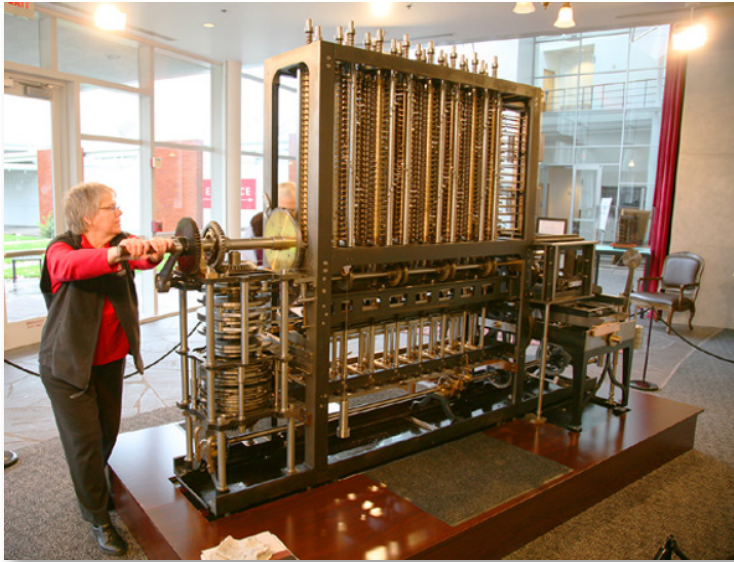
Photograph courtesy of Jitze Couperus
(https://commons.wikimedia.org/wiki/File:Babbage_Difference_Engine_(Being_utilised).jpg)

In order for computer programs to be converted into machine language, we need to use compilers. *Compilers* are programs used to convert programming languages into machine language. The very first compiler was created by Grace Murray Hopper in 1944. Her invention led to computer programs being able to run on different types of computers, and eventually gave birth to JavaScript. Grace Hopper is also the inventor of the term *debugging,* for fixing problems in computer programs. This term was inspired by the removal of an actual moth from an early computer. Grace Hopper became known as "The Queen of Software" or "Amazing Grace" for her contributions to modern computing. (What can we say? Nicknames were just cooler back then.)