Fourth Edition

Head First

C#

A Learner's Guide to Real-World Programming with C# and .NET Core
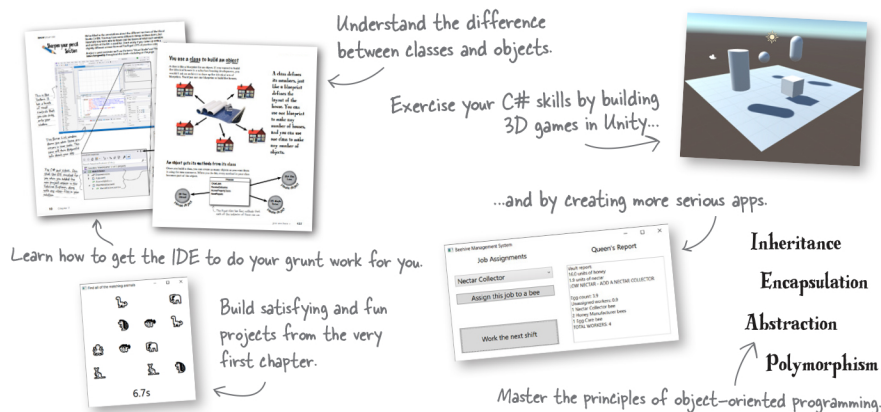
**Andrew Stellman
& Jennifer Greene**

A Brain-Friendly Guide

Head First

C#

What will you learn from this book?

Dive into C# and create apps, user interfaces, games, and more using this fun and highly visual introduction to C#, .NET Core, and Visual Studio. With this completely updated guide, which covers C# 8.0 and Visual Studio 2019, beginning programmers like you will build a fully functional game in the opening chapter. Then you'll learn how to use classes and object-oriented programming, create 3D games in Unity, and query data with LINQ. And you'll do it all by solving puzzles, doing hands-on exercises, and building real-world applications. By the time you're done, you'll be a solid C# programmer—and you'll have a great time along the way!

Understand the difference between classes and objects.

Exercise your C# skills by building 3D games in Unity...

...and by creating more serious apps.

Learn how to get the IDE to do your grunt work for you.

Build satisfying and fun projects from the very first chapter.

Inheritance

Encapsulation

Abstraction

Polymorphism

Master the principles of object-oriented programming.

What's so special about this book?

Based on the latest research in cognitive science and learning theory, *Head First C#* uses a visually rich format to engage your mind rather than a text-heavy approach that puts you to sleep. Why waste your time struggling with new concepts? This multisensory learning experience is designed for the way your brain really works.

"Thank you so much! Your books have helped me to launch my career."

—*Ryan White*
Game Developer

"Andrew and Jennifer have written a concise, authoritative, and most of all, fun introduction to C# development."

—*Jon Galloway*
Senior Program Manager on the .NET Community Team at Microsoft

"If you want to learn C# in depth and have fun doing it, this is THE book for you."

—*Andy Parker*
Fledgling C# programmer

.NET

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Head First C#

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WOULDN'T IT BE DREAMY IF THERE WAS A C# BOOK THAT WAS MORE FUN THAN MEMORIZING A DICTIONARY? IT'S PROBABLY NOTHING BUT A FANTASY...

Andrew Stellman

Jennifer Greene

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by Andrew Stellman and Jennifer Greene

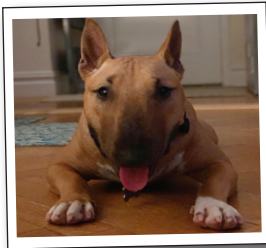|	
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Downloadable exercise: Animal match boss battle

If you've played a lot of video games (and we're pretty sure that you have!), then you've had to play through a whole lot of boss battles—those fights at the end of a level or section where you face off against an opponent that's bigger and stronger than what you've seen so far. We have one last challenge for you before the end of the book—consider it the *Head First C#* boss battle.

In Chapter 1 you built an animal matching game. It was a great start, but it's missing... something. Can you figure out how to turn your animal matching game into a memory game? Go to our GitHub page and download the PDF for this project—or if you want to play this boss battle in Hard mode, just dive right in and see if you can do it on your own.
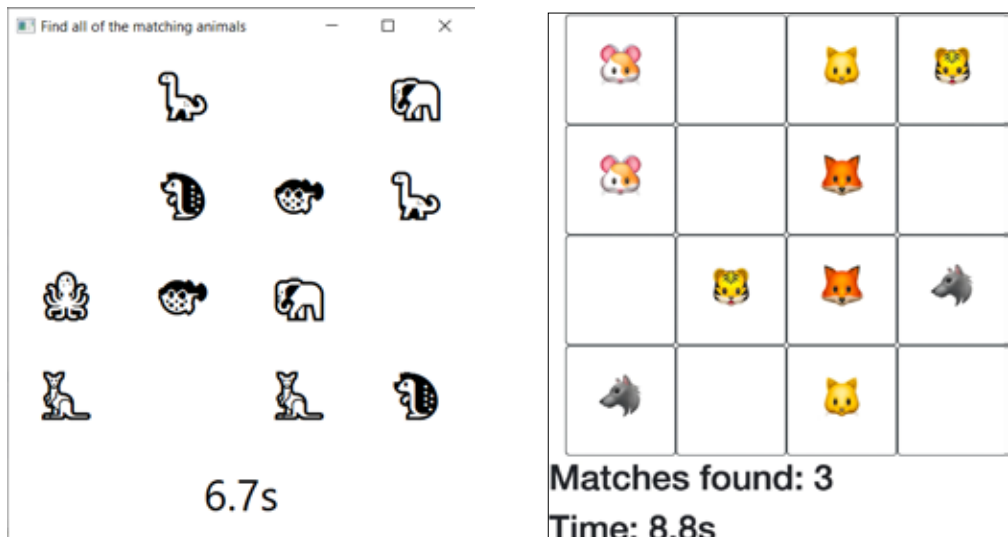
The rules of the boss battle

Your job is to turn your animal matching game from Chapter 1 into a memory game. Here's how it will work:

1. When the game starts, all of the animals are hidden. The timer works exactly like it did in Chapter 1.

2. The player clicks pairs of hidden animals. When the first hidden animal is clicked, the game reveals it.

3. When player clicks the second animal, if it's a match then both animals stay displayed. If it's not a match, then both animals are hidden again.

4. The game is over when all pairs have been found and displayed. At the end of the game, all of the animals will be displayed.

5. When the player starts a new game, the animals are shuffled and hidden again.

This is a project for you to do on your own!

If you go to the GitHub page for the book, you won't see any code for this project, because we want to give you the freedom to tackle this project in any way that you see fit.

However...

Sometimes it really helps to have some hints. Luckily, we have some very creative readers! Here are two of their solutions, one WPF version and one ASP.NET Blazor version.

> **Here's a WPF version from one of our readers. GitHub user charl4ee turned the WPF version of the game into a memory game, and also adding a great effect where unmatched animals are displayed for an extra second before disappearing. You can get the source code here: https://github.com/charl4ee/ImageMatch**
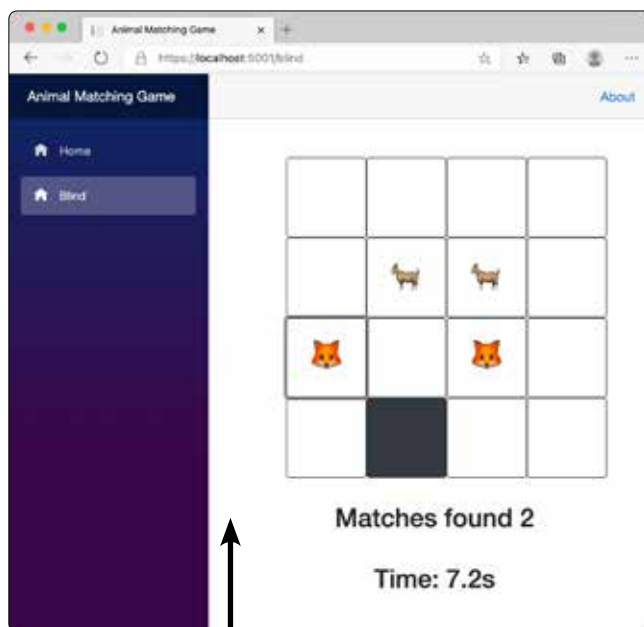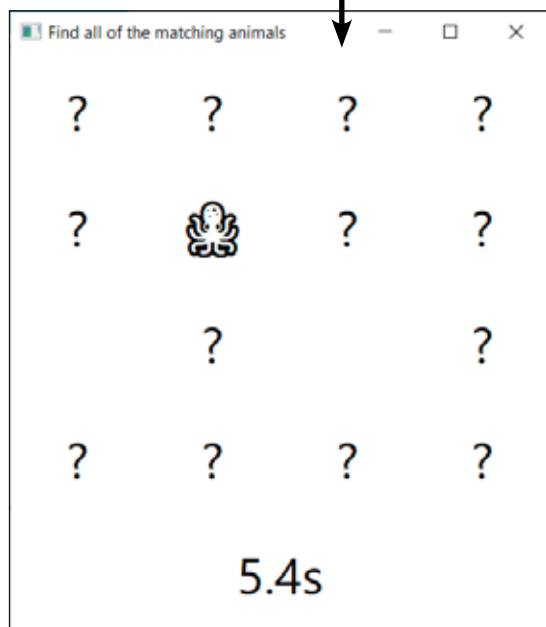
> **Here's an ASP.NET Blazor version from another one of our readers. GitHub user Pan (bodow) made some significant improvements to the ASP.NET Blazor version of the game. In the default mode, it keeps track of the high score, encouraging you to beat your best time. And more importantly, they also added a "memory" version where the animals are hidden, and only appear when you click them. You can get the source code here: https://github.com/bodow/BlazorMatchGame**

Get creative!

We started the book with the animal matching game because it's a great platform for you to get creative. There are so many "even-better-ifs" that you can try out. Here are a few ideas:

- ★ Can you figure out how to add rows or columns to your game?

- ★ Create a version where the player has to match three animals, not two.

- ★ Make the timer count down, not up. Add extra rounds with shorter timers.

- ★ Instead of matching animals, try matching pairs of related icons (like a fish 🐟 and a fishing rod 🎣).

- ★ Make the game more challenging by hiding some of the pairs the player previously found if too much time has elapsed.

Looking for more inspiration? Check out this blog on the Visual Studio Blog written by one of our authors, Andrew Stellman, that highlights creative work by other *Head First C#* readers: *https://devblogs.microsoft.com/visualstudio/head-first-csharp-contest-got-some-truly-creative-entries/*

Did you come up with a creative or interesting version of the animal matching game? If you did, then we want to hear from you! Publish your code to GitHub, then contact us via Twitter at *@HeadFirstCSharp* – our DMs are open – and send us a link to your project. We may even include it in this PDF to help provide inspiration and encouragement to other readers.

And finally... thank you for reading our book!

It means so much to us that we've helped you on your C# learning journey. If you feel like this book helped you, we hope you consider leaving a five-star review for our book on Amazon: *https://www.amazon.com/Head-First-CSharp/dp/1491976705/*

You'd be surprised at how much even a one-sentence review with five stars helps us out, so we'd really appreciate it! (Weirdly, reviews with four stars actually work against us.)

— Jenny and Andrew