Unity for Absolute Beginners

Sue Blackman

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ISBN-13 (pbk): 978-1-4302-6779-9

ISBN-13 (electronic): 978-1-4302-6778-2

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Distributed to the book trade worldwide by Springer Science+Business Media New York, 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax (201) 348-4505, e-mail orders-ny@springer-sbm.com, or visit www.springeronline.com. Apress Media, LLC is a California LLC and the sole member (owner) is Springer Science + Business Media Finance Inc (SSBM Finance Inc). SSBM Finance Inc is a Delaware corporation.

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For my Mom, who is now finishing her first book.

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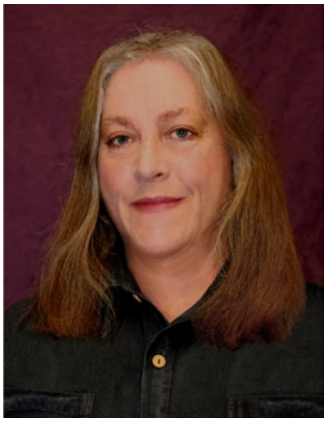

Sue Blackman is a 3D artist and interactive applications author and instructor based in southern California. She has taught 3ds Max and game classes for artists for well over ten years in top-rated community colleges and private schools, such as the Art Institute of California, and has been lead 3D artist on games for Activision through one of their subsidiaries. She has worked in the industry for several years to help train Fortune 1000 companies, such as Boeing, Raytheon, and Northrop Grumman, to create serious games and training applications with game-based formats. She has been involved with the commercial development of real-time 3D engines for well over ten years. She is an avid tutorial writer and has created both tutorials, as a contributing author, and artwork for various 3ds Max books over the years, as well as training manuals for 3D authoring applications for serious games. She has also written for ACM Siggraph on serious games, one of her favorite topics. You can visit her web site at www.3dadventurous.com.

About the Contributor

Jenny Wang graduated with a BA in Math and minor in Computer Science from University of Southern California. After working for many years in the corporate world, she became interested in video games. She decided to combine her love of art with technology, which led to web development and 3D art creation with 3DS Max and Photoshop. Learning and working with C# and the Unity game engine, she had a blast working on this book and working with Sue Blackman. You can visit her web site at www.jennywangdesign.com.

About the Technical Reviewer

Marc Schärer Schärer is an interactive media software engineer creating cutting-edge interactive media experiences for training, education, and entertainment with his company Gayasoft (http://www.gayasoft.net) located in Switzerland, using Unity since its early days in 2007.

Marc Schärer has a strong background in the 3D graphics, network technology, software engineering and the interactive media fields. After starting programming at the age of 11, he later studied Computer Science and Computational Science and Engineering at Swiss Federal Institute of Technology Zurich before working with various teams in North America, Oceania, and Japan to create compelling interactive experiences.

With the rise in popularity of serious games, interactive education, and immersive experiences, Gayasoft focuses on researching options and technologies for the next generation of interactive and immersive experiences. We apply state-of-the-art AR and VR technologies (Vuforia, Metaio, Oculus Rift) and intuitive, innovative input technologies (Razer Hydra, STEM, Thalmic Myo, Leap Motion, Emotive Insight).

Acknowledgments

Thanks go out to Jenny Wang for her invaluable help with the research, concept testing, and 2D art assets required for this book.

Thanks also to Barry Paul and John Irvin for introducing me to the fine art of potato-gun marksmanship (I still can't believe they actually beaned a bunny with that overripe orange) and to Erik Toraasen, whose many ideas for garden-gnome gameplay threatened to push the book way over schedule. From my 3ds Max class, I'd like to thank Brad Roach for "donating" the scarecrow used for some of the Mecanim experiments, and Jenny for taking the time to investigate Mixamo for character rigging. (You can read her report in Appendix A.)

The concept for the Gnomatic Garden Defender grew out of a frustration over keeping the destructive hoards of real bunnies out of my own garden and my fascination with the long-standing British love affair with garden gnomes. Upon returning from the UK after spending two years pursuing an alternate education, I was introduced to the newly published book, *Gnomes*, with its fanciful illustrations of forest gnomes by Rein Poortvliet. A #1 seller on the New York Times list, it became the de facto reference for the modern garden gnome.

Combining a common plaster garden gnome with a home-made potato gun seemed a perfect theme for the book's project, so after creating a working prototype for the gnome, weapon, and game-play I headed out to the web to immerse myself deeper into the culture. To my great delight, I discovered I wasn't alone in my desire to arm the little folk. Shawn Thorsson's collection of "combat gnomes" so tickled my sense of the outrageous that I painted my own gnome's potato gun to loosely resemble Shawn's rocket launcher, paying homage to his marvelous creativity and craftsmanship. Be sure to check out the "finest militarized lawn ornaments in the world" at http://thorssoli.etsy.com and his blog at http://protagonist4hire.blogspot.com/.

Introduction

The Unity community is very large and very helpful. There are videos, code, and 3D assets available on any number of topics, and the Unity help documents have recently undergone a major update. But if you are new to any or all of the components of game development (scripting, 2D or 3D art asset creation and manipulation, or game design in general), you have probably discovered how overwhelming it is to make sense of it all.

One of the biggest challenges is to learn how to bring it all together. Unlike short topic videos, this book takes you through the process of creating a game that seems very simple at first glance, yet becomes more sophisticated as you work your way through the design and creation process.

One of the great advantages books have over videos is the luxury to spend time on explanations. In game development, there are always several different ways to solve design and technical problems, but there is rarely a "best" solution. And unlike a large studio, where budget and time constraints dictate a highly detailed game document, you will discover that the game design and creation process must be flexible in order to be able to finish a game or even a working prototype.

About the Unity Game Engine

Unity provides an excellent entry point into game development, balancing features and functionality with price point. The free version of Unity allows people to experiment, learn, develop, and sell games before committing any of their hard-earned cash. Unity's very affordable, feature-packed Pro version is royalty free, allowing people to make and sell games with the very low overhead essential to the casual games market.

With its huge user community, Unity removes the elitist separation between programmers, artists, and game designers that is typical of high-priced game engines. It makes it possible for anyone to take the first step to bringing their ideas to life. In this book, you will get to wear many hats as you create your first Unity game, discovering where your interests lie as well as gaining an understanding of what is required should you reach the point where collaboration becomes appealing.

Will I Have to Learn to Script?

You don't have to be a programmer to make your own game with Unity, but you will need to be able to understand enough of what the scripts do to know what can be tweaked to your advantage or decide if a particular script will suit your needs.

Most game play needs to be scripted in Unity, but there are hundreds of scripts already available that can be readily reused. Unity ships with several of the most useful. More can be found by searching the forum, Wiki, or UnityAnswers. Many forum members will even write bits of script for less adept users. In the Collaboration section of the forum, you can even find scripters looking to trade for art assets. By the end of this book, you should know enough to be able to take advantage of the wealth of material available from the Unity community.

Games, by their very definition, are about interaction; even with games that are largely controlled by physics, logic-driven cause and effect is what differentiates games from linear, plot-driven passive media. Even the most "artist friendly" game engines need scripting to move beyond simple environmental walkthroughs. If you have no previous scripting experience, you will find that this book's aim is to familiarize you with scripting a few lines at a time, while providing visual feedback as often as possible. If you find you enjoy the scripting part of the project, feel free to delve deeper into programming with a more conventional approach.

What About Math?

One of the most common things heard in the game industry by artists and programmers alike is, "If I'd known math was going to be so useful, I would have paid more attention in class." Although it helps to have a good background in math, there are plenty of resources for both code and mathematical functions to help you solve a particular problem. And, as always, there are plenty of people on the Unity Forum and Answers who may be willing to help as long as you can show that you have spent a reasonable amount of time trying to solve it yourself.

Assumptions and Prerequisites

This book assumes that you are new to scripting, 3D and game design, and/or the Unity engine.

What This Book Doesn't Cover

This book is not about conventional game design; it is more of a precursor, getting you into the habit of analyzing needs and weighing choices. Not only is creating a massive design document intimidating when you are the one who will have to implement everything, but it is likely to be unrealistic until you are more familiar with the engine and your own capabilities. More typically, you will find yourself building your game up a little bit at a time, prototyping ideas and functionality as you go along.

This is not a book on how to become a programmer. It uses programming best practices when possible, but the scripting in this book is designed to ease a non-programmer into the process by providing instant visual feedback as often as possible. While there are usually several ways to attain the same goal, the scripting choices made in this book are generally the easiest to read and understand from an artist's or designer's point of view. In this book, scripting is presented in the

way a native speaker learns his own language. He is surrounded by it, immersed in it, and allowed to tinker with it to slowly gain a basic working knowledge of it. Don't worry about remembering it all. Some things you will use throughout the project, and others you will be encouraged to take note of for future reference.

Conventions Used in This Book

1. Instructions look like this.What Is the General Structure of this Book?

> **Tip** Follow this format.

```
Code looks like this
```

Platform

This book was written using Unity 4.5 in a Windows 8 environment. Differences for shortcut keys and operating system file storage with Unity on a Mac are noted throughout the book.