Foreword

Not so long ago developing professional quality games meant licensing an expensive game engine (or writing one yourself) and hiring a small army of developers to use it. Today, game engines like Unity have democratised game development to the point where you can simply download the tools and start making the game of your dreams right away.

Well... kinda.

Having a powerful game creation tool is not the same thing as having the technical knowledge and skills to use it effectively. I've been developing games and game tools professionally for over 13 years. When I took the plunge into learning Unity development, I quickly found that there was a huge amount of online documentation, tutorials and forum answers available for Unity developers. This makes getting started with Unity development very easy. It's fantastic that this information is out there, but it can also be quite fragmented. A lot of the time the piece of the puzzle you are missing is buried 40 minutes into an hour-long tutorial video or on the 15th page of a long forum thread. The hours you spend looking for these nuggets of wisdom are time that would be better spent working on your game.

The beauty of the Unity 5.x Cookbook is that Matt and Chico have done the tedious legwork of finding this information for you and distilled it into a neat collection of easy to follow step-by-step recipes (and provided the scripts and complete working projects for you to download). Unity development covers a vast range of topics, so the authors have sensibly focused on those areas that almost all developers will encounter. If you're serious about developing great games and tools with Unity, then you'll need to master just the kinds of topics you'll find in this book.

Getting started with Unity development is free and easy. When you're ready to take your skills to the next level, this book is an easy and effective way to do it. It covers a great deal in its hundreds of pages, and if you can master even half of what's here you'll be well on the way to becoming a great Unity developer.

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Preface

Game development is a broad and complex task. An interdisciplinary field covering subjects as diverse as Artificial Intelligence, character animation, digital painting, and sound editing. All those areas of knowledge can materialize as the production of hundreds (or thousands!) of multimedia and data assets. A special software application—the game engine—is required to consolidate all of those assets into a single product.

Game engines are specialized pieces of software, which used to belong to an esoteric domain. They were expensive, inflexible, and extremely complicated to use. They were for big studios or hardcore programmers only. Then along came Unity.

Unity represents true democratization of game development. An engine and multimedia editing environment that is user-friendly and versatile. It has free and Pro versions that includes even more features. As we write this preface, Unity offers deployment to:

- **Mobile:** Android, iOS, Windows Phone, and BlackBerry
- **Web:** WebGL
- **Desktop:** PC, Mac, and Linux platforms
- **Console:** PS4, PS3, Xbox One, XBox 360, PlayStation Mobile, PlayStation Vita, and Wii U
- **VR/AR:** Oculus Rift and Gear VR

Today, Unity is used by a diverse community of developers all around the world. Some are students and hobbyists, but many are commercial organizations ranging from garage developers to international studios, using Unity to make a huge number of games—some you might have already played in one platform or another.

This book provides over 100 Unity game development recipes. Some recipes demonstrate Unity application techniques for multimedia features, including working with animations and using preinstalled package systems. Other recipes develop game components with C# scripts, ranging from working with data structures and data file manipulation, to artificial intelligence algorithms for computer controlled characters.

If you want to develop quality games in an organized and straightforward way, and want to learn how to create useful game components and solve common problems, then both Unity and this book are for you.

What this book covers

Chapter 1, *Core UI - Messages, Menus, Scores, and Timers*, is filled with UI (User Interface) recipes to help you increase the entertainment and enjoyment of your games through the quality of the interactive visual elements. You'll learn a wide range of UI techniques, including updatable text and images, directional radars, countdown timers, and custom mouse cursors.

Chapter 2, *Inventory GUIs*, many games involve the player collecting items such as keys to open doors, ammo for weapons, or choosing from a selection of items such as from a collection of spells to cast. The recipes in this chapter offer a range of text and graphical solutions for displaying inventory status to the player, including whether they are carrying an item or not, or the maximum number of items they are able to collect.

Chapter 3, *2D Animation*, Unity 5 includes powerful 2D animation and physics features. In this chapter, we present recipes to help understand the relationships between the different animation elements in Unity, exploring both movement of different parts of the body, and also the use of sprite-sheet images files that contains sequences of sprite frames pictures.

Chapter 4, *Creating Maps and Materials*, contains recipes that will give you a better understanding on how to use maps and materials with Unity 5's new Physically Based Shaders, whether you are a game artist or not. It is a great resource for exercising your image editing skills.

Chapter 5, *Using Cameras*, explains recipes covering techniques for controlling and enhancing your game's camera. This chapter will present interesting solutions to work with both single and multiple cameras.

Chapter 6, *Lights and Effects*, offers a hands-on approach to a number Unity's lighting system features, such as cookie textures, reflection maps, lightmaps, light and reflection probes, and procedural skyboxes. Also, it demonstrates the use of Projectors.

Chapter 7, *Controlling 3D Animations*, focuses on character animation, and demonstrates how to take advantage of Unity's animation system—Mecanim. It covers a range of subjects, from basic character setup to procedural animation and ragdoll physics.

Chapter 8, *Player and Non-Player Character (NPC) gameObject Positions, Orientations, and Movement*, this chapter presents a range of directional recipes for computer-controlled objects and characters, which can lead to games with a richer and more exciting user experience. Examples of recipes include spawn points, checkpoints, waypoints, also making groups of objects flock together and the use of Unity NavMeshes for automated path-finding over terrains and around obstacles.

Chapter 9, *Playing and Manipulating Sounds*, is dedicated to making sound effects and soundtrack music in your game more interesting. The chapter demonstrates how to manipulate sound during runtime through the use of scripts, Reverb Zones, and Unity's new Audio Mixer.

Chapter 10, *Working with External Resource Files and Online Systems*, throws light on how external data can enhance your game in ways, such as adding renewable content and communicating with websites. The chapter also includes recipes on automating your builds with Unity Cloud, and how to structure your projects so they can be easily backed up using online version control systems such as GitHub.

Chapter 11, *Improving Games with Extra Features and Optimization*, provides several recipes with ideas for adding extra features to your game (such as adding slow motion and securing online games). Many other recipes in this chapter provide examples of how to investigate and potentially improve the efficiency and performance of your game's code.

Chapter 12, *Editor Extensions*, provides several recipes for enhancing **design-time** work in the Unity Editor. Editor Extensions are scripting and multimedia components allowing custom text and UI presentation of game parameters, and data in the Inspector and Scene panels, and custom menus and menu items. These can facilitate workflow improvements, thus allowing game developers to achieve their goals quicker and easier.

What you need for this book

All you need is a copy of Unity 5.x, which can be downloaded for free from `http://www.unity3d.com`.

If you wish to create your own image files for the recipes in *Chapter 4*, *Creating Maps and Materials*, you will also need an image editor such as Adobe Photoshop (which can be found at `http://www.photoshop.com`) or GIMP, which is free and can be found at `http://www.gimp.org`.

Who this book is for

This book is for anyone who wants to explore a wide range of Unity scripting and multimedia features and find ready-to-use solutions for many game features. Programmers can explore multimedia features, and multimedia developers can try their hand at scripting.

From intermediate to advanced users, from artists to coders, this book is for you and everyone on your team!

Intended for everyone who has the basics of using Unity, and a little programming knowledge in C#.

Sections

In this book, you will find several headings that appear frequently (Getting ready, How to do it, How it works, There's more, and See also).

To give clear instructions on how to complete a recipe, we use these sections as follows:

Getting ready

This section tells you what to expect in the recipe, and describes how to set up any software or any preliminary settings required for the recipe.

How to do it…

This section contains the steps required to follow the recipe.

How it works…

This section usually consists of a detailed explanation of what happened in the previous section.

There's more…

This section consists of additional information about the recipe in order to make the reader more knowledgeable about the recipe.

See also

This section provides helpful links to other useful information for the recipe.

Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, folder names, filenames, file extensions, pathnames, and user input are shown as follows: "Import the `externalTexture.jpg` file and place it into the `Resources` folder."

URLs are shown as follows: `www.packtpub.com`

A block of code is set as follows:

```
private void ChangeMaterial(){
   materialIndex++;
   materialIndex = (materialIndex % materialArray.Length);
   Material nextMaterial = materialArray[materialIndex];
```

```
        renderer.sharedMaterial = nextMaterial;
    }
```

New terms and **important words** are shown in bold. Words that you see on the screen, for example, in menus or dialog boxes, appear in the text like this: "Clicking the **Next** button moves you to the next screen."

> Warnings or important notes appear in a box like this.

Tips and tricks appear like this.

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Now that you are the proud owner of a Packt book, we have a number of things to help you to get the most from your purchase.

Downloading the example codes and color images

All the files you need to complete the recipes in the book can be downloaded from: `https://github.com/dr-matt-smith/unity-5-cookbook-codes`.

The downloadable codes are fully commented, and completed Unity projects for each recipe are also provided. In addition you'll also find a folder containing the color images for each chapter in this repository.

Errata

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