



Community Experience Distilled

Blueprints Visual Scripting for Unreal Engine

Build professional 3D games with Unreal Engine 4's Visual Scripting system

Brenden Sewell

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Brenden Sewell

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Faris Ansari

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Cover Work

Aparna Bhagat

About the Author

Brenden Sewell is a lead game designer at E-Line Media, and has spent the last 5 years designing and creating games that are both fun to play and have educational or social impact. He has been building games since 2002, when *Neverwinter Nights* taught him an invaluable lesson about the expressive power of game design. In 2010, he graduated with a degree in cognitive science from Indiana University. Since then, he has focused on enhancing his own craft of game design while harnessing its power to do good in the world, and exposing more people to the joy the profession holds.

I would like to thank the following people for contributing to this book and making it a reality: Steve Swink (@steveswink), Jake Martin, Demetrius Comes, and Graeme Bayless for providing me the right mentorship to elevate me in my design practice; Logan Barnett (@logan_barnett) and David Koontz (@dkoontz) for pushing my knowledge of scripting to become a more versatile developer; the Packt Publishing staff and my technical reviewers for helping me to make this book a reality; the Unreal development community for being supportive and informative as we all endeavor to master this technology together; and my supremely supportive girlfriend Michelle, my parents who made this all possible, and all of my incredible friends for enriching my life.

About the Reviewers

Faris Ansari is an IT professional from Pakistan, who has skills and interest in Unity 3D, Unreal Engine, Cocos2d, the Allegro library, OpenGL, and other game development environments. He started his career as a game developer and worked on successful games that generated huge revenues. He also possesses the skills required for, and takes on new challenges while, working on new technologies, especially open source technologies.

Faris has reviewed the book *Learning NGUI for Unity*.

His hobbies consist of playing games, learning new things, and watching movies. He is very interested in working with fellow coworkers and friends on innovative ideas. His favorite saying is, "Every professional was once a beginner."

Feel free to contact him and discuss something innovative. He can be reached on LinkedIn at <https://www.linkedin.com/in/farisansari>.

I would like to thank my friends and family for their continuous support and help.

Scott Hafner is a professional game designer with over 10 years of experience in the video game industry. Over the course of his career, he has worked as a producer, game designer, and level designer on a range of platforms and genres, including MMOs, third-person shooters, and RPGs.

I would like to thank my fiancé for her continued encouragement and support in all that I do!

Marcin Kamiński is working for CTAdventure as a senior programmer and has his own company, Digital Hussars. Previously, he worked for Artifex Mundi, CI Game, and Vivid Games. His main fields of expertise are artificial intelligence and network programming. For 14 years, he has helped develop great games for PCs, consoles, and mobiles.

Marcin was also a reviewer of the books *Unity iOS Essentials* and *Unity 2D Game Development Cookbook*.

Alankar Pradhan hails from Mumbai, Maharashtra. He did his schooling from I.E.S.'s CPV High School. He is an ambitious person who loves interacting with new people, dancing, kickboxing, traveling, spending leisure time with friends, and playing games on PCs and mobiles. Games have always been a passion in his life. More than just playing games, how things worked was his main curiosity. Hence, he decided to pursue his career in this. Alankar completed his BSc honors in software development from Sheffield Hallam University, UK. He has done his master's in video game programming and management (video game director; BAC+5 equivalent) from DSK Supinfogame, where he undertook industry-oriented projects to increase his skill sets and gave his best to do so. Alankar worked as a game programming intern at Walt Disney, India. During his internship, he was working on a live project called *Hitout Heroes*. His name was added to the credits due to his noticeable work accomplished. He also interned as a game programmer with DSK Green Ice Games, and then went on to work as a video game programmer on a game targeted at PCs and consoles. This game, *Death God University (D.G.U)*, was released on July 1, 2015. Another project he is working on is *The Forsaken Mountains*.

Alankar has worked on many small projects in teams as well as individually to sharpen his own skills in various languages, such as C#, C++, Java, Unreal scripting, Python, Lua, Groovy/Grails, HTML5/CSS and so on. He is familiar with engines such as Unity3D, Unreal Development Kit, and Visual Studio and SDKs such as NetBeans, Eclipse, and Wintermute. In 2013, his dissertation work on *Comparison between Python and Lua in Gaming Industry* got published as a book. He has worked with Packt Publishing previously as a technical reviewer of *Creating E-Learning Games With Unity* and *Learning Unreal Engine iOS Game Development*.

Other than this, Alankar likes to read, listen to music, and write poems and short stories at times. He has his own website at <http://alan.poetrycraze.com>, where he posts his poems. He has also published a book, *The Art Of Lost Words*, which is available on Amazon.com.

His e-mail ID is alankar.pradhan@gmail.com. You can visit his portfolio site at alankarpradhan.wix.com/my-portfolio or contact him on Facebook at www.facebook.com/alankar.pradhan.

We are so often caught up in our aim that we forget to appreciate the journey, especially the people we meet on the way. Appreciation is a wonderful feeling, and it's way better if we don't overlook it. I hereby like to take this opportunity to acknowledge the people who directed me and inspired me in this initiative.

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Matt Sutherlin has been working in the games industry over the last decade, where he's served roles ranging from a QA and scripter to an engine programmer and a technical artist. Most recently, he has had a strong focus on graphics technology, working on engine renderers, art pipelines, and shaders for AAA titles such as *Heroes of the Storm* and *Halo 5: Guardians*.

I would like to thank my wife, Megan, and parents, Mike and Mary Lynn, for years of support, patience, and understanding; I wouldn't be where I am without you. I'd also like to thank Alan Wolfe for being an unending stream of cool programming tricks and insightful algorithms and for generally being a really great friend.

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Preface

Game engines, such as Unreal Engine 4—as the tools that power the creation of the commercial games we love to play—are becoming increasingly accessible to both experienced and novice game developers outside of the traditional studio environment. Previous versions of Unreal Engine have powered many of the most popular console and PC games released over the last decade, and the newest version contains the tools for funneling this power into the hands of as many aspiring developers as possible. The most transformative of these tools is the Blueprints Visual Scripting system, which allows people who are not full-time programmers to create and implement the mechanics, interfaces, and interactions of a game.

Taking a step-by-step approach, this book will guide you through the process of using the visual nodes that make up Blueprint behavior, and link them together to create game mechanics, user interfaces, and more. In this process, you will be learning all the skills you need to get started with developing games in Unreal Engine 4 using Blueprints.

Starting with a basic first-person shooter template, each chapter will extend the prototype to create an increasingly complex and robust game experience. You will progress from creating basic shooting mechanics to gradually more complex systems that will generate user interface elements and intelligent enemy behavior. By focusing on universally applicable skills, the expertise you will develop in utilizing Blueprints can translate to other types of genres. By the time you finish this book, you will have a fully functional first-person shooter and the skills necessary to expand on the game to develop an entertaining, memorable experience for your players.

What this book covers

Chapter 1, Object Interaction with Blueprints, begins the book by covering how to bring new objects into a level to help build the world in which the game will be set. We move on to manipulating materials on objects, first through the object editor, and then by triggering during runtime via Blueprints.

Chapter 2, Enhancing Player Abilities, teaches you how to use Blueprints to generate new objects during gameplay, and link actions in Blueprints to player control inputs. You also learn to create Blueprints that allow objects to react to collisions with our generated projectiles.

Chapter 3, Creating Screen UI Elements, demonstrates setting up a Graphical User Interface (GUI) that will track the player's health, stamina, ammo, and current objective. Here, you learn how to set up a basic user interface using Unreal's GUI editor and how to use Blueprints to link the interface to the gameplay values.

Chapter 4, Creating Constraints and Gameplay Objectives, covers how to constrain the player's abilities, define the gameplay objectives for a level, and track those objectives via Blueprints that interact with the GUI elements created in the previous chapter. We walk through setting up collectible ammo packs that will refill the ammo of the player's gun, as well as utilizing the level Blueprint to define a win condition for our game.

Chapter 5, Making Moving Enemies with AI, is a crucial chapter that covers how to create an enemy zombie AI that will pursue the player around the level. We walk through setting up a navigation mesh on our level, and see how to use Blueprints to get enemies to traverse between patrol points.

Chapter 6, Upgrading the AI Enemies, shows how to create a compelling experience by modifying the zombie AI to have states in order to give the zombies a little more intelligence. In this chapter, we set up the patrol, searching, and attack states for the zombies using visual and auditory detection. Additionally, we explore how to make new enemies appear gradually, as the game is playing.

Chapter 7, Tracking Game States and Applying Finishing Touches, adds the finishing touches necessary to make our game a complete experience, before we finalize our game for release. In this chapter, we create rounds that will make the game increasingly difficult, game saves so that the player can save their progress and return, and player death to make the game's challenge meaningful.

Chapter 8, Building and Publishing, covers how to optimize graphics settings to get our game performing and looking at its best. Then, we explain how to create a shorable build of the game, and share some advice on how to continue progressing past the confines of this book on your way to becoming an accomplished game developer!

What you need for this book

This book is an Unreal Engine 4-focused title, which means you only need a copy of Unreal Engine to get started. Unreal Engine 4 can be downloaded for free from <https://www.unrealengine.com/>, and comes with everything you need to follow along with the book. This book was made using version 4.7.6 of Unreal Engine 4, and as such, it does not account for features added or removed in subsequent versions of the software.

Who this book is for


Whether you are brand new to game development or just unexposed to Unreal Engine 4's Blueprint Visual Scripting system, this is a great place to start learning how to build complex game mechanics quickly and easily without writing any text code. No programming experience required!


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, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "I named the project `BlueprintScripting` and stored it in the default `Unreal Projects` folder for OS X."

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: "Now click on the **Library** tab, find the yellow **Install** button (as seen in the following screenshot), and click on it."

[ Warnings or important notes appear in a box like this.]

[ Tips and tricks appear like this.]

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