

Unity Graphics Engine

Meet the Kinect introduces the exciting world of volumetric computing using the Microsoft Kinect. You'll learn to write scripts and software enabling the use of the Kinect as an input device. Interact directly with your computer through physical motion. The Kinect will read and track body movements, and is the bridge between the physical reality in which you exist and the virtual world created by your software. Microsoft's Kinect was released in fall 2010 to become the fastest-selling electronic device ever. For the first time, we have an inexpensive, three-dimensional sensor enabling direct interaction between human and computer, between the physical world and the virtual. The Kinect has been enthusiastically adopted by a growing culture of enthusiasts, who put it to work in creating technology-based art projects, three-dimensional scanners, adaptive devices for sight-impaired individuals, new ways of interacting with PCs, and even profitable business opportunities. Meet the Kinect is the resource to get you started in mastering the Kinect and the exciting possibilities it brings. You'll learn about the Kinect hardware and what it can do. You'll install drivers and learn to download and run the growing amount of Kinect software freely available on the Internet. From there, you'll move into writing code using some of the more popular frameworks and APIs, including the official Microsoft API and the language known as Processing that is popular in the art and creative world. Along the way, you'll learn principles and terminology. Volumetric computing didn't begin with the Kinect. The field is decades old—if you've ever had an MRI, for example, you have benefitted from volumetric computing technology. Meet the Kinect goes beyond just the one device to impart the principles and terminology underlying the exciting field of volumetric computing that is now wide-open and accessible to the average person. Explore every nook and cranny of Unity 5 to turn your imaginations into reality

About This Book* Demystify the C# programming language in Unity 5.x.* Unleash the power of Unity to create a wide variety of projects in numerous genres and formats.* Master the art of optimization for Unity 5.x applications with tips and techniques that will further enhance your game.

Who This Book Is For Beginner level Unity developers who do not have much programming experience.

What You Will Learn* Master the art of applying C# in Unity. Get to know about techniques to turn your game idea into working project.* Use loops and collections efficiently in Unity to reduce the amount of code.* Create and code a good-looking functional UI system for your game.* Find out how to create exciting and interactive games using GUIs.* Work with different animation assets and components to enhance your game further.* Personalize your game by learning how to use Unity's advanced animation system.* Create, visualize, and edit animated creatures to add to your already amazing game.* Familiarize yourself with the tools and practices of game development Discover how to create the Game Manager class to, generate game levels, and develop UI for the game.* Use the Unity Profiler to find bottlenecks anywhere in your application, and discover how to resolve them.* Implement best practices for C# scripting to avoid common mistakes

In Detail Unity is a cross-platform game engine that is used to develop 2D and 3D video games. Unity 5 is the latest version, and adds a real-time global illumination to the games; and its powerful new features help to improve a game's efficiency. If you love games and want to learn how to make them but have no idea where to begin, then this course is built just for you. This learning path is divided into three modules which will take you in this incredible journey of creating games. The course begins with getting you started with programming behaviors in C# so that you can create 2D games in Unity. You will begin by installing Unity and learning about its features. You will learn how to perform object-oriented programming and discover how to manage the game play loop, generate game levels, and develop a simple UI for the game. By the time this module comes to a close, you will have mastered the art of applying C# in Unity. It is now time we

put into use what we learned in the previous module into reality as we move onto the second module. Here, we will be building 7-8 action-packed games of different difficulty levels. Each project will focus on key Unity features as well as game strategy development. This module will mark your transformation from an application developer to a full-fledged Unity game developer. Who wouldn't love a game that is fully perfect, functional, and without any glitches? The third module deals with just that by teaching how to enhance your game by learning game optimization skills. Here, you'll gain an understanding of possible solutions to any problem and how to implement them. You will then learn everything you need to know about where performance bottlenecks can be found, why they happen, and how to work around them. With this massive wealth of knowledge, at the end of this learning path, you will be able to leverage an array of game development techniques to create your own basic games while resolving any issues that you encounter. Style and approach This learning path should be treated as the complete package necessary for building games. It is a step-by-step guide to develop a game from scratch by applying the fundamentals of C# and Unity scripting, with a reference guide in the end to solve all your gaming problems.

Videogames were once made with a vast range of tools and technologies, but in recent years a small number of commercially available 'game engines' have reached an unprecedented level of dominance in the global videogame industry. In particular, the Unity game engine has penetrated all scales of videogame development, from the large studio to the hobbyist bedroom, such that over half of all new videogames are reportedly being made with Unity. This book provides an urgently needed critical analysis of Unity as 'cultural software' that facilitates particular production workflows, design methodologies, and software literacies. Building on long-standing methods in media and cultural studies, and drawing on interviews with a range of videogame developers, Benjamin Nicoll and Brendan Keogh argue that Unity deploys a discourse of democratization to draw users into its 'circuits of cultural software'. For scholars of media production, software culture, and platform studies, this book provides a framework and language to better articulate the increasingly dominant role of software tools in cultural production. For videogame developers, educators, and students, it provides critical and historical grounding for a tool that is widely used yet rarely analysed from a cultural angle.

Designed for beginners with no knowledge or experience in game development or programming, this book teaches the essentials of the Unity game engine, the C# programming language, and the art of object-oriented programming. New concepts are not only explained, but thoroughly demonstrated. Starting with an introduction to Unity, you'll learn about scenes, GameObjects, prefabs, components, and how to use the various windows to interact with the engine. You'll then dive into the fundamentals of programming by reviewing syntax rules, formatting, methods, variables, objects and types, classes, and inheritance, all while getting your hands dirty writing and testing code yourself. Later, the book explains how to expose script data in the Inspector and the basics of Unity's serialization system. This carefully crafted work guides you through the planning and development of bare bones, simple game projects designed to exercise programming concepts while keeping less relevant interruptions out of the way, allowing you to focus on the implementation of game mechanics first and foremost. Through these example projects, the book teaches input handling, rigidbodies, colliders, cameras, prefab instantiation, scene loading, user interface design and coding, and more. By the end, you'll have built a solid foundation in programming that will pave your way forward in understanding core C# syntax and fundamentals of object-oriented programming—not just what to type but why it's typed and what it's really doing. Game Programming with Unity and C# will send you on your way to becoming comfortable with the Unity game engine and its documentation and how to independently seek further information on yet-untouched concepts and challenges. What You'll Learn Understand the fundamentals of object-oriented computer programming, including topics specifically relevant for games. Leverage beginner-

to-intermediate-level skills of the C# programming language and its syntax. Review all major component types of the Unity game engine: colliders and rigidbodies, lights, cameras, scripts, etc. Use essential knowledge of the Unity game engine and its features to balance gameplay mechanics for making interesting experiences. Who This Book Is For Beginners who have no prior experience in programming or game development who would like to learn with a solid foundation that prepares them to further develop their skills.

Master performance optimization for Unity3D applications with tips and techniques that cover every aspect of the Unity3D Engine About This Book Optimize CPU cycles, memory usage, and GPU throughput for any Unity3D application Master optimization techniques across all Unity Engine features including Scripting, Asset Management, Physics, Graphics Features, and Shaders A practical guide to exploring Unity Engine's many performance-enhancing methods Who This Book Is For This book is intended for intermediate and advanced Unity developers who have experience with most of Unity's feature-set, and who want to maximize the performance of their game. Familiarity with the C# language will be needed. What You Will Learn Use the Unity Profiler to find bottlenecks anywhere in our application, and discover how to resolve them Implement best-practices for C# scripting to avoid common pitfalls Develop a solid understanding of the rendering pipeline, and maximize its performance through reducing draw calls and avoiding fill rate bottlenecks Enhance shaders in a way that is accessible to most developers, optimizing them through subtle yet effective performance tweaks Keep our scenes as dynamic as possible by making the most of the Physics engine Organize, filter, and compress our art assets to maximize performance while maintaining high quality Pull back the veil on the Mono Framework and the C# Language to implement low-level enhancements that maximize memory usage and avoid garbage collection Get to know the best practices for project organization to save time through an improved workflow In Detail Competition within the gaming industry has become significantly fiercer in recent years with the adoption of game development frameworks such as Unity3D. Through its massive feature-set and ease-of-use, Unity helps put some of the best processing and rendering technology in the hands of hobbyists and professionals alike. This has led to an enormous explosion of talent, which has made it critical to ensure our games stand out from the crowd through a high level of quality. A good user experience is essential to create a solid product that our users will enjoy for many years to come. Nothing turns gamers away from a game faster than a poor user-experience. Input latency, slow rendering, broken physics, stutters, freezes, and crashes are among a gamer's worst nightmares and it's up to us as game developers to ensure this never happens. High performance does not need to be limited to games with the biggest teams and budgets. Initially, you will explore the major features of the Unity3D Engine from top to bottom, investigating a multitude of ways we can improve application performance starting with the detection and analysis of bottlenecks. You'll then gain an understanding of possible solutions and how to implement them. You will then learn everything you need to know about where performance bottlenecks can be found, why they happen, and how to work around them. This book gathers a massive wealth of knowledge together in one place, saving many hours of research and can be used as a quick reference to solve specific issues that arise during product development. Style and approach This book is organized based on the major features of Unity engine and should be treated as a reference guide. It is written as a series of investigations into both common and unusual performance pitfalls, each including a study on why the bottleneck is causing us problems, and a list of enhancements or features that can be used to work around them. Differences in effectiveness, behaviors, or feature-sets between Unity 4.x and Unity 5.x will be highlighted.

Master game design and digital art principles simultaneously with this all-in-one guide to creating games in the cutting-edge game engine Unity 5. Bursting with images and tutorials, Penny de Byl's Holistic Game Development with Unity will help the reader gain the multidisciplinary skills needed to succeed in the independent game industry. Holistic Game Development includes new coverage on

Augmented Reality, Networking and Virtual Reality such as the Oculus Rift. Supplementary material, including instructional videos, discussion forms and art assets are provided in the companion website located at www.holistic3d.com. Learn to combine the beauty of art and the functionality of programming in de Byl's second edition for Unity game development. Key Features Art and programming in unison-the only one-stop shop for individual developers and small teams looking to tackle both tasks. Proven step-by-step tutorials show you how to design and structure an entire game in Unity with art assets. Revised to cover the Unity 5 game engine. New coverage of Augmented Reality, Networking, and Virtual Reality. An introduction to essential two- and three-dimensional mathematical and physics concepts. A portfolio of royalty free reusable game mechanics. Revamped and expanded accompanying web site, www.holistic3d.com, features project source code, instructional videos, art assets, author blog, and discussion forums. Additional challenge questions and lesson plans are available online for an enhanced learning experience.

Get ahead of the game with Unity 4. The Unity engine is the tool of choice for many indie and AAA game developers. Unity 4 Fundamentals gives readers a head start on the road to game development by offering beginners a comprehensive, step by step introduction to the latest Unity 4 engine. The author takes a theory-to-practice approach to demonstrate what Unity 4 has to offer which includes: Asset management tools Real-time lighting and lightmapping Particle systems Navigation and pathfinding

An example-based practical guide to get you up and running with Unity 5.x About This Book The most updated resource on Unity 5.x with comprehensive discussion on all the new features of Unity 5.x Understand the core concepts surrounding Unity5 game development with this power-packed hands-on guide Brush up your existing game development skills and create games that have a brilliant gameplay using the excellent examples from this book Who This Book Is For The ideal target audience for this book would be game developers. They need not have previous experience with Unity since this book will cover all the basics about game development with unity. This would also be a very good resource for Unity developers who want to brush up their basic Unity skills and also get up and running with creating interesting games with Unity 5.x. What You Will Learn Understand core Unity concepts, such as game objects, components, and scenes Learn level design techniques for building immersive and interesting worlds Learn to make functional games with C# scripting Use the toolset creatively to build games of different themes and styles Learn to handle player controls and input functionality Dive into the process of working with terrains and world-creation tools Import custom content into Unity from third-party tools, such as Maya and Blender Get to grips with making both 2D and 3D games In Detail Unity is an exciting and popular engine in the game industry. Throughout this book, you'll learn how to use Unity by making four fun game projects, from shooters and platformers to exploration and adventure games. Unity 5 By Example is an easy-to-follow guide for quickly learning how to use Unity in practical context, step by step, by making real-world game projects. Even if you have no previous experience of Unity, this book will help you understand the toolset in depth. You'll learn how to create a time-critical collection game, a twin-stick space shooter, a platformer, and an action-fest game with intelligent enemies. In clear and accessible prose, this book will present you with step-by-step tutorials for making four interesting games in Unity 5 and explain all the fundamental concepts along the way. Starting from the ground up and moving toward an intermediate level, this book will help you establish a strong foundation in making games with Unity 5. Style and approach This book would be a very unique resource for any game developer who wants to get up and running with Unity. The unique example based approach will take you through the most basic games towards the more complex ones and will gradually build your skill level.

Explore the latest features of Unity 2018 to create immersive VR projects for Oculus Rift, HTC Vive, Daydream and Gear VR Key Features A project-based guide to teach you how to develop immersive and fun VR applications using Unity 3D Build experiences with interactable objects, physics, UI, animations, C# scripting, and other Unity features Explore the world of VR by building experiences such as diorama, first-person characters, 360-degree projections, social VR, audio fireball game, and VR storytelling Book Description Unity has become the leading platform for building virtual reality games, applications, and experiences for this new generation of consumer VR devices. Unity Virtual Reality Projects walks you through a series of hands-on tutorials and in-depth discussions on using the Unity game engine to develop VR applications. With its practical and project-based approach, this book will get you up to speed with the specifics of VR development in Unity. You will learn how to use Unity to develop VR applications that can be experienced with devices such as Oculus, Daydream, and Vive. Among the many topics and projects, you will explore gaze-based versus hand-controller input, world space UI canvases, locomotion and teleportation, software design patterns, 360-degree media, timeline animation, and multiplayer networking. You will learn about the Unity 3D game engine via the interactive Unity Editor, and you will also learn about C# programming. By the end of the book, you will be fully equipped to develop rich, interactive VR experiences using Unity. What you will learn Create 3D scenes with Unity and other 3D tools while learning about world space and scale Build and run VR applications for specific headsets, including Oculus, Vive, and Daydream Interact with virtual objects using eye gaze, hand controllers, and user input events Move around your VR scenes using locomotion and teleportation Implement an audio fireball game using physics and particle systems Implement an art gallery tour with teleportation and data info Design and build a VR storytelling animation with a soundtrack and timelines Create social VR experiences with Unity networking Who this book is for If you're a non-programmer unfamiliar with 3D computer graphics, or experienced in both but new to virtual reality, and are interested in building your own VR games or applications, then this book is for you. Any experience in Unity is an advantage. Master game design and digital art principles simultaneously with this all-in-one guide to creating games in the cutting-edge game engine Unity. Reworked for C# and Unity 2018 & 2019, and bursting with images and tutorials, Penny de Byl's Holistic Game Development with Unity will help the reader gain the multidisciplinary skills needed to succeed in the independent game industry. Holistic Game Development with Unity includes new coverage on Augmented Reality, Networking, and Virtual Reality such as the Oculus Rift. Supplementary material, including instructional videos, discussion forums and art assets are provided in the companion website located at www.holistic3d.com. Learn to combine the beauty of art and the functionality of programming in de Byl's third edition for Unity game development. Key features: Art and programming in Unity, the only one-stop shop for individual developers and small teams looking to

tackle both tasks. Proven step-by-step tutorials show you how to design and structure an entire game in Unity with art assets. Revised to cover the Unity game engine versions 2018 and 2019. New coverage of Nav Meshes, Augmented Reality, Mobile Builds and Mecanim. An introduction to essential two- and three-dimensional mathematical and physics concepts. A portfolio of royalty free reusable game mechanics. Revamped and expanded accompanying website, www.holistic3d.com, features project source code, instructional videos, art assets, author blog, and discussion forums. Additional challenge questions and lesson plans are available online for an enhanced learning experience.

If you don't know anything about programming in general, writing code, writing scripts, or have no idea where to even begin, then this book is perfect for you. If you want to make games and need to learn how to write C# scripts or code, then this book is ideal for you. Unity is a cross-platform development platform initially created for developing games but is now used for a wide range of things such as: architecture, art, children's apps, information management, education, entertainment, marketing, medical, military, physical installations, simulations, training, and many more. Unity takes a lot of the complexities of developing games and similar interactive experiences and looks after them behind the scenes so people can get on with designing and developing their games. These complexities include graphics rendering, world physics and compiling. More advanced users can interact and adapt them as needed but for beginners they need not worry about it. Games in Unity are developed in two halves; the first half -within the Unity editor, and the second half -using code, specifically C#. Unity is bundled with MonoDeveloper Visual Studio 2015 Community for writing C#.

Learn how to build a complete 3D game using the industry-leading Unity game development engine and Blender, the graphics software that gives life to your ideas About This Book Learn the fundamentals of two powerful tools and put the concepts into practice Find out how to design and build all the core elements required for a great game - from characters to environments, to props— Learn how to integrate Artificial Intelligence (AI) into your game for sophisticated and engaging gameplay Who This Book Is For This book has been created for anyone who wants to learn how to develop their own game using Blender and Unity, both of which are freely available, yet very popular and powerful, tools. Not only will you be able to master the tools, but you will also learn the entire process of creating a game from the ground up. What You Will Learn Design and create a game concept that will determine how your game will look and how it will be played Construct 3D models of your game characters and create animations for them before importing them into the game Build the game environment from scratch by constructing the terrain and props, and eventually put it all together to form a scene Import and integrate game assets created in Blender into Unity—for example, setting up textures, materials, animation states, and prefabs Develop game structures including a game flow, user interface diagram, game logic, and a state machine Make the game characters move around and perform certain actions either through player inputs or fully

controlled by artificial intelligence Create particles and visual effects to enhance the overall visual aesthetic Deploy the game for various types of platforms In Detail In the wake of the indie game development scene, game development tools are no longer luxury items costing up to millions of dollars but are now affordable by smaller teams or even individual developers. Among these cutting-edge applications, Blender and Unity stand out from the crowd as a powerful combination that allows small-to-no budget indie developers or hobbyists alike to develop games that they have always dreamt of creating. Starting from the beginning, this book will cover designing the game concept, constructing the gameplay, creating the characters and environment, implementing game logic and basic artificial intelligence, and finally deploying the game for others to play. By sequentially working through the steps in each chapter, you will quickly master the skills required to develop your dream game from scratch. Style and approach A step-by-step approach with tons of screenshots and sample code for readers to follow and learn from. Each topic is explained sequentially and placed in context so that readers can get a better understanding of every step in the process of creating a fully functional game. Develop your first interactive 2D platformer game by learning the fundamentals of C# About This Book- Get to grips with the fundamentals of scripting in C# with Unity- Create an awesome, 2D platformer game from scratch using the principles of object-oriented programming and coding in C#- This is a step-by-step guide to learn the fundamentals of C# scripting to develop GameObjects and master the basics of the new UI system in Unity Who This Book Is For The book is targeted at beginner level Unity developers with no programming experience. If you are a Unity developer and you wish to learn how to write C# scripts and code by creating games, then this book is for you. What You Will Learn- Understand the fundamentals of variables, methods, and code syntax in C#- Get to know about techniques to turn your game idea into working project- Use loops and collections efficiently in Unity to reduce the amount of code- Develop a game using the object-oriented programming principles- Generate infinite levels for your game- Create and code a good-looking functional UI system for your game- Publish and share your game with users In Detail Unity is a cross-platform game engine that is used to develop 2D and 3D video games. Unity 5 is the latest version, released in March 2015, and adds a real-time global illumination to the games, and its powerful new features help to improve a game's efficiency. This book will get you started with programming behaviors in C# so you can create 2D games in Unity. You will begin by installing Unity and learning about its features, followed by creating a C# script. We will then deal with topics such as unity scripting for you to understand how codes work so you can create and use C# variables and methods. Moving forward, you will find out how to create, store, and retrieve data from collection of objects. You will also develop an understanding of loops and their use, and you'll perform object-oriented programming. This will help you to turn your idea into a ready-to-code project and set up a Unity project for production. Finally, you will discover how to create the GameManager class to

manage the game play loop, generate game levels, and develop a simple UI for the game. By the end of this book, you will have mastered the art of applying C# in Unity. Style and approach This is a step-by-step guide to developing a game from scratch by applying the fundamentals of C# and Unity scripting.

Build exciting AR applications on mobile and wearable devices with Unity 3D, Vuforia, ARToolKit, Microsoft Mixed Reality HoloLens, Apple ARKit, and Google ARCore About This Book Create unique AR applications from scratch, from beginning to end, with step-by-step tutorials Use Unity 3D to efficiently create AR apps for Android, iOS, and Windows platforms Use Vuforia, ARToolKit, Windows Mixed Reality, and Apple ARKit to build AR projects for a variety of markets Learn best practices in AR user experience, software design patterns, and 3D graphics Who This Book Is For The ideal target audience for this book is developers who have some experience in mobile development, either Android or iOS. Some broad web development experience would also be beneficial. What You Will Learn Build Augmented Reality applications through a step-by-step, tutorial-style project approach Use the Unity 3D game engine with the Vuforia AR platform, open source ARToolKit, Microsoft's Mixed Reality Toolkit, Apple ARKit, and Google ARCore, via the C# programming language Implement practical demo applications of AR including education, games, business marketing, and industrial training Employ a variety of AR recognition modes, including target images, markers, objects, and spatial mapping Target a variety of AR devices including phones, tablets, and wearable smartglasses, for Android, iOS, and Windows HoloLens Develop expertise with Unity 3D graphics, UIs, physics, and event systems Explore and utilize AR best practices and software design patterns In Detail Augmented Reality brings with it a set of challenges that are unseen and unheard of for traditional web and mobile developers. This book is your gateway to Augmented Reality development—not a theoretical showpiece for your bookshelf, but a handbook you will keep by your desk while coding and architecting your first AR app and for years to come. The book opens with an introduction to Augmented Reality, including markets, technologies, and development tools. You will begin by setting up your development machine for Android, iOS, and Windows development, learning the basics of using Unity and the Vuforia AR platform as well as the open source ARToolKit and Microsoft Mixed Reality Toolkit. You will also receive an introduction to Apple's ARKit and Google's ARCore! You will then focus on building AR applications, exploring a variety of recognition targeting methods. You will go through multiple complete projects illustrating key market sectors including business marketing, education, industrial training, and gaming. By the end of the book, you will have gained the necessary knowledge to make quality content appropriate for a range of AR devices, platforms, and intended uses. Style and approach This book adopts a practical, step-by-step, tutorial-style approach. The design principles and methodology will be explained by creating different modules of the AR app.

Nowadays, online gaming has become a multi-billion-dollar industry, but in the past, it took a lot of time and manpower to develop an MMOG (massively multiplayer online game). This is because MMOG is a very complex system, and the development of a fastpaced online action game requires further technical considerations. After reading books and tutorials related to online game design, many readers are still unable to develop a multiplayer online game because the current books on the market are all focused on the technical discussion, but lack a complete and coherent example. This book adopts a new way to explore this complex topic; that is, a working online game example is focused and comes with programming details to verify the theoretical discussion. The reason why it can be presented in this way is based on my work over a decade as both a professional game developer and a lecturer of multimedia and game development at several universities in Taiwan. Over the years, our team has accumulated experience and achievements in making online games, and obtained good results in related online game-design competitions. This book aims to share our experience with anyone interesting in making MMOGs. If you have some experience in any programming language and want to know how to implement a massively multiplayer online game, this book is perfect for you. In the first part of this book, the essentials of the C# programming language, which is currently the main script language of the Unity game engine, is covered, followed by exploring the C# Object-Oriented Programming techniques required in the later chapters. After you become familiar with programming in C#, further examples are provided in the rest of this book to guide you to build and host an MMOG. If you are an experienced Unity game developer who is interesting in MMOG development, this book is also useful. C# network and multithreaded programming are introduced in the second part to help the readers understanding the fundamentals in the network library, like the UNet or Mirror used in this book. Also, a dedicated chapter for mobile online game development covers the details of porting your MMOG to the largest gaming platform. Through the provided working examples, you'll not only understand the details in implementing an MMOG but also can apply the techniques presented in this book to the other networking libraries or game engines.

Harness the power of procedural content generation to design unique games with Unity About This Book Learn the basics of PCG development Develop a 2D game from start to finish Explore all the different ways PCG can be applied in games Who This Book Is For This book is for Unity game developers, especially those who work on indie games. You should be familiar with Unity and C# scripting but you'll be able to jump in and start learning PCG straightaway. What You Will Learn Understand the theory of Procedural Content Generation Learn the uses of Pseudo Random Numbers Create reusable algorithm designs for PCG Evaluate the data structures for PCG Develop smaller games with larger amounts of content Generate content instead of spending time designing every minute detail Learn when and how to add PCG to your game Learn the fundamental techniques of PCG In Detail Procedural Content Generation is a process by which

game content is developed using computer algorithms, rather than through the manual efforts of game developers. This book teaches readers how to develop algorithms for procedural generation that they can use in their own games. These concepts are put into practice using C# and Unity is used as the game development engine. This book provides the fundamentals of learning and continued learning using PCG. You'll discover the theory of PCG and the mighty Pseudo Random Number Generator. Random numbers such as die rolls and card drafting provide the chance factor that makes games fun and supplies spontaneity. This book also takes you through the full development of a 2D game. Starting with level generation, you'll learn how PCG can make the game environment for you. You'll move into item generation and learn the different techniques to procedurally create game items. Thereafter, you'll be guided through the more abstract PCG areas such as scaling difficulty to the player and even generating music! The book helps you set up systems within your games where algorithms create computationally generated levels, art assets, quests, stories, characters, and weapons; these can substantially reduce the burden of manually creating every aspect of the game. Finally, you'll get to try out your new PCG skills on 3D terrain generation. Style and approach An easy-to-follow, project-based guide that will let you build a complete game by the end of the book using PCG.

Explore the world of augmented reality development with the latest features of Unity and step-by-step tutorial-style examples with easy-to-understand explanations

Key Features: Build functional and interactive augmented reality applications using the Unity 3D game engine Learn to use Unity's XR and AR components, including AR Foundation and other standard Unity features Implement common AR application user experiences needed to build engaging applications

Book Description: Augmented reality applications allow people to interact meaningfully with the real world through digitally enhanced content. The book starts by helping you set up for AR development, installing the Unity 3D game engine, required packages, and other tools to develop for Android (ARCore) and/or iOS (ARKit) mobile devices. Then we jump right into the building and running AR scenes, learning about AR Foundation components, other Unity features, C# coding, troubleshooting, and testing. We create a framework for building AR applications that manages user interaction modes, user interface panels, and AR onboarding graphics that you will save as a template for reuse in other projects in this book. Using this framework, you will build multiple projects, starting with a virtual photo gallery that lets you place your favorite framed photos on your real-world walls, and interactively edit these virtual objects. Other projects include an educational image tracking app for exploring the solar system, and a fun selfie app to put masks and accessories on your face. The book provides practical advice and best practices that will have you up and running quickly. By the end of this AR book, you will be able to build your own AR applications, engaging your users in new and innovative ways.

What You Will Learn: Discover Unity engine features for building AR applications and games Get up to speed with Unity AR Foundation components and the Unity API Build a variety of AR projects using best practices and important AR user experiences Understand the core concepts of augmented reality technology and development for real-world projects Set up your system for AR development and

learn to improve your development workflow Create an AR user framework with interaction modes and UI, saved as a template for new projects Who this book is for: This augmented reality book is for game developers interested in adding AR capabilities to their games and apps. The book assumes beginner-level knowledge of Unity development and C# programming, familiarity with 3D graphics, and experience in using existing AR applications. Beginner-level experience in developing mobile applications will be helpful to get the most out of this AR Unity book.

A how-to guide, this book covers areas where either a programmatic or procedural approach can add value or save time in the creation of games. The book uses stand alone, concrete examples, and often complete but simple games to illustrate the tools and techniques of programming the Unity 3D game engine in C#. It gives readers the skills and knowledge to quickly develop various game genres. It contains enough examples to give game programmers the best approaches for their particular work-flow, whether team or solo.

Master a series of performance-enhancing coding techniques and methods that help them improve the performance of their Unity3D applications About This Book* Discover features and techniques to optimize Unity Engine's CPU cycles, memory usage, and the GPU throughput of any application* Explore multiple techniques to solve performance issues with your VR projects* Learn the best practices for project organization to save time through an improved workflow Who This Book Is For This book is intended for intermediate and advanced Unity developers who have experience with most of Unity's feature-set, and who want to maximize the performance of their game. Familiarity with the C# language will be needed. What You Will Learn* Use the Unity Profiler to find bottlenecks anywhere in your application, and discover how to resolve them* Implement best practices for C# scripting to avoid common pitfalls* Develop a solid understanding of the rendering pipeline, and maximize its performance by reducing draw calls and avoiding fill rate bottlenecks* Enhance shaders in a way that is accessible to most developers, optimizing them through subtle yet effective performance tweaks* Keep your scenes as dynamic as possible by making the most of the Physics engine* Organize, filter, and compress your art assets to maximize performance while maintaining high quality* Discover different kinds of performance problems that are critical for VR projects and how to tackle them* Use the Mono Framework and C# to implement low-level enhancements that maximize memory usage and avoid garbage collection* Get to know the best practices for project organization to save time through an improved workflow In Detail Unity is an awesome game development engine. Through its massive feature-set and ease-of-use, Unity helps put some of the best processing and rendering technology in the hands of hobbyists and professionals alike. This book shows you how to make your games fly with the recent version of Unity 2017, and demonstrates that high performance does not need to be limited to games with the biggest teams and budgets. Since nothing turns gamers away from a game faster than a poor user-experience, the book starts by explaining how to use the Unity Profiler to detect problems. You will learn how to use stopwatches, timers and logging methods to diagnose the problem. You will then explore techniques to improve performance through better programming practices. Moving on, you will then learn about Unity's built-in batching processes; when they can be used to improve performance, and their limitations. Next, you will import your art assets

using minimal space, CPU and memory at runtime, and discover some underused features and approaches for managing asset data. You will also improve graphics, particle system and shader performance with a series of tips and tricks to make the most of GPU parallel processing. You will then delve into the fundamental layers of the Unity3D engine to discuss some issues that may be difficult to understand without a strong knowledge of its inner-workings. The book also introduces you to the critical performance problems for VR projects and how to tackle them. By the end of the book, you will have learned to improve the development workflow by properly organizing assets and ways to instantiate assets as quickly and waste-free as possible via object pooling. Style and approach This practical book will help readers understand the essentials of the Unity3D engine and how to build games while improving the performance of their applications.

Master everything you need to build a 2D game using Unity 5 by developing a complete RPG game framework! About This Book Explore the new features of Unity 5 and recognize obsolete code and elements. Develop and build a complete 2D retro RPG with a conversation system, inventory, random map battles, full game menus, and sound. This book demonstrates how to use the new Unity UI system effectively through detailed C# scripts with full explanations. Who This Book Is For This book is for anyone looking to get started developing 2D games with Unity 5. If you're already accomplished in Unity 2D and wish to expand or supplement your current Unity knowledge, or are working in 2D in Unity 4 and looking to upgrade Unity 5, this book is for you. A basic understanding of programming logic is needed to begin learning with this book, but intermediate and advanced programming topics are explained thoroughly so that coders of any level can follow along. Previous programming experience in C# is not required.

What You Will Learn Create a 2D game in Unity 5 by developing a complete retro 2D RPG framework. Effectively manipulate and utilize 2D sprites. Create 2D sprite animations and trigger them effectively with code. Write beginning to advanced-level C# code using MonoDevelop. Implement the new UI system effectively and beautifully. Use state machines to trigger events within your game. In Detail The Unity engine has revolutionized the gaming industry, by making it easier than ever for indie game developers to create quality games on a budget. Hobbyists and students can use this powerful engine to build 2D and 3D games, to play, distribute, and even sell for free! This book will help you master the 2D features available in Unity 5, by walking you through the development of a 2D RPG framework. With fully explained and detailed C# scripts, this book will show you how to create and program animations, a NPC conversation system, an inventory system, random RPG map battles, and full game menus. After your core game is complete, you'll learn how to add finishing touches like sound and music, monetization strategies, and splash screens. You'll then be guided through the process of publishing and sharing your game on multiple platforms. After completing this book, you will have the necessary knowledge to develop, build, and deploy 2D games of any genre! Style and approach This book takes a step-by-step practical tutorial style approach. The steps are accompanied by examples, and all the intermediate steps will be clearly explained. The focus of this book will obviously be on the advanced topics so that the game looks and performs efficiently.

If you have C# knowledge but now want to become truly confident in creating fully functional 2D RPG games with Unity, then this

book will show you everything you need to know.

Create enthralling Android games with Unity Faster Than Ever Before About This Book Develop complex Android games with the help of Unity's advanced features such as artificial intelligence, high-end physics, and GUI transformations. Create amazing Graphical User Interfaces (GUIs) with Unity's new uGUI system Unravel and deploy exciting games across Android devices Who This Book Is For If you are a Unity 5 developer and want to expand your knowledge of Unity 5 to create high-end complex Android games, then this book is for you. Readers are expected to have a basic understanding of Unity 5, working with its environment, and its basic concepts. What You Will Learn Develop your own Jetpack Joyride clone game Explore the advanced features of Unity 5 by building your own Action Fighting game Develop remarkable Graphical User Interfaces (GUIs) with Unity's new uGUI system Enhance your game by adding stunning particle systems and complex animations Build pleasing virtual worlds with special effects, lights, sky cube maps, and cameras Make your game more realistic by providing music and sound effects Debug and deploy your games on different Android devices In Detail Game engines such as Unity are the power-tools behind the games we know and love. Unity is one of the most widely-used and best loved packages for game development and is used by everyone, from hobbyists to large studios, to create games and interactive experiences for the Web, desktop, mobile, and console. With Unity's intuitive, easy-to-learn toolset and this book, it's never been easier to become a game developer. You will begin with the basic concepts of Android game development, a brief history of Android games, the building blocks of Android games in Unity 5, and the basic flow of games. You will configure an empty project for the Jetpack Joyride Clone Game, add an environment and characters, and control them. Next you will walk through topics such as particle systems, camera management, prefabs, animations, triggers, colliders, and basic GUI systems. You will then cover the basic setup for 3D action fighting games, importing models, textures and controlling them with a virtual on-screen joystick. Later you will set up Scene for 3D Configuration, create basic gameplays, and manage input controls. Next you will learn to create the interface for the main menu, gameplay, game over, achievements, and high score screens. Finally you will polish your game with stats, sounds, and Social Networking, followed by testing the game on Android devices and then publishing it on Google Play, Amazon, and OUYA Stores. Style and approach A step-by-step and detailed guide to developing high-end complex Android games utilizing the advanced concepts of Unity. Discover how to use the Unity game engine to its full potential for both 3D and 2D game development—from the basics of scripting to useful tricks in gameplay, behavior, and animation. With this problem-solving cookbook, you'll get started in two ways: First, you'll learn about the Unity game engine through brief recipes that teach specific features of the software and scripting systems. Second, you'll apply a collection of snippets to address common gameplay scenarios, such as properly keeping score. Using our cookbook format, we pinpoint the problem, set out the solution, and discuss how to solve your problem in the best and most straightforward way possible. This book is ideal for beginning to intermediate Unity developers. You'll find solutions for: 2D and 3D graphics Math, physics, and character control Animation and movement Behavior and AI Sound and music Input and gameplay Scripting and user interface

The REV conference aims to discuss the fundamentals, applications and experiences in remote engineering, virtual instrumentation and related new technologies, as well as new concepts for education on these topics, including emerging technologies in learning, MOOCs & MOOLs, Open Resources, and STEM pre-university education. In the last 10 years, remote solutions based on Internet technology have been increasingly deployed in numerous areas of research, science, industry, medicine and education. With the new focus on cyber-physical systems, Industry 4.0, Internet of Things and the digital transformation in industry, economy and education, the core topics of the REV conference have become indispensable elements of a future digitized society. REV 2018, which was held at the University of Applied Sciences in Duesseldorf from 21–23 March 2018, addressed these topics as well as state-of-the-art and future trends.

Beginner game developers are wonderfully optimistic, passionate, and ambitious. But that ambition is often dangerous! Too often, budding indie developers and hobbyists bite off more than they can chew. Some of the most popular games in recent memory – Doodle Jump, Paper Toss, and Canabalt, to name a few – have been fun, simple games that have delighted players and delivered big profits to their creators. This is the perfect climate for new game developers to succeed by creating simple games with Unity 3D, starting today. This book starts you off on the right foot, emphasizing small, simple game ideas and playable projects that you can actually finish. The complexity of the games increases gradually as we progress through the chapters. The chosen examples help you learn a wide variety of game development techniques. With this understanding of Unity 3D and bite-sized bits of programming, you can make your own mark on the game industry by finishing fun, simple games. This book shows you how to build crucial game elements that you can reuse and re-skin in many different games, using the phenomenal (and free!) Unity 3D game engine. It initiates you into indie game culture by teaching you how to make your own small, simple games using Unity3D and some gentle, easy-to-understand code. It will help you turn a rudimentary keep-up game into a madcap race through hospital hallways to rush a still-beating heart to the transplant ward, program a complete 2D game using Unity's User Interface controls, put a dramatic love story spin on a simple catch game, and turn that around into a classic space shooter with spectacular explosions and "pew" sounds! By the time you're finished, you'll have learned to develop a number of important pieces to create your own games that focus in on that small, singular piece of joy that makes games fun. This book shoots straight for the heart of fun, simple game design and keeps shooting until you have all the pieces you need to assemble your own great games.

Create a game for the Windows Phone market with a heavy emphasis placed on optimization and good design decisions. While doing so, you will be introduced to key Unity concepts and functionality, weigh the pros and cons of various possibilities, and gain a good working knowledge of scripting in the Unity environment using both JavaScript and C#. Learn Unity for Windows 10 Game Development starts by exploring the Unity editor and experimenting with staple game functionality. If you are new to scripting or just new to C#, you will be able to investigate syntax, commonly used functions, and communication required to bring your ideas to life. With the book's included art assets, you will learn the ins and outs of asset choices and management while making use of Unity's 2D physics, Shuriken particle systems and Mecanim's character and state management tools. Finally, you will bring it all

together to create a multi-level game as you learn how to incorporate mobile specific functionality, test on a Windows Phone device, and others for Windows 10 and ultimately, publish your game to the Windows App Store. What You Will Learn Learn C# basics for Unity Work with the Unity Editor Manage assets Use the Mecanim animation system and 2D features and physics Who This Book Is For Game developers, hobbyists and game dev students who are new to Unity or Windows Mobile game development or both. JavaScript and C# experience are helpful, but C# experience is not required.

- Die bekannten Design Patterns der Gang of Four im konkreten Einsatz für die Entwicklung von Games - Zahlreiche weitere vom Autor entwickelte Patterns - Sequenzierungs-, Verhaltens-, Entkopplungs- und Optimierungsmuster Für viele Spieleprogrammierer stellt die Finalisierung ihres Spiels die größte Herausforderung dar. Viele Projekte verlaufen im Sande, weil Programmierer der Komplexität des eigenen Codes nicht gewachsen sind. Die im Buch beschriebenen Design Patterns nehmen genau dieses Problem in Angriff. Der Autor blickt auf jahrelange Erfahrung in der Entwicklung von weltweit erfolgreichen Games zurück und stellt erprobte Patterns vor, mit deren Hilfe Sie Ihren Code entwirren und optimieren können. Die Patterns sind in Form unabhängiger Fallbeispiele organisiert, so dass Sie sich nur mit den für Sie relevanten zu befassen brauchen und das Buch auch hervorragend zum Nachschlagen verwenden können. Sie erfahren, wie man eine stabile Game Loop schreibt, wie Spielobjekte mithilfe von Komponenten organisiert werden können und wie man den CPU-Cache nutzt, um die Performance zu verbessern. Außerdem werden Sie sich damit beschäftigen, wie Skript-Engines funktionieren, wie Sie Ihren Code mittels Quadrees und anderen räumlichen Aufteilungen optimieren und wie sich die klassischen Design Patterns in Spielen einsetzen lassen.

Holistic Mobile Game Development with Unity: An All-In-One Guide to Implementing Mechanics, Art Design and Programming for iOS and Android Games Master mobile game design and development in this all-in-one guide to creating iOS and Android games in the cutting-edge game engine, Unity. By using Penny de Byl's holistic method, you will learn about the principles of art, design, and code and gain multidisciplinary skills needed to succeed in the independent mobile games industry. In addition, hands-on exercises will help you throughout the process from design to publication in the Apple App Store and Google Play Store. Over 70 practical step-by-step exercises recreating the game mechanics of contemporary mobile games, including Angry Birds, Temple Run, Year Walk, Minecraft, Curiosity Cube, Fruit Ninja, and more. Design principles, art, and programming in unison – the one-stop shop for indie developers requiring interdisciplinary skills in their small teams. An introduction to essential two- and three-dimensional mathematics, geometry and physics concepts. A portfolio of royalty free reusable game mechanics and assets. Accompanying website, www.holistic3d.com, features project source code, instructional videos, art assets, author blog, and teaching resources. Challenge questions and lesson plans are available online for an enhanced learning experience.

Develop your first interactive 2D platformer game by learning the fundamentals of C# About This Book Get to grips with the fundamentals of scripting in C# with Unity Create an awesome, 2D platformer game from scratch using the principles of object-oriented programming and coding in C# This is a step-by-step guide to learn the fundamentals of C# scripting to develop GameObjects and master the basics of the new UI system in Unity Who This Book Is For The book is targeted at beginner level

Unity developers with no programming experience. If you are a Unity developer and you wish to learn how to write C# scripts and code by creating games, then this book is for you. What You Will Learn Understand the fundamentals of variables, methods, and code syntax in C# Get to know about techniques to turn your game idea into working project Use loops and collections efficiently in Unity to reduce the amount of code Develop a game using the object-oriented programming principles Generate infinite levels for your game Create and code a good-looking functional UI system for your game Publish and share your game with users In Detail Unity is a cross-platform game engine that is used to develop 2D and 3D video games. Unity 5 is the latest version, released in March 2015, and adds a real-time global illumination to the games, and its powerful new features help to improve a game's efficiency. This book will get you started with programming behaviors in C# so you can create 2D games in Unity. You will begin by installing Unity and learning about its features, followed by creating a C# script. We will then deal with topics such as unity scripting for you to understand how codes work so you can create and use C# variables and methods. Moving forward, you will find out how to create, store, and retrieve data from collection of objects. You will also develop an understanding of loops and their use, and you'll perform object-oriented programming. This will help you to turn your idea into a ready-to-code project and set up a Unity project for production. Finally, you will discover how to create the GameManager class to manage the game play loop, generate game levels, and develop a simple UI for the game. By the end of this book, you will have mastered the art of applying C# in Unity. Style and approach This is a step-by-step guide to developing a game from scratch by applying the fundamentals of C# and Unity scripting.

The ideal Unity book for programmers ready to dive into advanced 3D gaming As a dynamic, graphically rich 3D game engine, Unity3D stands out from its competitors by working on nearly every desktop and mobile platform. This book is the first to offer professional-level programming of Unity using C#. You begin with learning how to install Unity3D and gradually move on to more advanced coding topics in C#. Each object is introduced, applied to the code, demonstrated through examples, and added to an example game that is built upon throughout the book. By the end of the book, you will be encouraged to create a game and upload it to a site where other users can view and comment, cultivating the learning process through dialog and interaction. Explains how to maximize advanced capabilities of Unity3D for programming games Highlights techniques for creating shaders, which manipulate the way graphics are rendered by the game engine Extends the reach of the book by discussing how Unity3D is an ideal way to break into the social web market Demystifies Unity3D co-routines and the yield statement in a clear and concise manner Whether you use this book as a tutorial or reference manual for working with Unity3D and C#, you will most certainly find it to be invaluable.

This hands-on guide to Unity is for new and existing Unity users who want to get the most out of the Unity engine, create scripts using C#, delve into graphics, sound, and animations and manipulate physics to create interesting mechanics for games. You'll be able to practically apply the knowledge you've gained to a real-world game.

Master a series of performance-enhancing coding techniques and methods that help them improve the performance of their

Unity3D applications About This Book Discover features and techniques to optimize Unity Engine's CPU cycles, memory usage, and the GPU throughput of any application Explore multiple techniques to solve performance issues with your VR projects Learn the best practices for project organization to save time through an improved workflow Who This Book Is For This book is intended for intermediate and advanced Unity developers who have experience with most of Unity's feature-set, and who want to maximize the performance of their game. Familiarity with the C# language will be needed. What You Will Learn Use the Unity Profiler to find bottlenecks anywhere in your application, and discover how to resolve them Implement best practices for C# scripting to avoid common pitfalls Develop a solid understanding of the rendering pipeline, and maximize its performance by reducing draw calls and avoiding fill rate bottlenecks Enhance shaders in a way that is accessible to most developers, optimizing them through subtle yet effective performance tweaks Keep your scenes as dynamic as possible by making the most of the Physics engine Organize, filter, and compress your art assets to maximize performance while maintaining high quality Discover different kinds of performance problems that are critical for VR projects and how to tackle them Use the Mono Framework and C# to implement low-level enhancements that maximize memory usage and avoid garbage collection Get to know the best practices for project organization to save time through an improved workflow In Detail Unity is an awesome game development engine. Through its massive feature-set and ease-of-use, Unity helps put some of the best processing and rendering technology in the hands of hobbyists and professionals alike. This book shows you how to make your games fly with the recent version of Unity 2017, and demonstrates that high performance does not need to be limited to games with the biggest teams and budgets. Since nothing turns gamers away from a game faster than a poor user-experience, the book starts by explaining how to use the Unity Profiler to detect problems. You will learn how to use stopwatches, timers and logging methods to diagnose the problem. You will then explore techniques to improve performance through better programming practices. Moving on, you will then learn about Unity's built-in batching processes; when they can be used to improve performance, and their limitations. Next, you will import your art assets using minimal space, CPU and memory at runtime, and discover some underused features and approaches for managing asset data. You will also improve graphics, particle system and shader performance with a series of tips and tricks to make the most of GPU parallel processing. You will then delve into the fundamental layers of the Unity3D engine to discuss some issues that may be difficult to understand without a strong knowledge of its inner-workings. The book also introduces you to the critical performance problems for VR projects and how to tackle them. By the end of the book, you will have learned to improve the development workflow by properly organizing assets and ways to instantiate assets as quickly and waste-free as possible via object pooling. Style and approach This practical book will help readers understand the essentials of the Unity3D engine and how to build games while improving the performance of their applications.

Do you want to build mobile games, but lack game development experience? No problem. This practical guide shows you how to create beautiful, interactive content for iOS and Android devices with the Unity game engine. Authors Jon Manning and Paris Buttfield-Addison (iOS Swift Game Development Cookbook) provide a top-to-bottom overview of Unity's features with specific,

project-oriented guidance on how to use them in real game situations. Over the course of this book, you'll learn hands-on how to build 2D and 3D games from scratch that will hook and delight players. If you have basic programming skills, you're ready to get started. Explore the basics of Unity, and learn how to structure games, graphics, scripting, sounds, physics, and particle systems Use 2D graphics and physics features to build a side-scrolling action game Create a 3D space combat simulator with projectile shooting and respawning objects, and learn how to manage the appearance of 3D models Dive into Unity's advanced features, such as precomputed lighting, shading, customizing the editor, and deployment

"You've downloaded the Unity software, you know what the Inspector is, and now you're ready to build something. In this course, you'll create an entire physics-based 2D game starring a gnome who is lowered down a well on a rope and goes searching for treasure. You'll start from an empty scene and finish with a complete polished game. Along the way you'll learn about game design, GUI setup, camera control, the game manager, gameplay practices, advanced graphics techniques, and the iterative nature of game development. Learn how to create 2D games using Unity game development software; discover how ragdolls work and how to create physics-based gameplay; learn how to manage gameplay with game managers and advanced game scripting; practice techniques for better camera control and for creating polished graphics; discover how the various pieces you build in Unity fit together to form gameplay; understand how to architect your games for easier changes"--Resource description page.

If you have a good understanding of Unity's core functionality and a decent grasp of C# scripting in Unity (although not essential if you are just using the Editor with the new UI), you'll be well placed to take advantage of the new UI feature set.

Benefit from the latest rendering tech developments, currently covered only in papers and talks from Siggraph, in a way any developer or technical artist using Unity can take advantage of. This book starts by introducing how shader programming works in general, the common principles of different platforms (OpenGL, Vulkan, and DirectX), and the shading languages Unity uses: Cg, GLSL, and ShaderLab. Physically Based Shader Development for Unity 2017 discusses artistic choices, presenting various techniques (such as translucency and subsurface scattering) and BRDFs (Oren-Nayar, Cook-Torrance, and Ashikhmin-Shirley), and what they can be used for. Finally you'll cover the importance of optimizing your code by developing approximations, which achieve similar end results, but are computationally cheaper. By the end of your journey you'll be able to develop the look of your game or Unity-rendered animated short so that it looks both unique and impressively realistic, thanks to your own custom lighting system. What You Will Learn Master shader programming Gain all you need to know about physically based shading Take almost full control of the shader subsystem Discover what you can achieve with that control Implement a custom physically based lighting system and examine the logic behind every choice Who This Book Is For Most game developers (both indie and AA) that use Unity and technical artists who are responsible for the final look of a game.

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