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He coauthored OpenGL® Programming Guide, Ninth Edition. Contributing author John Kessenich is language lead on the Vulkan specification and is Senior Compiler Architect at LunarG Inc. He been active in OpenGL, GLSL, Vulkan, and SPIR-V development in the OpenGL ARB and in Khronos since 1999. Kessenich created SPIR-V and is its specification editor.

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The Official Guide to Learning Vulkan (OpenGL) (Inglés) Tapa blanda - 31 octubre 2016 de Graham M. Sellers (Autor), John M. Kessenich (Autor) 2,8 de 5 estrellas 25 valoraciones Ver los formatos y ediciones

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Vulkan is a low-overhead, cross-platform 3D graphics and computing API. Vulkan targets high-performance realtime 3D graphics applications such as video games and interactive media across all platforms.

Compared to OpenGL, Direct3D 11 and Metal, Vulkan is intended to offer higher performance and more balanced CPU/GPU usage.

Other major differences from Direct3D 11 and OpenGL are Vulkan being a considerably lower-level API and offering parallel tasking. In

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addition to its lower CPU usage, Vulkan i

## Vulkan (API) - Wikipedia

Vulkan Programming Guide has 13 chapters, each focusing on a key aspect of the Vulkan API.

## Review: Vulkan Programming Guide: The Official Guide to

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The Vulkan Programming Guide: The Official Guide to Learning Vulkan book written by AMD's Graham Sellers and Google's John Kessenich is now up for pre-orders. This appears to be the first official book written about the next-generation Khronos graphics API.

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Vulkan is the next big step

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in graphics programming and GPU computing and first implementations will be released soon have been released by GPU makers like NVIDIA or AMD. Here is a list of recent articles and tutorials about Vulkan. This page will be updated as soon as new resources are available. Last Update: 2016.11.25

## Vulkan Programming Resources List | Geeks3D

Those games relied on an Nvidia extension to get ray tracing working ahead of Vulkan's official support, however. That's a viable band-aid, but using an Nvidia extension also means

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that the games can't activate ray tracing on AMD's rival Radeon RX 6000-series graphics cards —it's not even a visible option in Wolfenstein .

Vulkan ray tracing support is finally official, starting ...

Vulkan ray tracing is ready for use in games, promising potential performance boosts techradar.com - Darren Allan. Vulkan, an alternative graphics API to DirectX, now supports ray tracing for game developers, the Khronos Group announced with its official release ...

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The next generation specification of OpenGL, Vulkan has been redesigned from the ground up, giving applications direct control over GPU acceleration for unprecedented performance and predictability. Vulkan Programming Guide is the essential, authoritative reference to this new standard, for graphics programmers at all levels of experience, in any Vulkan environment, on any platform. written by Vulkan language lead John Kessenich and Vulkan API lead Graham Sellers, this guide offers comprehensive, example-rich introductions to both the new portable Vulkan API and

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the new SPIR-V shading language. Kessenich and Sellers cover everything from drawing to memory, threading to compute shaders. Throughout, they present realistic sample code, and explain everything you need to know and do to get it to work. You'll learn powerful techniques you can use for 3D application development in fields ranging from videogames to medical imaging -- as well as techniques for solving many of today's most challenging scientific compute problems. Whether you're upgrading from OpenGL or moving to open-standard graphics APIs for the first

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time, this guide will help you get the results and performance you're looking for.

The Definitive Vulkan™ Developer's Guide and Reference: Master the Next-Generation Specification for Cross-Platform Graphics The next generation of the OpenGL specification, Vulkan, has been redesigned from the ground up, giving applications direct control over GPU acceleration for unprecedented performance and predictability. Vulkan™ Programming Guide is the essential, authoritative reference to this new standard for experienced

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graphics programmers in all Vulkan environments. Vulkan API lead Graham Sellers (with contributions from language lead John Kessenich) presents example-rich introductions to the portable Vulkan API and the new SPIR-V shading language. The author introduces Vulkan, its goals, and the key concepts framing its API, and presents a complex rendering system that demonstrates both Vulkan's uniqueness and its exceptional power. You'll find authoritative coverage of topics ranging from drawing to memory, and threading to compute shaders. The author

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especially shows how to handle tasks such as synchronization, scheduling, and memory management that are now the developer's responsibility. Vulkan™ Programming Guide introduces powerful 3D development techniques for fields ranging from video games to medical imaging, and state-of-the-art approaches to solving challenging scientific compute problems. Whether you're upgrading from OpenGL or moving to open-standard graphics APIs for the first time, this guide will help you get the results and performance you're looking for. Coverage includes Extensively tested

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code examples to demonstrate Vulkan's capabilities and show how it differs from OpenGL Expert guidance on getting started and working with Vulkan's new memory system Thorough discussion of queues, commands, moving data, and presentation Full explanations of the SPIR-V binary shading language and compute/graphics pipelines Detailed discussions of drawing commands, geometry and fragment processing, synchronization primitives, and reading Vulkan data into applications A complete case study application: deferred rendering using complex multi-pass architecture and multiple processing queues

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Appendixes presenting Vulkan  
functions and SPIR-V  
opcodes, as well as a  
complete Vulkan glossary  
Example code can be found  
here: Example code can be  
found here: [https://github.c  
om/vulkanprogrammingguide/ex  
amples](https://github.com/vulkanprogrammingguide/examples)

Discover how to build  
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Get started with the Vulkan  
API and its programming  
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follow examples to create  
stunning 3D graphics  
Understand memory management  
in Vulkan and implement  
image and buffer resources

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Get hands-on with the drawing process and synchronization, and render a 3D graphics scene with the Vulkan graphics pipeline Who This Book Is For This book is ideal for graphic programmers who want to get up and running with Vulkan. It's also great for programmers who have experience with OpenGL and other graphic APIs who want to take advantage of next generation APIs. A good knowledge of C/C++ is expected. What You Will Learn Learn fundamentals of Vulkan programming model to harness the power of modern GPU devices. Implement device, command buffer and

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queues to get connected with the physical hardware.

Explore various validation layers and learn how to use it for debugging Vulkan application. Get a grip on memory management to control host and device memory operations. Understand and implement buffer and image resource types in Vulkan. Define drawing operations in the Render pass and implement graphics pipeline. Manage GLSL shader using SPIR-V and update the shader resources with descriptor sets and push constants. Learn the drawing process, manage resources with synchronization objects and render 3D scene output on

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screen with Swapchain. Bring realism to your rendered 3D scene with textures, and implement linear and optimal textures In Detail Vulkan, the next generation graphics and compute API, is the latest offering by Khronos. This API is the successor of OpenGL and unlike OpenGL, it offers great flexibility and high performance capabilities to control modern GPU devices. With this book, you'll get great insights into the workings of Vulkan and how you can make stunning graphics run with minimum hardware requirements. We begin with a brief introduction to the Vulkan system and show you

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its distinct features with the successor to the OpenGL API. First, you will see how to establish a connection with hardware devices to query the available queues, memory types, and capabilities offered. Vulkan is verbose, so before diving deep into programming, you'll get to grips with debugging techniques so even first-timers can overcome error traps using Vulkan's layer and extension features. You'll get a grip on command buffers and acquire the knowledge to record various operation commands into command buffer and submit it to a proper queue for GPU processing. We'll take a

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detailed look at memory management and demonstrate the use of buffer and image resources to create drawing textures and image views for the presentation engine and vertex buffers to store geometry information. You'll get a brief overview of SPIR-V, the new way to manage shaders, and you'll define the drawing operations as a single unit of work in the Render pass with the help of attachments and subpasses. You'll also create frame buffers and build a solid graphics pipeline, as well as making use of the synchronizing mechanism to manage GPU and CPU handshaking. By the end, you'll

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know everything you need to know to get your hands dirty with the coolest Graphics API on the block. Style and approach This book takes a practical approach to guide you through the Vulkan API, and you will get to build an application throughout the course of the book. Since you are expected to be familiar with C/C++, there is not much hand-holding throughout the course of the book.

Using the new OpenCL (Open Computing Language) standard, you can write applications that access all available programming resources: CPUs, GPUs, and

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other processors such as DSPs and the Cell/B.E. processor. Already implemented by Apple, AMD, Intel, IBM, NVIDIA, and other leaders, OpenCL has outstanding potential for PCs, servers, handheld/embedded devices, high performance computing, and even cloud systems. This is the first comprehensive, authoritative, and practical guide to OpenCL 1.1 specifically for working developers and software architects. Written by five leading OpenCL authorities, OpenCL Programming Guide covers the entire specification. It reviews key use cases, shows how

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OpenCL can express a wide range of parallel algorithms, and offers complete reference material on both the API and OpenCL C programming language. Through complete case studies and downloadable code examples, the authors show how to write complex parallel programs that decompose workloads across many different devices. They also present all the essentials of OpenCL software performance optimization, including probing and adapting to hardware. Coverage includes Understanding OpenCL's architecture, concepts, terminology, goals, and

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Using buffers, sub-buffers, images, samplers, and events  
Sharing and synchronizing data with OpenGL and Microsoft's Direct3D  
Simplifying development with the C++ Wrapper API Using OpenCL Embedded Profiles to support devices ranging from cellphones to supercomputer nodes  
Case studies dealing with physics simulation; image and signal processing, such as image histograms, edge detection filters, Fast Fourier Transforms, and optical flow; math libraries, such as matrix multiplication and high-performance sparse matrix

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Source code for this book is available at <https://code.google.com/p/opencv-book-samples/>

Work through recipes to unlock the full potential of the next generation graphics API—Vulkan About This Book This book explores a wide range of modern graphics programming techniques and GPU compute methods to make the best use of the Vulkan API Learn techniques that can be applied to a wide range of platforms desktop, smartphones, and embedded devices Get an idea on the graphics engine with multi-platform support and learn

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exciting imaging processing and post-processing techniques Who This Book Is For This book is ideal for developers who know C/C++ languages, have some basic familiarity with graphics programming, and now want to take advantage of the new Vulkan API in the process of building next generation computer graphics. Some basic familiarity of Vulkan would be useful to follow the recipes. OpenGL developers who want to take advantage of the Vulkan API will also find this book useful. What You Will Learn Work with Swapchain to present images on screen Create, submit, and

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synchronize operations  
processed by the hardware  
Create buffers and images,  
manage their memory, and  
upload data to them from CPU  
Explore descriptor sets and  
set up an interface between  
application and shaders  
Organize drawing operations  
into a set of render passes  
and subpasses Prepare  
graphics pipelines to draw  
3D scenes and compute  
pipelines to perform  
mathematical calculations  
Implement geometry  
projection and tessellation,  
texturing, lighting, and  
post-processing techniques  
Write shaders in GLSL and  
convert them into SPIR-V  
assemblies Find out about

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and implement a collection of popular, advanced rendering techniques found in games and benchmarks In Detail Vulkan is the next generation graphics API released by the Khronos group. It is expected to be the successor to OpenGL and OpenGL ES, which it shares some similarities with such as its cross-platform capabilities, programmed pipeline stages, or nomenclature. Vulkan is a low-level API that gives developers much more control over the hardware, but also adds new responsibilities such as explicit memory and resources management. With it, though, Vulkan is

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expected to be much faster. This book is your guide to understanding Vulkan through a series of recipes. We start off by teaching you how to create instances in Vulkan and choose the device on which operations will be performed. You will then explore more complex topics such as command buffers, resources and memory management, pipelines, GLSL shaders, render passes, and more. Gradually, the book moves on to teach you advanced rendering techniques, how to draw 3D scenes, and how to improve the performance of your applications. By the end of the book, you will be

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familiar with the latest advanced techniques implemented with the Vulkan API, which can be used on a wide range of platforms. Style and approach This recipe-based guide will empower you to implement modern graphic programming techniques and help gain a solid understanding of the new Vulkan API.

Complete Coverage of OpenGL 4.5--the Latest Version (Includes 4.5, 4.4, SPIR-V, and Extensions) The latest version of today's leading worldwide standard for computer graphics, OpenGL 4.5 delivers significant improvements in application

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efficiency, flexibility, and performance. OpenGL 4.5 is an exceptionally mature and robust platform for programming high-quality computer-generated images and interactive applications using 2D and 3D objects, color images, and shaders. *OpenGL® Programming Guide, Ninth Edition*, presents definitive, comprehensive information on OpenGL 4.5, 4.4, SPIR-V, OpenGL extensions, and the OpenGL Shading Language. It will serve you for as long as you write or maintain OpenGL code. This edition of the best-selling "Red Book" fully integrates shader techniques alongside

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classic, function-centric approaches, and contains extensive code examples that demonstrate modern techniques. Starting with the fundamentals, its wide-ranging coverage includes drawing, color, pixels, fragments, transformations, textures, framebuffers, light and shadow, and memory techniques for advanced rendering and nongraphical applications. It also offers discussions of all shader stages, including thorough explorations of tessellation, geometric, and compute shaders. New coverage in this edition includes Thorough coverage of OpenGL 4.5 Direct State

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Access (DSA), which overhauls the OpenGL programming model and how applications access objects. Deeper discussions and more examples of shader functionality and GPU processing, reflecting industry trends to move functionality onto graphics processors. Demonstrations and examples of key features based on community feedback and suggestions. Updated appendixes covering the latest OpenGL libraries, related APIs, functions, variables, formats, and debugging and profiling techniques.

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Build a 3D rendering engine from scratch while solving problems in a step-by-step way with the help of useful recipes Key Features Learn to integrate modern rendering techniques into a single performant 3D rendering engine Leverage Vulkan to render 3D content, use AZDO in OpenGL applications, and understand modern real-time rendering methods Implement a physically based rendering pipeline from scratch in Vulkan and OpenGL Book Description OpenGL is a popular cross-language, cross-platform application programming interface (API)

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used for rendering 2D and 3D graphics, while Vulkan is a low-overhead, cross-platform 3D graphics API that targets high-performance applications. 3D Graphics Rendering Cookbook helps you learn about modern graphics rendering algorithms and techniques using C++ programming along with OpenGL and Vulkan APIs. The book begins by setting up a development environment and takes you through the steps involved in building a 3D rendering engine with the help of basic, yet self-contained, recipes. Each recipe will enable you to incrementally add features to your codebase and show

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you how to integrate different 3D rendering techniques and algorithms into one large project. You'll also get to grips with core techniques such as physically based rendering, image-based rendering, and CPU/GPU geometry culling, to name a few. As you advance, you'll explore common techniques and solutions that will help you to work with large datasets for 2D and 3D rendering. Finally, you'll discover how to apply optimization techniques to build performant and feature-rich graphics applications. By the end of this 3D rendering book, you'll have gained an improved

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understanding of best practices used in modern graphics APIs and be able to create fast and versatile 3D rendering frameworks. What you will learn Improve the performance of legacy OpenGL applications Manage a substantial amount of content in real-time 3D rendering engines Discover how to debug and profile graphics applications Understand how to use the Approaching Zero Driver Overhead (AZDO) philosophy in OpenGL Integrate various rendering techniques into a single application Find out how to develop Vulkan applications Implement a physically based rendering

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pipeline from scratch  
Integrate a physics library with your rendering engine  
Who this book is for This book is for 3D graphics developers who are familiar with the mathematical fundamentals of 3D rendering and want to gain expertise in writing fast rendering engines with advanced techniques using C++ libraries and APIs. A solid understanding of C++ and basic linear algebra, as well as experience in creating custom 3D applications without using premade rendering engines is required.

OpenVX is the computer

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vision API adopted by many high-performance processor vendors. It is quickly becoming the preferred way to write fast and power-efficient code on embedded systems. OpenVX Programming Guidebook presents definitive information on OpenVX 1.2 and 1.3, the Neural Network, and other extensions as well as the OpenVX Safety Critical standard. This book gives a high-level overview of the OpenVX standard, its design principles, and overall structure. It covers computer vision functions and the graph API, providing examples of usage for the majority of the functions.

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It is intended both for the first-time user of OpenVX and as a reference for experienced OpenVX developers. Get to grips with the OpenVX standard and gain insight why various options were chosen Start developing efficient OpenVX code instantly Understand design principles and use them to create robust code Develop consumer and industrial products that use computer vision to understand and interact with the real world

OpenGL® ES™ is the industry's leading software interface and graphics library for rendering

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sophisticated 3D graphics on handheld and embedded devices. The newest version, OpenGL ES 3.0, makes it possible to create stunning visuals for new games and apps, without compromising device performance or battery life. In the OpenGL® ES™ 3.0 Programming Guide, Second Edition, the authors cover the entire API and Shading Language. They carefully introduce OpenGL ES 3.0 features such as shadow mapping, instancing, multiple render targets, uniform buffer objects, texture compression, program binaries, and transform feedback. Through detailed, downloadable C-based code

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examples, you'll learn how to set up and program every aspect of the graphics pipeline. Step by step, you'll move from introductory techniques all the way to advanced per-pixel lighting and particle systems. Throughout, you'll find cutting-edge tips for optimizing performance, maximizing efficiency with both the API and hardware, and fully leveraging OpenGL ES 3.0 in a wide spectrum of applications. All code has been built and tested on iOS 7, Android 4.3, Windows (OpenGL ES 3.0 Emulation), and Ubuntu Linux, and the authors demonstrate how to build OpenGL ES code for

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each platform. Coverage includes EGL API: communicating with the native windowing system, choosing configurations, and creating rendering contexts and surfaces Shaders: creating and attaching shader objects; compiling shaders; checking for compile errors; creating, linking, and querying program objects; and using source shaders and program binaries OpenGL ES Shading Language: variables, types, constructors, structures, arrays, attributes, uniform blocks, I/O variables, precision qualifiers, and invariance Geometry, vertices, and primitives:

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inputting geometry into the pipeline, and assembling it into primitives 2D/3D, Cubemap, Array texturing: creation, loading, and rendering; texture wrap modes, filtering, and formats; compressed textures, sampler objects, immutable textures, pixel unpack buffer objects, and mipmapping Fragment shaders: multitexturing, fog, alpha test, and user clip planes Fragment operations: scissor, stencil, and depth tests; multisampling, blending, and dithering Framebuffer objects: rendering to offscreen surfaces for advanced effects Advanced rendering:

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per-pixel lighting, environment mapping, particle systems, image post-processing, procedural textures, shadow mapping, terrain, and projective texturing Sync objects and fences: synchronizing within host application and GPU execution This edition of the book includes a color insert of the OpenGL ES 3.0 API and OpenGL ES Shading Language 3.0 Reference Cards created by Khronos. The reference cards contain a complete list of all of the functions in OpenGL ES 3.0 along with all of the types, operators, qualifiers, built-ins, and functions in the OpenGL ES Shading Language.

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