

# Opengl Documentation

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opengl superbible sixth edition is the definitive programmer s guide tutorial and reference for the world s leading 3d api for real time computer graphics opengl 4 3 the best all around introduction to opengl for developers at all levels of experience it clearly explains both the newest api and indispensable related concepts you ll find up to date hands on guidance for all facets of modern opengl development on both desktop and mobile platforms including transformations texture mapping shaders buffers geometry management and much more extensively revised this edition presents many new opengl 4 3 features

including compute shaders texture views indirect draws and enhanced api debugging it has been reorganized to focus more tightly on the api to cover the entire pipeline earlier and to help you thoroughly understand the interactions between opengl and graphics hardware coverage includes a practical introduction to the essentials of realtime 3d graphics core opengl 4 3 techniques for rendering transformations and texturing foundational math for creating interesting 3d graphics with opengl writing your own shaders with examples to get you started cross platform opengl including essential platform specific api initialization material for linux os x and windows vertex processing drawing commands primitive processing fragments and framebuffers using compute shaders to harness today s graphics cards for more than graphics monitoring and controlling the opengl graphics pipeline advanced rendering light simulation artistic and non photo realistic rendering and deferred shading modern opengl debugging and performance optimization bonus material and sample code are available from the companion site [openglsuperbible.com](http://openglsuperbible.com)

opengl superbible fourth edition begins by illuminating the core techniques of classic opengl graphics programming from drawing in space to geometric transformations from lighting to texture mapping the authors cover newer opengl capabilities including opengl 2 1 s powerful programmable pipeline vertex and fragment shaders and advanced buffers they also present thorough up to date introductions to opengl implementations on multiple platforms including windows mac os x gnu linux unix and embedded systems coverage includes an entirely new chapter on opengl es programming for handhelds completely rewritten chapters on opengl for mac os x and gnu linux up to the minute coverage of opengl on windows vista new material on floating point color buffers and off screen rendering in depth introductions to 3d modeling and object composition expert techniques for utilizing opengl s programmable shading language thorough coverage of curves surfaces interactive graphics textures shadows and much more a fully updated api reference and an all new section of full color images you ll rely on this book constantly whether you re learning opengl for the first time deepening your graphics programming expertise upgrading from older versions of opengl or porting applications from other environments now part of the opengl technical library the official knowledge resource for opengl developers the opengl technical library provides tutorial and reference books for opengl the library enables programmers to gain a practical understanding of opengl and shows them how to unlock its full potential originally developed by sgi the library continues to evolve under the auspices of the opengl architecture review board arb steering group now part of the khronos group an industry consortium responsible for guiding the evolution of opengl and related technologies

the official reference document to opengl version 1 4 opengl is a powerful software interface used to produce high quality computer generated images and interactive graphics applications by rendering 2d and 3d geometric objects bitmaps and color images officially sanctioned by the opengl architecture review board arb the opengl reference manual fourth edition is the comprehensive and definitive documentation of all core opengl functions this fourth edition has been completely revised and updated for opengl versions 1 3 and 1 4 it features coverage of cube mapped textures multisampling depth textures and shadowing multitexturing and register combiners in addition this book documents all opengl utility library functions glu 1 3 and the opengl extension to the x window system glx 1 3 a comprehensive reference section documents each set of related opengl commands each reference page contains a description of the command s parameters the command s effect on rendering and how opengl s state is modified examples references to related functions errors generated by each function this book also includes a conceptual overview of opengl a summary of commands and routines a chapter on defined constants and associated commands and descriptions of the multitexturing and imaging subset arb extensions the opengl technical library provides tutorial and reference books for opengl the library enables programmers to gain a practical understanding of opengl and shows them how to unlock its full potential originally developed by sgi the library continues to evolve under the auspices of the architecture review board arb an industry consortium responsible for guiding the evolution of opengl and related technologies the opengl arb is composed of leaders in the computer graphics industry 3dlabs apple ati dell evans sutherland hewlett packard ibm intel matrox nvidia sgi and sun microsystems

the reference section documents each set of related opengl commands each reference page covers a

description of the command s parameters the effects on rendering and the opengl state by the command examples errors generated by functions and references to related functions book jacket

opengl es tm is the industry s leading software interface and graphics library for rendering 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 estm 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 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 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 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 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

opengl programming guide sixth edition opengl is a powerful software interface used to produce high quality computergenerated images and interactive applications using 2d and 3d objects bitmaps and color images the opengl programming guide sixth edition provides definitive and comprehensive information on opengl and the opengl utility library the previous edition covered opengl through version 2 0 this sixth edition of the best selling red book describes the latest features of opengl version 2 1 you will find clear explanations of opengl functionality and many basic computer graphics techniques such as building and rendering 3d models interactively viewing objects from different perspective points and using shading lighting and texturing effects for greater realism in addition this book provides in depth coverage of advanced techniques including texture mapping antialiasing fog and atmospheric effects nurbs image processing and more the text also explores other key topics such as enhancing performance opengl extensions and cross platform techniques this sixth edition has been updated to include the newest features of opengl version 2 1 including using server side pixel buffer objects for fast pixel rectangle download and retrieval discussion of the srgb texture format expanded discussion of the opengl shading language this edition continues the discussion of the opengl shading language glsl and explains the mechanics of using this language to create complex graphics effects and boost the computational power of opengl the opengl technical library provides tutorial and reference books for opengl the library enables programmers to gain a practical understanding of opengl and shows them how to unlock its full potential originally developed by sgi the library continues to evolve under the auspices of the opengl architecture review board arb steering group now part of the khronos group an industry consortium responsible for guiding the evolution of opengl and related technologies

providing an overview of how opengl works this text also contains detailed reference page descriptions of

each opengl function the edition includes functions used by the new features recently approved by the architecture review board for inclusion in opengl release 1 1 this book is an essential tool for every programmer working with the opengl library

opengl es 2 0 is the industry s leading software interface and graphics library for rendering sophisticated 3d graphics on handheld and embedded devices with opengl es 2 0 the full programmability of shaders is now available on small and portable devices including cell phones pdas consoles appliances and vehicles however opengl es differs significantly from opengl graphics programmers and mobile developers have had very little information about it until now in the opengl es 2 0 programming guide three leading authorities on the open gl es 2 0 interface including the specification s editor provide start to finish guidance for maximizing the interface s value in a wide range of high performance applications the authors cover the entire api including khronos ratified extensions using detailed c based code examples they demonstrate how to set up and program every aspect of the graphics pipeline you ll move from introductory techniques all the way to advanced per pixel lighting particle systems and performance optimization coverage includes shaders in depth creating shader objects compiling shaders checking for compile errors attaching shader objects to program objects and linking final program objects the opengl es shading language variables types constructors structures arrays attributes uniforms varyings precision qualifiers and invariance inputting geometry into the graphics pipeline and assembling geometry into primitives vertex shaders their special variables and their use in per vertex lighting skinning and other applications using fragment shaders including examples of multitexturing fog alpha test and user clip planes fragment operations scissor test stencil test depth test multisampling blending and dithering advanced rendering per pixel lighting with normal maps environment mapping particle systems image post processing and projective texturing real world programming challenges platform diversity c portability openkode and platform specific shader binaries

opengl opens the door to the world of high quality high performance 3d computer graphics the preferred application programming interface for developing 3d applications opengl is widely used in video game development visualization and simulation cad virtual reality modeling and computer generated animation opengl distilled provides the fundamental information you need to start programming 3d graphics from setting up an opengl development environment to creating realistic textures and shadows written in an engaging easy to follow style this book makes it easy to find the information you re looking for you ll quickly learn the essential and most often used features of opengl 2 0 along with the best coding practices and troubleshooting tips topics include drawing and rendering geometric data such as points lines and polygons controlling color and lighting to create elegant graphics creating and orienting views increasing image realism with texture mapping and shadows improving rendering performance preserving graphics integrity across platforms a companion site includes complete source code examples color versions of special effects described in the book and additional resources

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