



Tech Info Library

QuickDraw 3D Glossary of Terms - A to F (1/96)

Revised: 1/29/96
Security: Everyone

QuickDraw 3D Glossary of Terms - A to F (1/96)

=====
Article Created: 17 November 1995
Article Reviewed/Updated: 25 January 1996

TOPIC -----

This article is a glossary of terms for QuickDraw 3D.

DISCUSSION -----

2D: Two-dimensional. See also planar.

3D: Three-dimensional. See also spatial.

3DMF: See QuickDraw 3D Object Metafile.

3D pointing device: Any physical device capable of controlling movements or specifying positions in three-dimensional space.

3D Viewer: A shared library that you can use to display 3D objects and other data in a window and to allow users limited interaction with those objects. See also viewer object.

accelerator: See graphics accelerator.

adjoint: The transpose of a matrix in which each element has been replaced by its cofactor.

adjoint matrix: See adjoint.

affine matrix: A matrix that specifies an affine transform.

affine transform: Any arbitrary concatenation of scale, translate, and rotate transforms. An affine transform preserves parallel lines in the objects transformed.

aliasing: The jagged edges (or staircasing) that result from drawing an image on

a raster device such as a computer screen. Compare antialiasing.alpha channel A color component in some color spaces whose value represents the opacity of the color defined in the other components. Compare ARGB color structure.

ambient coefficient: A measure of an object's level of reflection of ambient light.

ambient light: An amount of light of a specific color that is added to the illumination of all surfaces in a model.

ambient reflection coefficient: See ambient coefficient.

antialiasing: The smoothing of jagged edges on a displayed shape by modifying the transparencies of individual pixels along the shape's edge. Compare aliasing.

API: See application programming interface.

application coordinate system: See world coordinate system.

application space: See world coordinate system.

application programming interface (API): The total set of constants, data structures, routines, and other programming elements that allow developers to use some part of the system software.

area: A rectangular section of a plane. Defined by the TQ3Area data type.

ARGB color space: A color space whose components measure the intensity of red, green, and blue, together with the opacity (or alpha component) of the color thus defined.

ARGB color structure: A data structure that contains information about a color and its opacity. Defined by the TQ3ColorARGB data type.

artifact: Any oddity or unwanted feature of a rendered image. Compare aliasing.

aspect ratio: The ratio of the width of an image or other rectangular area to its height.

aspect ratio camera: A type of perspective camera defined in terms of a viewing angle and a horizontal-to-vertical aspect ratio.

aspect ratio camera data structure: A data structure that contains basic information about an aspect ratio camera. Defined by the TQ3ViewAngleAspectCameraData data type.

attenuation: The loss of light intensity over distance.

attribute: See attribute object.

attribute metahandler: A metahandler that defines methods for handling custom attribute data.

attribute object: A type of QuickDraw 3D object that determines some of the characteristics of a model, such as the color of objects or parts of objects in the model, the transparency of objects, and so forth. An attribute is of type TQ3Element. See also ambient coefficient, diffuse color, highlight state, normal vector, shading parameterization, specular color, specular reflection exponent, standard surface parameterization, surface shader, surface tangent, transparency color.

attribute set: A collection of zero or more different attribute types and their associated data.

axis: See coordinate axis.

back clipping plane: See yon plane.

backface culling: Ignoring backfacing polygons during rendering. Backface culling can reduce the amount of time required to render a model. Compare hidden surface removal.

backfacing polygon: Any polygon in a surface whose surface normal points away from a view's camera.

backfacing style: A type of QuickDraw 3D object that determines whether or not a renderer draws shapes that face away from a scene's camera.

badge: A visual element in a frame of a 3D model displayed by the 3D Viewer that distinguishes the frame from a static image.

base class: See parent class.

big-endian: Data formatting in which each field is addressed by referring to its most significant byte. See also little-endian.

binary file: A file object whose data is a stream of raw binary data, the type of which is indicated by object type codes. Compare text file.

bitmap: A two-dimensional array of values, each of which represents the state of one pixel. Defined by the TQ3Bitmap data type. See also pixmap, storage pixmap.

bounding box: A rectangular box, aligned with the coordinate axes, that completely encloses an object. Defined by the TQ3BoundingBox data type.

bounding loop: A section of code in which all bounding box or sphere calculation takes place. A bounding loop begins with a call to the Q3View_StartBoundingBox (or Q3View_StartBoundingSphere) routine and should end when a call to Q3View_EndBoundingBox (or Q3View_EndBoundingSphere) returns some value other than kQ3ViewStatusRetraverse. A bounding loop is a type of submitting loop. See also picking loop, rendering loop, writing loop.

bounding sphere: A sphere that completely encloses an object. Defined by the TQ3BoundingSphere data type.

bounding volume: A bounding box or a bounding sphere.

bounds: See bounding volume.

box: A three-dimensional object defined by an origin (that is, a corner of the box) and three vectors that define the edges of the box meeting in that corner. Defined by the TQ3BoxData data type.

B-spline curve: A curve that passes smoothly through a series of control points.

B-spline polynomial: A parametric equation that defines a B-spline curve.

B-spline surface: A surface that passes smoothly through a series of control points.

camera: See camera object. camera angle button A button in the controller strip of a viewer object that, when held down, causes a pop-up menu to appear listing the available cameras. Compare distance button, move button, rotate button, zoom button.

camera coordinate system: The coordinate system defined by a view's camera. Also called the view coordinate system. Compare local coordinate system, window coordinate system, world coordinate system.

camera data structure: A data structure that contains basic information about a camera. Defined by the TQ3CameraData data type.

camera location: The position, in the world coordinate system, of a camera. Also called the eye point. Compare camera placement structure.

camera object: A type of QuickDraw 3D object that you can use to define a point of view, a range of visible objects, and a method of projection for generating a two-dimensional image of those objects from a three-dimensional model. A camera object is an instance of the TQ3CameraObject

class: See also aspect ratio camera, orthographic camera, view plane camera.

camera placement: The location, orientation, and direction of a camera. See also camera placement structure.

camera placement structure: A data structure that contains information about the placement (that is, the location, orientation, and direction) of a camera. Defined by the TQ3CameraPlacement data type.

camera range: The spatial extent that lies between the hither and yon planes of a camera. See also camera range structure.

camera range structure: A data structure that contains information about the hither and yon clipping planes for a camera. Defined by the TQ3CameraRange data type.

camera space: See camera coordinate system.

camera vector: See viewing direction.

camera view port: The rectangular portion of a view plane that is to be mapped onto the area specified by the current draw context.

camera view port structure: A data structure that contains information about the view port of a camera. Defined by the TQ3CameraViewPort data type.

cap: A plane figure having the shape of an oval that closes the base of a cone or one end of a cylinder.

Cartesian coordinate system: A system of assigning planar positions to objects in terms of their distances from two mutually perpendicular lines (the x and y coordinate axes), or of assigning spatial positions to objects in terms of their distances from three mutually perpendicular lines (the x, y, and z coordinate axes). Compare polar coordinate system, spherical coordinate system.

center of projection: The point at which the projectors in a perspective projection intersect.

child class: A class that is immediately below some other class (the parent class) in the QuickDraw 3D class hierarchy. For example, the light class is a child class of the shape class. A child class inherits all of the methods of its parent. Also called a subclass.

clamp: For a shader effect, to replicate the boundaries of the effect across the portion of the mapped area that lies outside the valid range 0.0 to 1.0. Compare wrap.

class: See QuickDraw 3D class.

class type: See object type.

clipping plane: Either of the two planes that limit the part of a model that is rendered. See also hither plane, yon plane.

closed: Not open. Compare open.

color space: A specification of a particular method for representing colors. Compare RGB color space.

complement: The set of points that lie outside a given solid object. The complement of the object A is represented by the function \bar{A} . Compare intersection, union.

component: See mesh component.

concave polygon: A polygon with at least one interior angle greater than 180°. Compare convex polygon.

conic: See conic section.

conic section: Any two-dimensional curve that is formed by the intersection of a plane with a right circular cone. The most common conic sections are ellipses, circles, parabolas, and hyperbolas. Compare nonuniform rational B-spline (NURB).

connected: Said of a pair of mesh vertices if an unbroken path of edges exists linking one vertex to the other. Compare mesh component.

constant shading: A method of shading surfaces in which the incident light color and intensity are calculated for a single point on a polygon and then applied to the entire polygon. Compare Gouraud shading, Phong shading.

constant subdivision: A method of subdividing smooth curves and surfaces. In this method, the renderer subdivides a curve into some given number of polyline segments and a surface into a certain-sized mesh of polygons. Compare screen-space subdivision, world-space subdivision.

constructive solid geometry (CSG): A way of modeling solid objects constructed from the union, intersection, or difference of other solid objects.

container face: The face in a mesh that contains a particular contour.

contour: A list of vertices. In a mesh, a contour specifies a hole in a face. Compare container face.

controller: See controller object.

controller channel: Any piece of information sent from an application to an input device. Compare controller value.

controller data structure: A data structure that contains information about a controller. Defined by the TQ3ControllerData data type. controller object A QuickDraw 3D object that represents a 3D pointing device. A controller object is an instance of the TQ3ControllerObject class. See also tracker object.

controller state: See controller state object.

controller state object: A QuickDraw 3D object that represents the current channels and other settings of a controller. A controller state object is an instance of the TQ3ControllerStateObject class.

controller strip: A rectangular area at the bottom of a viewer object that contains one or more controls (usually buttons). Compare camera angle button, distance button, move button, rotate button, zoom button.

controller value: Any piece of information sent from an input device to an application. Compare controller channel.

control point: A geometric point used to control the curvature of a curve or surface. Compare knot.

convex polygon: A polygon whose interior angles are all less than or equal to 180 . Compare concave polygon.

coordinate axis: A line in a plane or in space that helps to define the position of geometric objects. See also x axis, y axis, z axis.

coordinates: (1) See coordinate system. (2) See tracker coordinates.

coordinate space: See coordinate system.

coordinate system: Any system of assigning planar or spatial positions to objects. Compare Cartesian coordinate system, polar coordinate system, spherical coordinate system.

corner: See mesh corner.

cross product: The vector that is perpendicular to two given vectors and whose magnitude is the product of the magnitudes of those two vectors multiplied by the sine of the angle between them. The cross product of the vectors u and v is denoted $u \times v$. Compare dot product.

CSG: See constructive solid geometry.

CSG equation: A value that encodes which CSG operations are to be performed on a model's CSG objects.

CSG object ID: A number, attached to an object as an attribute, that identifies an object for CSG operations.

C standard I/O library: See standard I/O library.

C string object: A QuickDraw 3D object that contains a standard C string (that is, an array of characters terminated by the null character).

culling: See backface culling.

custom: Supplied by your application, not by QuickDraw 3D.

custom surface parameterization: A parameterization of a surface supplied by your application. Compare natural surface parameterization, standard surface parameterization. database file A metafile in which all shared objects contained in the file are listed in the file's table of contents. See also normal file, stream file.

database mode: The mode in which a database file is opened. See also normal mode, stream mode.

default surface parameterization: See standard surface parameterization.

degrees of freedom (DOF): The number of dimensions that are independently specifiable by a particular input device. For example, a slider or a dial has one degree of freedom; a mouse typically has two degrees of freedom.

device coordinate system: See window coordinate system.

device space: See window coordinate system.

differential scaling: A scale transform in which the scaling values $d x$, $d y$, and $d z$ are not all identical. Compare uniform scaling.

diffuse coefficient: A measure of an object's level of diffuse reflection.

diffuse color: The color of the light of a diffuse reflection.

diffuse reflection: The type of reflection that is characteristic of light reflected from a dull, nonshiny surface. Also called Lambertian reflection. Compare specular reflection.

diffuse reflection coefficient: See diffuse coefficient.

directional light: A light source that emits parallel rays of light in a specific direction.

directional light data structure: A data structure that contains information about a directional light. Defined by the `TQ3DirectionalLightData` data type.

dirty state: A Boolean value that indicates whether an unknown object is preserved in its original state (`kQ3False`) or should be updated when written back to the file object from which it was originally read (`kQ3True`).

display group: A type of group that contains drawable objects. See also ordered display group, proxy display group.

distance button: A button in the controller strip of a viewer object that, when clicked, puts the cursor into trucking mode. Subsequent dragging up or down in the picture area causes the object to move farther away or closer. Compare camera angle button, move button, rotate button, zoom button.

DOF: See degrees of freedom.

dot product: The floating-point number obtained by multiplying corresponding scalar components of two vectors and then adding together all those products. The dot product of the vectors u and v is denoted $u \cdot v$. Compare cross product.

drawable flag: A group state flag that determines whether a group is to be drawn when it is passed to a view for rendering or picking. Compare inline flag, picking flag.

draw context: See draw context object.

draw context coordinate system: See window coordinate system.
draw context data structure A data structure that contains basic information about a draw context. Defined by the `TQ3DrawContextData` data type.

draw context object: A QuickDraw 3D object that maintains information specific to a particular window system or drawing destination. A draw context object is an instance of the `TQ3DrawContextObject` class. See also Macintosh draw context, pixmap draw context.

draw context space: See window coordinate system.

drawing destination: The window or other output destination for a rendered model.

edge: A straight line that connects two vertices. See also mesh edge.

edge tolerance: A measure of how close a point must be to a line for a hit to occur. Compare vertex tolerance.

element: See element object.

element object: Any QuickDraw 3D object that can be part of a set. An element object is an instance of the TQ3ElementObject class.

elevation projection: A type of orthographic projection in which the view plane is perpendicular to one of the principal axes of the object being projected. See also front elevation projection, side elevation projection, top elevation projection. Compare isometric projection.

error: A nonrecoverable condition that causes the currently executing QuickDraw 3D routine to fail. See also fatal error, notice, warning.

Error Manager: The part of QuickDraw 3D that you can use to handle any errors or other exceptional conditions that occur during the execution of QuickDraw 3D routines.

even-odd rule: A method of determining which planar areas defined by an arbitrary list of vertices are inside a polygon. To determine whether a particular bounded region is inside or outside a polygon, shoot a ray from any point in that region in any direction that does not intersect any vertex. If the ray cuts an odd number of edges, that region is inside the polygon; if the ray cuts an even number of edges, that region is outside the polygon.

eye point: See camera location.

face: A closed figure that forms part of the surface of an object. Usually faces are planar, but mesh faces do not need to be planar. See also mesh face.

face attribute: An attribute that defines a characteristic of a polygonal object.

face index: In a mesh, a unique integer (between 0 the total number of faces in the mesh minus 1) associated with a face. Compare vertex index.

facet: See face.

faceted shading: See constant shading.fall-off value A measure of the attenuation of a spot light's intensity from the edge of the hot angle to the edge of the outer angle. See also hot angle, outer angle.

far plane: See yon plane.

fatal error: An error whose effects persist even after the call that caused it has ended.

field of view: The horizontal or vertical angular expanse visible through a camera. See also aspect ratio camera.

file: See file object.

file idle method: A callback routine that is called during lengthy file operations. Compare view idle method.

file mode: A set of flags that determine which operations can be performed on a piece of storage.

file mode flag: A value used to construct a file mode.

file object: A type of QuickDraw 3D object that you can use to access disk- or memory-based data stored in a container. A file object is an instance of the TQ3FileObject class. See also storage object.

file status value: A value returned by the Q3File_EndWrite function that indicates whether QuickDraw 3D has finished writing the model to a file object.

fill style: A type of QuickDraw 3D object that determines whether an object is drawn as a solid filled object or is decomposed into its components (namely, into a set of edges or points).

flat shading: See constant shading.

frame: See viewer pane.

front clipping plane: See hither plane.

front elevation projection: A type of elevation projection in which the view plane is parallel to the front of the object being projected.

frustum: A solid figure created by cutting a cone or pyramid with two parallel planes. Compare view frustum.

frustum coordinate system: See camera coordinate system.

frustum space: See camera coordinate system.

frustum-to-window transform: A transform that defines the relationship between a frustum coordinate system and a window coordinate system. Compare local-to-world transform, world-to-frustum transform.

Article Change History:

25 Jan 1996 - Divided article to fit size limitation.

Support Information Services

Copyright 1995-96, Apple Computer, Inc.

Tech Info Library Article Number:18945