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QuickDraw 3D Glossary of Terms - G to O (1/96)

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TOPIC -----

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

DISCUSSION -----

general polygon: A closed plane figure defined by one or more lists of vertices (that is, defined by one or more contours). Defined by the TQ3GeneralPolygonData data type. See also simple polygon.

generic renderer: A renderer that you can use solely to collect state information. The generic renderer does not draw any image.

geometric object: A type of QuickDraw 3D object that describes a particular kind of drawable shape, such as a triangle or a box. A geometric object is an instance of the TQ3GeometryObject class. See also box, general polygon, line, marker, mesh, NURB curve, NURB patch, point, polygon, triangle, trigrid.geometric primitive Any of the basic geometric objects defined by QuickDraw 3D.

geometry: See geometric object.

geometry attribute: An attribute that defines a characteristic of a nonpolygonal geometric object.

global coordinate system: See world coordinate system.

global space: See world coordinate system.

Gouraud shading: A method of shading surfaces in which the incident light color and intensity are calculated for each vertex of a polygon and then interpolated linearly across the entire polygon. Compare constant shading, Phong shading.

graphics accelerator: Any hardware device used by QuickDraw 3D to accelerate rendering.

group: See group object.

group object: A type of QuickDraw 3D object that you can use to collect objects together into hierarchical models. A group object is an instance of the TQ3GroupObject class.

group position: A pointer to a data structure maintained internally by QuickDraw 3D that indicates the position of a group element in the group.

group state flag: A value that indicates the state of some characteristic of a group.

group state value: A set of group state flags that determine how a group is traversed during rendering or picking, or during computation of its bounding box or sphere.

handle storage object: A storage object that represents a handle to a dynamically allocated block of RAM.

hidden line removal: The process of removing any lines in a model that are hidden by opaque surfaces of objects.

hidden surface removal: The process of removing any surfaces in a model that are hidden by opaque surfaces of objects. Compare backface culling.

hierarchy: See QuickDraw 3D class hierarchy.

highlight state: An attribute having data of type TQ3Boolean that determines whether a highlight style overrides the material attributes of an object (kQ3True) or not.

highlight style: A type of QuickDraw 3D object that determines the material attributes of a geometric object (or a group of geometric objects) that override the normal attributes of the object (or group of objects).

high-order bit: See most significant bit.

hit: An object in a model that is close enough to the pick geometry. See also hit list.

hit data structure: A data structure that contains information about a hit. Defined by the TQ3HitData data type. hither plane The clipping plane closest to the camera.

hit information mask: A value that indicates the type of information you want returned for the items in a hit list.

hit list: A list of all objects in a model that are close to the pick geometry.

hit list sorting value: A value that determines the kind of sorting that is to

be done on a hit list.

hit path structure: A data structure that contains information about the path through a model hierarchy to a specific picked object. Defined by the TQ3HitPath data type.

hit testing: See picking.

hot angle: The half-angle (specified in radians) from the center of a spot light's cone of light within which the light remains at constant full intensity. See also fall-off value, outer angle.

identity matrix: Any $n \times n$ square matrix with elements a_{ij} such that $a_{ij} = 1$ if $i = j$ and $a_{ij} = 0$ otherwise. Compare inverse.

idle method: See file idle method, view idle method.

illumination shader: A shader that determines the effects of the view's group of lights on the objects in a model. Compare Lambert illumination shader, Phong illumination shader.

image: The two-dimensional product of rendering.

image plane structure: A data structure that contains information about an image plane. Defined by the TQ3ImagePlane data type.

immediate mode: A mode of defining and rendering a model in which the application maintains the only copy of the model data. See also retained mode.

immediate object: An object that is rendered in immediate mode. See also retained object.

infinite light: See directional light.

information group: A group that contains one or more strings (and no other types of QuickDraw 3D objects).

inherit: To have the data and methods of a parent class apply to a child class. Compare override.

inheritance: The property of the QuickDraw 3D class hierarchy whereby a child class inherits the data and methods of its parent class.

initial line: See polar axis.

inline: A method of executing groups that does not push and pop the graphics state stack before and after it is executed.

inline flag: A group state flag that determines whether or not a group should be executed inline. Compare drawable flag, picking flag.

inner product: See dot product.

input/output (I/O): The parts of a computer system that transfer data to or from peripheral devices.
instantiable class A class of which instances can be created. All leaf classes are instantiable, and many parent classes are instantiable as well. (For example, both the class TQ3AttributeSet and its parent class TQ3SetObject are instantiable.)

interacting: The process of selecting and manipulating objects in a model.

interactive renderer: A renderer that uses a fast and accurate algorithm for drawing solid, shaded surfaces. See also wireframe renderer.

interpolated shading: See Gouraud shading.

interpolation style: A type of QuickDraw 3D object that determines the method of interpolation a renderer uses when applying lighting or other shading effects to a surface.

intersection: The set of points that lie inside both of two given solid objects. The intersection of the objects A and B is represented by the function $A \llcorner B$. Compare complement, union.

inverse: For an $n \times n$ square matrix A with a nonzero determinant, the matrix B such that $AB = BA = I$, where I is the $n \times n$ identity matrix.

inverse matrix: See inverse.

I/O: See input/output.

I/O proxy display group: A display group that contains several representations of a single geometric object.

isometric projection: A type of orthographic projection in which the view plane is not perpendicular to any of the principal axes of the object being projected but makes equal angles with each of those axes. Compare elevation projection.

join point: See knot.

knot: A point on a curve that joins two segments of the curve.

knot vector: An array of numbers that defines a curve's knots.

Lambertian reflection: See diffuse reflection.

Lambert illumination: A method of calculating the illumination of a point on a surface based on diffuse reflection. Compare null illumination, Phong illumination.

Lambert illumination shader: An illumination shader that implements a Lambert illumination model. Compare null illumination shader, Phong illumination shader.

leaf class: A class that has no children.

leaf object: An instance of a leaf class.

leaf type: The object type of a leaf object.

least significant bit (LSB): The bit contributing the least value in a string of bits. Same as low-order bit. Compare most significant bit.

left-handed coordinate system: A coordinate system that obeys the left-hand rule. In a left-handed coordinate system, positive rotations of an axis are clockwise. Compare right-handed coordinate system.

left-hand rule: A method of determining the direction of the positive z axis (and thereby the front of a planar surface). According to the left-hand rule, if the thumb of the left hand points in the direction of the positive x axis and the index finger points in the direction of the positive y axis, then the middle finger points in the direction of the positive z axis. Compare right-hand rule.

light: See light object.

light attenuation: See attenuation.

light data structure: A data structure that contains basic information about a light. Defined by the TQ3LightData data type.

light fall-off: See fall-off value.

light group: A group that contains one or more lights (and no other types of QuickDraw 3D objects).

light object: A type of QuickDraw 3D object that you can use to illuminate the surfaces in a model. A light object is an instance of the TQ3LightObject class. See also ambient light, directional light, point light, spot light.

line: A straight segment in three-dimensional space defined by its two endpoints, with an optional set of attributes. Defined by the TQ3LineData data type.

line of projection: See projector.

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

local coordinate system: The coordinate system in which an individual geometric objects is defined. Also called the object coordinate system or the modeling coordinatesystem. Compare camera coordinate system, window coordinate system, world coordinate system.

local space: See local coordinate system.

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

low-order bit: See least significant bit.

LSB: See least significant bit.

luminance: The intensity of light in a color.

Macintosh draw context: A draw context that is associated with a Macintosh window.

Macintosh draw context data structure: A data structure that contains information about a Macintosh draw context. Defined by the TQ3MacDrawContextData data type.

Macintosh FSSpec storage object: A storage object that represents the data fork of a Macintosh file using a file system specification structure (of type FSSpec).

Macintosh storage object: A storage object that represents the data fork of a Macintosh file using a file reference number. Compare Macintosh FSSpec storage object.

mapping: The process of transforming one coordinate space into another.

marker: A two-dimensional object typically used to indicate the position of an object (or part of an object) in a window. Defined by the TQ3MarkerData data type.
matrix A rectangular array of numbers. QuickDraw 3D defines 3-by-3 and 4-by-4 matrices using the TQ3Matrix3x3 and TQ3Matrix4x4 data types.

matrix transform: Any transform specified by an affine, invertible 4-by-4 matrix.

memory storage object: A storage object that represents a dynamically allocated block of RAM. Compare handle storage object.

mesh: A collection of vertices, faces, and edges that represent a topological polyhedron. Defined by the TQ3Mesh data type.

mesh component: A collection of connected vertices in a mesh. Defined by the TQ3MeshComponent data type.

mesh corner: A mesh face together with one of its vertices. You can associate a set of attributes with a mesh corner. The attributes in a corner override any existing attributes of the associated vertex.

mesh edge: A line that connects two mesh vertices. A mesh edge is part of one or more mesh faces. Defined by the TQ3MeshEdge data type.

mesh face: A closed figure that forms part of a mesh. Unlike the faces of other geometric objects, mesh faces do not need to be planar. Defined by the TQ3MeshFace data type.

mesh iterator structure: A data structure used by QuickDraw 3D to maintain information when iterating through parts of a mesh. Defined by the

TQ3MeshIterator data type.

mesh part: See mesh part object.

mesh part object: A distinguishable part of a mesh. A mesh part object is an instance of the TQ3MeshPartObject class.

mesh vertex: A vertex (that is, a three-dimensional point) that is contained in a mesh. Defined by the TQ3MeshVertex data type.

metafile: A file format (that is, a description of the format of a kind of file). See also QuickDraw 3D Object Metafile.

metafile object: A basic unit contained in a file that conforms to the QuickDraw 3D Object Metafile.

metahandler: An application-defined function that QuickDraw 3D calls to build a method table for a custom object type. Compare attribute metahandler.

method: An item of data associated with a particular object class. The data is usually a function pointer or other information used by the object class.

metric pick: See metric pick object.

metric pick object: A pick object whose pick geometry has a pick origin.

model: A collection of synthetic three-dimensional geometric objects and groups of geometric objects. A model represents a prototype.

modeling: The process of creating a representation of real or abstract objects.

modeling coordinate system: See local coordinate system.

modeling space: See local coordinate system.
most significant bit (MSB) The bit contributing the greatest value in a string of bits. Same as high-order bit. Compare least significant bit.

move button: A button in the controller strip of a viewer object that, when clicked, puts the cursor into move mode. Subsequent dragging on an object in the picture area causes the object to be moved to a new location. Compare camera angle button, distance button, rotate button, zoom button.

MSB: See most significant bit.

natural attribute: An attribute that can naturally be contained in a set of attributes of a specific type.

natural surface parameterization: A parameterization of a surface that can be derived directly from the definition of the surface. Compare custom surface parameterization, standard surface parameterization.

near plane: See hither plane.

nonuniform rational B-spline (NURB): A curve defined by nonuniform parametric ratios of B-spline polynomials. NURB curves can be used to define very complex curves and surfaces, as well as very common geometric objects (for instance, the conic sections). See also control point, knot, NURB curve, NURB patch.

normal: (a.) Perpendicular. (n.) A normal vector.

normal file: A metafile in which the specification of an object in the file never occurs more than once. In other words, a file object that contains a table of contents that lists all multiply-referenced objects in the file. See also normal file, stream file.

normalized vector: A vector whose length is 1.

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

normal vector: A vector that is normal (that is perpendicular) to a surface or planar object at a specific point.

notice: A condition that is less severe than a warning, and that will likely not cause problems. See also error, warning.

notify function: See tracker notify function.

null illumination: A method of calculating the illumination of a point on a surface that depends only on the diffuse color of the point. Compare Lambert illumination, Phong illumination.

null illumination shader: An illumination shader that implements a null illumination model. Compare Lambert illumination shader, Phong illumination shader.

NURB: See nonuniform rational B-spline.

NURB curve: A three-dimensional curve represented by a NURB equation. Defined by the TQ3NURBCurveData data type.

NURB patch: A three-dimensional surface represented by a NURB equation. Defined by the TQ3NURBPatchData data type.

object: (1) See QuickDraw 3D object. (2) See metafile object. object coordinate system See local coordinate system.

object space: See local coordinate system.

object type: The identifier of the class of which a QuickDraw 3D object is an instance. Also called the class type.

oblique projection: A type of parallel projection in which the view plane is not perpendicular to the viewing direction. Compare orthographic projection.

off-axis viewing: A method of perspective projection in which the center of the projected object on the view plane is not on the camera vector.

opaque: (1) For a data structure, not publicly defined. You must use QuickDraw 3D functions to get and set values in an opaque data structure. For an object, having data and methods that are not publicly defined. (2) For a geometric object, not allowing light to pass through.

open: Said of a storage object whenever its associated storage is in use—for example, when an application is reading data from a file object attached to the storage object.

order: For a NURB curve or patch, one more than the highest degree equation used to define the curve or patch. For example, the order of a NURB curve defined by cubic polynomial equations is 4.

ordered display group: A display group in which the objects in the group are sorted by their type.

orientation style: A type of QuickDraw 3D object that determines which side of a planar surface is considered to be the "front" side.

origin: In Cartesian coordinates, the point (0, 0) or (0, 0, 0). The coordinate axes intersect at the origin.

original QuickDraw: See QuickDraw.

orthogonal: Perpendicular.

orthographic camera: A type of camera that uses orthographic projection.

orthographic camera data structure: A data structure that contains basic information about an orthographic camera. Defined by the `TQ3OrthographicCameraData` data type.

orthographic projection: A type of parallel projection in which the view plane is perpendicular to the viewing direction. Compare oblique projection. See also elevation projection, isometric projection.

outer angle: The half-angle (specified in radians) from the center of a spot light's cone to the edge of the cone. See also fall-off value, hot angle.

outer product: See cross product.

override: To define class data or methods that replace those of the parent class. Compare inherit.

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