



## Tarjeta de Referencia

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## GL Functions

### Primitives

void **glBegin** (GLenum mode)  
void **glEdgeFlag** (GLboolean flag)  
void **glEdgeFlagv** (const GLboolean \*flag)  
void **glEnd** (void)  
extern void **glPolygonOffset** (GLfloat factor, GLfloat units)  
void **glRect** (TYPE x1, TYPE y1, TYPE x2, TYPE y2)  
void **glRectv** (const TYPE \*v1, const TYPE \*v2)  
void **glVertex2** (TYPE x, TYPE y)  
void **glVertex3** (TYPE x, TYPE y, TYPE z)  
void **glVertex4** (TYPE x, TYPE y, TYPE z, TYPE w)

### Vertex Arrays

extern void **glArrayElement** (GLint i)  
extern void **glColorPointer** (GLint size, GLenum type, GLsizei stride, const GLvoid \*pointer)  
extern void **glDisableClientState** (GLenum array)  
extern void **glDrawArrays** (GLenum mode, GLint first, GLsizei count)  
extern void **glDrawElements** (GLenum mode, GLsizei count, GLenum type, const GLvoid \*indices)  
extern void **glEdgeFlagPointer** (GLsizei stride, const GLvoid \*pointer)  
extern void **glEnableClientState** (GLenum array)  
extern void **glIndexPointer** (GLenum type, GLsizei stride, const GLvoid \*pointer)  
extern void **glInterleavedArrays** (GLenum format, GLsizei stride, const GLvoid \*pointer)  
extern void **glNormalPointer** (GLenum type, GLsizei stride, const GLvoid \*pointer)  
extern void **glTexCoordPointer** (GLint size, GLenum type, GLsizei stride, const GLvoid \*pointer)  
extern void **glVertexPointer** (GLint size, GLenum type, GLsizei stride, const GLvoid \*pointer)

### Coordinate Transformation

void **glDepthRange** (GLclampd near, GLclampd far)  
void **glFrustum** (GLdouble left, GLdouble right, GLdouble bottom, GLdouble top, GLdouble near, GLdouble far)  
void **glLoadIdentity** (void)  
void **glLoadMatrix** (const TYPE \*m)  
void **glMatrixMode** (GLenum mode)  
void **glMultMatrix** (const TYPE \*m)  
void **glOrtho** (GLdouble left, GLdouble right, GLdouble bottom, GLdouble top, GLdouble near, GLdouble far)  
void **glPopMatrix** (void)  
void **glPushMatrix** (void)  
void **glRotate** (TYPE angle, TYPE x, TYPE y, TYPE z)  
void **glScale** (TYPE x, TYPE y, TYPE z)  
void **glTranslate** (TYPE x, TYPE y, TYPE z)  
void **glViewport** (GLint x, GLint y, GLsizei width, GLsizei height)

### Coloring and Lighting

void **glColor3** (TYPE red, TYPE green, TYPE blue)  
void **glColor4** (TYPE red, TYPE green, TYPE blue, TYPE alpha)  
void **glColorMaterial** (GLenum face, GLenum mode)  
void **glFrontFace** (GLenum dir)  
void **glGetLight** (GLenum light, GLenum pname, TYPE \*params)  
void **glGetMaterial** (GLenum face, GLenum pname, TYPE \*params)  
void **glIndex** (TYPE index)

void **glLight** (GLenum light, GLenum pname, TYPE param)  
void **glLightModel** (GLenum pname, TYPE param)  
void **glMaterial** (GLenum face, GLenum pname, TYPE param)  
void **glNormal3** (TYPE nx, TYPE ny, TYPE nz)  
void **glShadeModel** (GLenum mode)

### Clipping

void **glClipPlane** (GLenum plane, const GLdouble \*equation)  
void **glGetClipPlane** (GLenum plane, GLdouble \*equation)

### Rasterization

void **glBitmap** (GLsizei width, GLsizei height, GLfloat xorig, GLfloat yorig, GLfloat xmove, GLfloat ymove, const GLubyte \*bitmap)  
void **glCullFace** (GLenum mode)  
void **glGetPolygonStipple** (GLubyte \*mask)  
void **glLineStipple** (GLint factor, GLushort pattern)  
void **glLineWidth** (GLfloat width)  
void **glPointSize** (GLfloat size)  
void **glPolygonMode** (GLenum face, GLenum mode)  
void **glPolygonStipple** (const GLubyte \*mask)  
void **glRasterPos2** (TYPE x, TYPE y)  
void **glRasterPos3** (TYPE x, TYPE y, TYPE z)  
void **glRasterPos4** (TYPE x, TYPE y, TYPE z, TYPE w)

### Pixel Operations

void **glCopyPixels** (GLint x, GLint y, GLsizei width, GLsizei height, GLenum type)  
void **glDrawPixels** (GLsizei width, GLsizei height, GLenum format, GLenum type, const GLvoid \*pixels)  
void **glGetPixelMap** (GLenum map, TYPE \*values)  
void **glPixelMap** (GLenum map, GLint mapsize, const TYPE \*values)  
void **glPixelStore** (GLenum pname, TYPE param)  
void **glPixelTransfer** (GLenum pname, TYPE param)  
void **glPixelZoom** (GLfloat xfactor, GLfloat yfactor)  
void **glReadBuffer** (GLenum mode)  
void **glReadPixels** (GLint x, GLint y, GLsizei width, GLsizei height, GLenum format, GLenum type, GLvoid \*pixels)

### Textures

GLboolean **glAreTexturesResident** (GLsizei n, const GLuint \*textures, GLboolean \*residences)  
void **glBindTexture** (GLenum target, GLuint texture)  
void **glCopyTexSubImage1D** (GLenum target, GLint level, GLint xoffset, GLint x, GLint y, GLsizei width)  
void **glCopyTexSubImage2D** (GLenum target, GLint level, GLint xoffset, GLint yoffset, GLint x, GLint y, GLsizei width, GLsizei height)  
void **glCopyTexImage1D** (GLenum target, GLint level, GLenum internalFormat, GLint x, GLint GLsizei v, GLint border)  
void **glCopyTexImage2D** (GLenum target, GLint level, GLenum internalFormat, GLint x, GLint, GLsizei width, GLsizei height, GLint border)  
void **glDeleteTextures** (GLsizei n, const GLuint \*textures)  
void **glGenTextures** (GLsizei n, GLuint \*textures)  
void **glGetTexEnv** (GLenum target, GLenum pname, TYPE \*params)  
void **glGetTexGen** (GLenum coord, GLenum pname, TYPE \*params)  
void **glGetTexLevelParameter** (GLenum target, GLint level, GLenum pname, TYPE \*params)  
void **glGetTexParameter** (GLenum target, GLenum pname, TYPE \*params)  
void **glGetTeximage** (GLenum target, GLint level, GLenum format, GLenum type, GLvoid \*pixels)  
void **glIsTexture** (GLuint texture)  
void **glTexCoord1** (TYPE s)  
void **glTexCoord2** (TYPE s, TYPE t)  
void **glTexCoord3** (TYPE s, TYPE t, TYPE r)  
void **glTexCoord4** (TYPE s, TYPE t, TYPE r, TYPE q)  
void **glTexEnv** (GLenum target, GLenum pname, TYPE param)  
void **glTexGen** (GLenum coord, GLenum pname, TYPE param)  
void **glTexImage1D** (GLenum target, GLint level, GLint components, GLsizei width, GLint border, GLenum format, GLenum type, const GLvoid \*pixels)  
void **glTexImage2D** (GLenum target, GLint level, GLint components,

GLsizei width, GLsizei height, GLint border, GLenum format, GLenum type, const GLvoid \*pixels)  
void **glTexParameter** (GLenum target, GLenum pname, TYPE param)  
void **glTexSubImage1D** (GLenum target, GLint level, GLint xoffset, GLsizei width, GLenum format, GLenum type, const GLvoid \*pixels)  
void **glTexSubImage2D** (GLenum target, GLint level, GLint xoffset, GLint yoffset, GLsizei width, GLsizei height, GLenum format, GLenum type, const GLvoid \*pixels)

### Fog

void **glFog** (GLenum pname, TYPE param)

### Frame Buffer Operations

void **glAccum** (GLenum op, GLfloat value)  
void **glAlphaFunc** (GLenum func, GLclampf ref)  
void **glBlendFunc** (GLenum sfactor, GLenum dfactor)  
void **glClear** (GLbitfield mask)  
void **glClearAccum** (GLfloat red, GLfloat green, GLfloat blue, GLfloat alpha)  
void **glClearColor** (GLclampf red, GLclampf green, GLclampf blue, GLclampf alpha)  
void **glClearDepth** (GLclampd depth)  
void **glClearIndex** (GLfloat c)  
void **glClearStencil** (GLint s)  
void **glColorMask** (GLboolean red, GLboolean green, GLboolean blue, GLboolean alpha)  
void **glDepthFunc** (GLenum func)  
void **glDepthMask** (GLboolean flag)  
void **glDrawBuffer** (GLenum mode)  
void **glIndexMask** (GLuint mask)  
void **glLogicOp** (GLenum opcode)  
void **glScissor** (GLint x, GLint y, GLsizei width, GLsizei height)  
void **glStencilFunc** (GLenum func, GLint ref, GLuint mask)  
void **glStencilMask** (GLuint mask)  
void **glStencilOp** (GLenum fail, GLenum pass, GLenum zpass)

### Evaluators

void **glEvalCoord1** (TYPE u)  
void **glEvalCoord2** (TYPE u, TYPE v)  
void **glEvalMesh1** (GLenum mode, GLint i1, GLint i2)  
void **glEvalMesh2** (GLenum mode, GLint i1, GLint i2, GLint j1, GLint j2)  
void **glEvalPoint1** (GLint i)  
void **glEvalPoint2** (GLint i, GLint j)  
void **glGetMap** (GLenum target, GLenum query, TYPE \*v)  
void **glMap1** (GLenum target, TYPE u1, TYPE u2, GLint stride, GLint order, const TYPE \*points)  
void **glMap2** (GLenum target, TYPE u1, TYPE u2, GLint ustride, GLint uorder, TYPE v1, TYPE v2, GLint vstride, GLint vorder, const TYPE \*points)  
void **glMapGrid1** (GLint n, TYPE u1, TYPE u2)  
void **glMapGrid2** (GLint un, TYPE u1, TYPE u2, GLint vn, TYPE v1, TYPE v2)

### Selection and Feedback

void **glFeedbackBuffer** (GLsizei size, GLenum type, GLfloat \*buffer)  
void **glInitNames** (void)  
void **glLoadName** (GLuint name)  
void **glPassThrough** (GLfloat token)  
void **glPopName** (void)  
void **glPushName** (GLuint name)  
GLint **glRenderMode** (GLenum mode)  
void **glSelectBuffer** (GLsizei size, GLuint \*buffer)

### Display Lists

void **glCallList** (GLuint list)  
void **glCallLists** (GLsizei n, GLenum type, const GLvoid \*lists)  
void **glDeleteLists** (GLuint list, GLsizei range)  
void **glEndList** (void)  
GLuint **glGenLists** (GLsizei range)  
GLboolean **glIsList** (GLuint list)  
void **glListBase** (GLuint base)  
void **glNewList** (GLuint list, GLenum mode)

## Modes and Execution

void **glDisable** (GLenum cap)  
void **glEnable** (GLenum cap)  
void **glFinish** (void)  
void **glFlush** (void)  
void **glHint** (GLenum target, GLenum mode)  
GLboolean **glIsEnabled** (GLenum cap)

## State Queries

void **glGetBooleanv** (GLenum pname, GLboolean \*params)  
void **glGetDoublev** (GLenum pname, GLdouble \*params)  
GLenum **glGetError** (void)  
void **glGetFloatv** (GLenum pname, GLfloat \*params)  
void **glGetIntegerv** (GLenum pname, GLint \*params)  
const GLubyte\* **glGetString** (GLenum name)  
void **glPopAttrib** (void)  
void **glPushAttrib** (GLbitfield mask)

## GLU Functions

### Coordinate Transformations

void **gluLookAt** (GLdouble eyex, GLdouble eyey, GLdouble eyez, GLdouble centerx, GLdouble centery, GLdouble centerz, GLdouble upx, GLdouble upy, GLdouble upz)  
void **gluOrtho2D** (GLdouble left, GLdouble right, GLdouble bottom, GLdouble top)  
void **gluPerspective** (GLdouble fovy, GLdouble aspect, GLdouble zNear, GLdouble zFar)  
void **gluPickMatrix** (GLdouble x, GLdouble y, GLdouble width, GLdouble height, GLint viewport[4])  
int **gluProject** (GLdouble objx, GLdouble objy, GLdouble objz, GLdouble modelMatrix[16], GLdouble projMatrix[16], GLint viewport[4], GLdouble \*winx, GLdouble \*winy, GLdouble \*winz)  
int **gluUnProject** (GLdouble winx, GLdouble winy, GLdouble winz, GLdouble modelMatrix[16], GLdouble projMatrix[16], GLint viewport[4], GLdouble \*objx, GLdouble \*objy, GLdouble \*objz)

### Manipulating Images for Texturing

int **gluBuild1DMipmaps** (GLenum target, GLint components, GLint width, GLenum format, GLenum type, void \*data)  
int **gluBuild2DMipmaps** (GLenum target, GLint components, GLint width, GLint height, GLenum format, GLenum type, void \*data)  
int **gluScaleImage** (GLenum format, GLint widthin, GLint heightin, GLenum typein, const void \*datain, GLint widthout, GLint heightout, GLenum typeout, void \*dataout)

### Polygon Tessellation

void **gluBeginPolygon** (GLUtesselator \*tess)  
void **gluDeleteTess** (GLUtesselator \*tobj)  
void **gluEndPolygon** (GLUtesselator \*tess)  
void **gluGetTessProperty** (GLUtesselator \*tess, GLenum which, GLdouble \*data)  
GLUtesselator\* **gluNewTess** (void)  
void **gluNextContour** (GLUtesselator \*tobj, GLenum type)  
void **gluTessBeginContour** (GLUtesselator \*tess)  
void **gluTessBeginPolygon** (GLUtesselator \*tobj)  
void **gluTessCallback** (GLUtesselator \*tobj, GLenum which, void (\*fn)())  
void **gluTessEndContour** (GLUtesselator \*tess)  
void **gluTessEndPolygon** (GLUtesselator \*tobj)  
void **gluTessNormal** (GLUtesselator \*tess, GLdouble x, GLdouble y, GLdouble z)  
void **gluTessProperty** (GLUtesselator \*tess, GLenum which, GLdouble value)  
void **gluTessVertex** (GLUtesselator \*tobj, GLdouble v[3], void \*data)

### Quadric Objects

GLUquadric\* **gluNewQuadric** (void)  
void **gluQuadricCallback** (GLUquadric \*qobj, GLenum which, void (\*fn)())  
void **gluQuadricDrawStyle** (GLUquadric \*quadObject, GLenum drawStyle)  
void **gluQuadricNormals** (GLUquadric \*quadObject, GLenum normals)  
void **gluQuadricOrientation** (GLUquadric \*quadObject, GLenum orientation)  
void **gluQuadricTexture** (GLUquadric \*quadObject, GLboolean textureCoords)

## Rendering Spheres, Cylinders, and Disks

void **gluCylinder** (GLUquadric \*qobj, GLdouble baseRadius, GLdouble topRadius, GLdouble height, GLint slices, GLint stacks)  
void **gluDisk** (GLUquadric \*qobj, GLdouble innerRadius, GLdouble outerRadius, GLint slices, GLint loops)  
void **gluPartialDisk** (GLUquadric \*qobj, GLdouble innerRadius, GLdouble outerRadius, GLint slices, GLint loops, GLdouble startAngle, GLdouble sweepAngle)  
void **gluSphere** (GLUquadric \*qobj, GLdouble radius, GLint slices, GLint stacks)

## NURBS Curve and Surfaces

void **gluBeginCurve** (GLUnurbs \*nobj)  
void **gluBeginSurface** (GLUnurbs \*nobj)  
void **gluBeginTrim** (GLUnurbs \*nobj)  
void **gluDeleteNurbsRenderers** (GLUnurbs \*nobj)  
void **gluEndCurve** (GLUnurbs \*nobj)  
void **gluEndSurface** (GLUnurbs \*nobj)  
void **gluEndTrim** (GLUnurbs \*nobj)  
void **gluGetNurbsProperty** (GLUnurbs \*nobj, GLenum property, GLfloat \*value)  
[Incompleto. Más información en la referencia oficial de OpenGL]

## Describing Errors

const GLubyte\* **gluGetString** (GLenum errorCode)  
const GLubyte\* **gluErrorString** (GLenum name)  
wchar\_t\* **gluErrorUnicodeStringEXT** (GLenum errCode)

## GLUT Functions

### Initialization

void **glutInit** (int \*argc, char \*\*argv)  
void **glutInitDisplayMode** (unsigned int mode)  
void **glutInitWindowPosition** (int x, int y)  
void **glutInitWindowSize** (int width, int height)  
void **glutMainLoop** (void)

### Window Management

int **glutCreateWindow** (char \*name)  
int **glutCreateSubWindow** (int win, int x, int y, int width, int height)  
void **glutDestroyWindow** (int win)  
void **glutFullScreen** (void)  
int **glutGetWindow** (void)  
void **glutHideWindow** (void)  
void **glutIconifyWindow** (void)  
void **glutPopWindow** (void)  
void **glutPushWindow** (void)  
void **glutPositionWindow** (int x, int y)  
void **glutPostRedisplay** (void)  
void **glutReshapeWindow** (int width, int height)  
void **glutSetCursor** (int cursor)  
void **glutSetWindow** (int win)  
void **glutSetWindowTitle** (char \*name)  
void **glutSetIconTitle** (char \*name)  
void **glutShowWindow** (void)  
void **glutSwapBuffers** (void)

### Overlay Management

void **glutEstablishOverlay** (void)  
void **glutHideOverlay** (void)  
void **glutPostOverlayRedisplay** (void)  
void **glutRemoveOverlay** (void)  
void **glutShowOverlay** (void)  
void **glutUseLayer** (GLenum layer)

### Menu Management

void **glutAddMenuEntry** (char \*name, int value)  
void **glutAddSubMenu** (char \*name, int value)  
void **glutAttachMenu** (int button)  
void **glutChangeToMenuEntry** (int entry, char \*name, int value)

void **glutChangeToSubMenu** (int entry, char \*name, int menu);  
int **glutCreateMenu** (void (\*func)(int value))  
void **glutDestroyMenu** (int menu)  
void **glutDetachMenu** (int button)  
int **glutGetMenu** (void)  
void **glutRemoveMenuItem** (int entry)  
void **glutSetMenu** (int menu)

## Callback Registration

void **glutButtonBoxFunc** (void (\*func)(int button, int state))  
void **glutDialsFunc** (void (\*func)(int dial, int value))  
void **glutDisplayFunc** (void (\*func)(void))  
void **glutEntryFunc** (void (\*func)(int state))  
void **glutIdleFunc** (void (\*func)(void))  
void **glutKeyboardFunc** (void (\*func)(unsigned char key, int x, int y))  
void **glutMenuStatusFunc** (void (\*func)(int status, int x, int y))  
void **glutMenuStateFunc** (void (\*func)(int status))  
void **glutMotionFunc** (void (\*func)(int x, int y))  
void **glutMouseFunc** (void (\*func)(int button, int state, int x, int y))  
void **glutOverlayDisplayFunc** (void (\*func)(void))  
void **glutPassiveMotionFunc** (void (\*func)(int x, int y))  
void **glutReshapeFunc** (void (\*func)(int width, int height))  
void **glutSpaceballButtonFunc** (void (\*func)(int button, int state))  
void **glutSpaceballMotionFunc** (void (\*func)(int x, int y, int z))  
void **glutSpaceballRotateFunc** (void (\*func)(int x, int y, int z))  
void **glutSpecialFunc** (void (\*func)(int key, int x, int y))  
void **glutTabletButtonFunc** (void (\*func)(int button, int state, int x, int y))  
void **glutTabletMotionFunc** (void (\*func)(int x, int y))  
void **glutTimerFunc** (unsigned int msec, void (\*func)(int value), value)  
void **glutVisibilityFunc** (void (\*func)(int state))

## Color Index Colormap Management

void **glutCopyColormap** (int win)  
GLfloat **glutGetColor** (int cell, int component)  
void **glutSetColor** (int cell, GLfloat red, GLfloat green, GLfloat blue)

## State Retrieval

int **glutDeviceGet** (GLenum info)  
int **glutExtensionSupported** (char \*extension)  
int **glutGet** (GLenum state)  
int **glutGetModifiers** (void)  
int **glutLayerGet** (GLenum info)

## Font Rendering

void **glutBitmapCharacter** (void \*font, int character)  
int **glutBitmapWidth** (GLUTbitmapFont font, int character)  
void **glutStrokeCharacter** (void \*font, int character)  
int **glutStrokeWidth** (GLUTstrokeFont font, int character)

## Geometric Object Rendering

void **glutSolidCone** (GLdouble base, GLdouble height, GLint slices, GLint stacks)  
void **glutSolidCube** (GLdouble size)  
void **glutSolidDodecahedron** (void)  
void **glutSolidIcosahedron** (void)  
void **glutSolidOctahedron** (void)  
void **glutSolidSphere** (GLdouble radius, GLint, slices, GLint stacks)  
void **glutSolidTeapot** (GLdouble size)  
void **glutSolidTetrahedron** (void)  
void **glutSolidTorus** (GLdouble innerRadius, GLdouble outerRadius, GLint nsides, GLint rings)  
void **glutWireCone** (GLdouble base, GLdouble height, GLint slices, GLint stacks)  
void **glutWireCube** (GLdouble size)  
void **glutWireDodecahedron** (void)  
void **glutWireIcosahedron** (void)  
void **glutWireOctahedron** (void)  
void **glutWireSphere** (GLdouble radius, GLint, slices, GLint stacks)  
void **glutWireTeapot** (GLdouble size)  
void **glutWireTetrahedron** (void)  
void **glutWireTorus** (GLdouble innerRadius, GLdouble outerRadius, GLint nsides, GLint rings)