The GL Utility Toolkit (GLUT)

GLUT serves two major purposes:
1. It interfaces with your operating system and window system
2. It provides various application utilities, such as drawing 3D shapes for you

You can find GLUT (actually freeGLUT) at:
http://freeglut.sourceforge.net/

What is GLUT?
You don't actually have to go out here. We will give you some libraries that are ready-to-use.

Using GLUT to Setup the Window
All the GLUT_XXX constants are #defined in glut.h

```
void glutDisplayMode( int enable);
```

// set the initial window configuration:

```
void glutInitDisplayMode( int displayMode);
```

// open the window and set its title:

```
int glutInitWindowPosition( int x, int y);
```

```
int glutInitWindowSize ( int width, int height);
```

```
int glutCreateWindow( const char* title);
```

```
int glutSetWindowTitle( const char* title);
```

Constants not beginning with GL_ or GLUT_ are user-defined

GLUT_RGBA         I want to display colors
GLUT_DOUBLE    I want to do double-buffering
GLUT_DEPTH       I want to use a depth-buffer while rendering

Using GLUT to Specify Event-driven Callback Functions

```
void glutDisplayFunc( void (*display)( int x, int y, int state ) );
```

For example, the Keyboard() function gets called whenever a keyboard key is hit:

```
int glutKeyboardFunc( void (*key)( unsigned char c, int x, int y ));
```

A NULL callback function means that this event will be ignored

The Keyboard Callback Function
Where the mouse was when the key was hit
The key that was hit

```
int Keyboard( unsigned char c, int x, int y );
```

Assign new display parameter values depending on what key was hit

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Good programming practice

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The MouseButton Callback Function
Where the mouse was when the button was hit
Which button was hit

```
void MouseButton( int button, int state, int x, int y );
```

- GLUT_LEFT_BUTTON
- GLUT_MIDDLE_BUTTON
- GLUT_RIGHT_BUTTON


do not return

```
void glutReshapeFunc( void (*reshape)( int width, int height ) );
```

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The GLUT 3D Objects

Without lighting, the GLUT solids don't look very cool. I'd recommend you stick with the wireframe versions of the GLUT 3D objects for now! We will get to lighting soon.