

# THE OPENGL

## 2.1 The OpenGL API

- OpenGL is a software interface to graphics hardware.
- This interface consists of about 150 distinct commands that you use to specify the objects and operations needed to produce interactive three-dimensional applications.
- OpenGL is designed as a streamlined, hardware-independent interface to be implemented on many different hardware platforms.
- To achieve these qualities, no commands for performing windowing tasks or obtaining user input are included in OpenGL; instead, you must work through whatever windowing system controls the particular hardware you're using.

The following list briefly describes the major graphics operations which OpenGL performs to render an image on the screen.

1. Construct shapes from geometric primitives, thereby creating mathematical descriptions of objects.

(OpenGL considers points, lines, polygons, images, and bitmaps to be primitives.)

2. Arrange the objects in three-dimensional space and select the desired vantage point for viewing the composed scene.

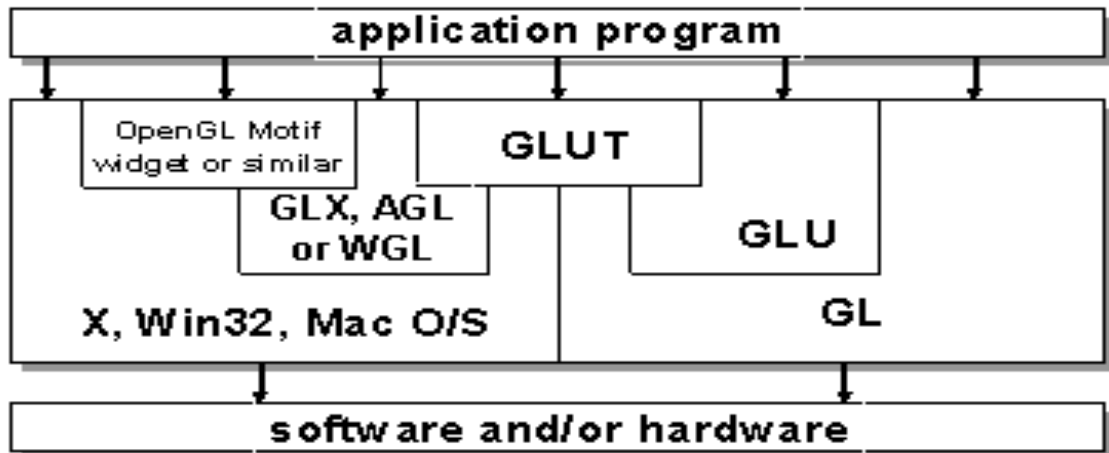
3. Calculate the color of all the objects. The color might be explicitly assigned by the application, determined from specified lighting conditions, obtained by pasting a texture onto the objects, or some combination of these three actions.

4. Convert the mathematical description of objects and their associated color information to pixels on the screen. This process is called *rasterization*.

## 2.2 OpenGL functions

- Primitive functions : Defines low level objects such as points, line segments, polygons etc.
- Attribute functions : Attributes determine the appearance of objects
  - Color (points, lines, polygons)

- Size and width (points, lines)
- Polygon mode
  - Display as filled
  - Display edges



- Display vertices
- Viewing functions : Allows us to specify various views by describing the camera's position and orientation.
- Transformation functions : Provides user to carry out transformation of objects like rotation, scaling etc.
- 'Input functions : Allows us to deal with a diverse set of input devices like keyboard, mouse etc
- Control functions : Enables us to initialize our programs, helps in dealing with any errors during execution of the program.
- Query functions : Helps query information about the properties of the particular implementation.

The entire graphics system can be considered as a state machine getting inputs from the application prog.

- inputs may change the state of a machine
- inputs may cause the machine to produce a visible output.

2 types of graphics functions :

- functions defining primitives
- functions that change the state of the machine.

Source : <http://elearningatria.files.wordpress.com/2013/10/cse-vi-computer-graphics-and-visualization-10cs65-notes.pdf>