

OpenGL: API's

① Initialization & Setup :

- glutInit()
- glutCreateWindow("title")
- glewInit()

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② Drawing primitives:

- `glBegin (GL_TRIANGLES) --- glEnd()`
- `glDrawArrays()`, `glDrawElements()`

③ Transformations:

- `glTranslatef (x, y, z);`
- `glRotatef (Angle, x, y, z);`
- `glScalef (x, y, z);`

④ Coloring and Texturing.

- `glColor3f (r, g, b);`
- `glTex Image 2D ();`

⑤ Shading and lighting.

- `glEnable (GL_LIGHTING);`

⑥ Buffer operations

- `glFlush()` displays the rendered image

APIs for Rendering

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1. GL (Open GL) : core graphics API.
2. GLU (OpenGL Utility Library) : Helper function for OpenGL.
3. GLUT (OpenGL Utility Toolkit) : windowing & user input management.

(i) GL Functions

- `glBegin(GL_TRIANGLES) ... glEnd()` ; Defines primitive shapes
- `glColor3f(r, g, b)` ; sets color
- `glVertex3f(x, y, z)` ; Defines a vertex
- `glTranslatef(x, y, z)`
- `glRotatef(angle, x, y, z)`
- `glScalef(x, y, z)`

(ii) GLU

- `gluOrtho2D(left, right, bottom, top)`
- `gluPerspective(fov, aspect, near, far)`
- `gluLookAt(eyex, eyey, eyez, centerx, centery, centerz, upx, upy, upz)`
- `glusphere()` , `glucylinder()`

(iii) GLUT

- `glutCreateWindow("OpenGL Window")`
- `glutDisplayFunc(displayFunc)`
- `glutKeyboardFunc(keyboardFunc)`
- `glutMouseFunc(mouseFunc)`
- `glutMainLoop()`

lighting \rightarrow `glLightfv(light, pname, params)`

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Call back functions

\hookrightarrow Used via GLUT

- `glutDisplayFunc (display)`
- `glutKeyboardFunc (Keyboard)`
- `glutReshapeFunc (reshape)`