```
 1: // $Id: ellipses.cpp,v 1.10 2016-07-20 13:50:04-07 - - $
 2:
 3: // Draw several ellipses in window.
 4:
 5: #include <cmath>
 6: #include <iostream>
 7: #include <string>
 8: using namespace std;
 9:
10: #include <GL/freeglut.h>
11: #include <libgen.h>
12:
13: // Characteristics of the window.
14: struct window {
15:    string name;
16:    int width {512};
17:    int height {384};
18: } window;
19:
20: const GLubyte RED[] = {0xFF, 0x00, 0x00};
21: const GLubyte CYAN[] = {0x00, 0xFF, 0xFF};
22: const GLubyte BLUE[] = {0x00, 0x00, 0xFF};
23: const GLubyte YELLOW[] = {0xFF, 0xFF, 0x00};
24:
25: void draw_ellipse (int kind, const GLubyte* color, float scale) {
26:    glBegin (kind);
27:    glEnable (GL_LINE_SMOOTH);
28:    glColor3ubv (color);
29:    const float delta = 2 * M_PI / 32;
30:    float width = window.width / 3 * scale;
31:    float height = window.height / 3 * scale;
32:    for (float theta = 0; theta < 2 * M_PI; theta += delta) {
33:       float xpos = width * cos (theta) + window.width / 2;
34:       float ypos = height * sin (theta) + window.height / 2;
35:       glVertex2f (xpos, ypos);
36:    }
37:    glEnd();
38: }
39:
40: // Called by glutMainLoop to display window contents.
41: void display() {
42:    cout << __func__ << "()" << endl;
43:    glClearColor (0.25, 0.25, 0.25, 1.0);
44:    glClear (GL_COLOR_BUFFER_BIT);
45:    glLineWidth (4);
46:    draw_ellipse (GL_POLYGON, CYAN, 1.0);
47:    draw_ellipse (GL_LINE_LOOP, RED, 1.0);
48:    draw_ellipse (GL_POLYGON, YELLOW, 0.5);
49:    draw_ellipse (GL_LINE_LOOP, BLUE, 0.5);
50:    glutSwapBuffers();
51: }
52:
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53:
54: void reshape (int width, int height) {
55:    cout << __func__ << "(" << width << "," << height << ")" << endl;
56:    window.width = width;
57:    window.height = height;
58:    glMatrixMode (GL_PROJECTION);
59:    glLoadIdentity();
60:    glOrtho (0, window.width, 0, window.height, -1, +1);
61:    glMatrixMode (GL_MODELVIEW);
62:    glViewport (0, 0, window.width, window.height);
63:    glutPostRedisplay();
64: }
65:
66: void close() {
67:    cout << __func__ << "()" << endl;
68: }
69:
70: void entry (int state) {
71:    cout << __func__ << "(";
72:    switch (state) {
73:       case GLUT_LEFT: cout << "GLUT_LEFT"; break;
74:       case GLUT_ENTERED: cout << "GLUT_ENTERED"; break;
75:       default: cout << state; break;
76:    }
77:    cout << ")" << endl;
78: }
79:
80: int main (int argc, char** argv) {
81:    window.name = basename (argv[0]);
82:    glutInit (&argc, argv);
83:    glutInitDisplayMode (GLUT_RGBA | GLUT_DOUBLE);
84:    glutInitWindowSize (window.width, window.height);
85:    glutInitWindowPosition (128, 128);
86:    glutCreateWindow (window.name.c_str());
87:    glutDisplayFunc (display);
88:    glutReshapeFunc (reshape);
89:    glutEntryFunc (entry);
90:    glutCloseFunc (close);
91:    glutMainLoop();
92:    return 0;
93: }
94:
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1: @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ mkc: starting ellipses.cpp
2: ellipses.cpp:
3:      $Id: ellipses.cpp,v 1.10 2016-07-20 13:50:04-07 - - $
4: g++ -g -O0 -Wall -Wextra -rdynamic -std=gnu++14 ellipses.cpp
5:          -o ellipses -lglut -lGLU -lGL -lX11 -lrt -lm
6: rm -f ellipses.o
7: @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ mkc: finished ellipses.cpp
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