```
 1: // $Id: ellipses.cpp,v 1.15 2019-02-22 19:17:22-08 - - $
 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:    glColor3ubv (color);
28:    const float delta = 2 * M_PI / 32;
29:    float width = window.width / 3 * scale;
30:    float height = window.height / 3 * scale;
31:    for (float theta = 0; theta < 2 * M_PI; theta += delta) {
32:       float xpos = width * cos (theta) + window.width / 2;
33:       float ypos = height * sin (theta) + window.height / 2;
34:       glVertex2f (xpos, ypos);
35:    }
36:    glEnd();
37: }
38:
39: // Called by glutMainLoop to display window contents.
40: void display() {
41:    cout << __PRETTY_FUNCTION__ << ":" << endl;
42:    glClearColor (0.25, 0.25, 0.25, 1.0);
43:    glClear (GL_COLOR_BUFFER_BIT);
44:    glLineWidth (8);
45:    draw_ellipse (GL_POLYGON, CYAN, 1.0);
46:    draw_ellipse (GL_LINE_LOOP, RED, 1.0);
47:    draw_ellipse (GL_POLYGON, YELLOW, 0.5);
48:    draw_ellipse (GL_LINE_LOOP, BLUE, 0.5);
49:    glutSwapBuffers();
50: }
51:
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52:
53: void reshape (int width, int height) {
54:    cout << __PRETTY_FUNCTION__ << ": "
55:         << width << ", " << height << endl;
56:    window.width = width;
57:    window.height = height;
58:    glMatrixMode (GL_PROJECTION);
59:    glLoadIdentity();
60:    gluOrtho2D (0, window.width, 0, window.height);
61:    glMatrixMode (GL_MODELVIEW);
62:    glViewport (0, 0, window.width, window.height);
63:    glutPostRedisplay();
64: }
65:
66: int main (int argc, char** argv) {
67:    window.name = basename (argv[0]);
68:    glutInit (&argc, argv);
69:    glutInitDisplayMode (GLUT_RGBA | GLUT_DOUBLE);
70:    glutInitWindowSize (window.width, window.height);
71:    glutInitWindowPosition (128, 128);
72:    glutCreateWindow (window.name.c_str());
73:    glutDisplayFunc (display);
74:    glutReshapeFunc (reshape);
75:    glutMainLoop();
76:    return 0;
77: }
78:
79: //TEST// mkpspdf ellipses.ps ellipses.cpp*
80:
```

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    1: @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ mkc: starting ellipses.cpp
    2: checksource ellipses.cpp
    3: ident ellipses.cpp
    4: ellipses.cpp:
    5:      $Id: ellipses.cpp,v 1.15 2019-02-22 19:17:22-08 - - $
    6: cpplint.py.perl ellipses.cpp
    7: Done processing ellipses.cpp
    8: g++ -g -O0 -Wall -Wextra -Werror -Wpedantic -Wshadow -fdiagnostics-color
=never -std=gnu++17 -Wold-style-cast ellipses.cpp -o ellipses -lm -lglut -lGLU
-lGL -lX11 -ldrm -lm
    9: rm -f ellipses.o
   10: @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@ mkc: finished ellipses.cpp
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