Primjer

- BouncingBall
- Kreiranje kruga

```
glTranslatef(ballX, ballY, 0.0f);  // Translate to (xPos, yPos)
// Use triangular segments to form a circle
glBegin(GL_TRIANGLE_FAN);
    glColor3f(0.0f, 0.0f, 1.0f);  // Blue
    glVertex2f(0.0f, 0.0f);       // Center of circle
    int numSegments = 100;
    GLfloat angle;
    for (int i = 0; i <= numSegments; i++) { // Last vertex same as first vertex
        angle = i * 2.0f * PI / numSegments;  // 360 deg for all segments
        glVertex2f(cos(angle) * ballRadius, sin(angle) * ballRadius);
    }
glEnd();
```

Primjer

- BouncingBall
- Pozicija, veličina i brzina kruga

```
GLfloat ballRadius = 0.5f;      // Radius of the bouncing ball
GLfloat ballX = 0.0f;           // Ball's center (x, y) position
GLfloat ballY = 0.0f;
GLfloat ballXMax, ballXMin, ballYMax, ballYMin; // Ball's center (x, y) bounds
GLfloat xSpeed = 0.02f;         // Ball's speed in x and y directions
GLfloat ySpeed = 0.007f;
```

Primjer

- BouncingBall
- Definisanje kretanja i ponašanja na ivicama prozora („odbijanje")

```
glutSwapBuffers();  // Swap front and back buffers (of double buffered mode)

// Animation Control - compute the location for the next refresh
ballX += xSpeed;
ballY += ySpeed;
// Check if the ball exceeds the edges
if (ballX > ballXMax) {
   ballX = ballXMax;
   xSpeed = -xSpeed;
} else if (ballX < ballXMin) {
   ballX = ballXMin;
   xSpeed = -xSpeed;
}
if (ballY > ballYMax) {
   ballY = ballYMax;
   ySpeed = -ySpeed;
} else if (ballY < ballYMin) {
   ballY = ballYMin;
   ySpeed = -ySpeed;
}
```
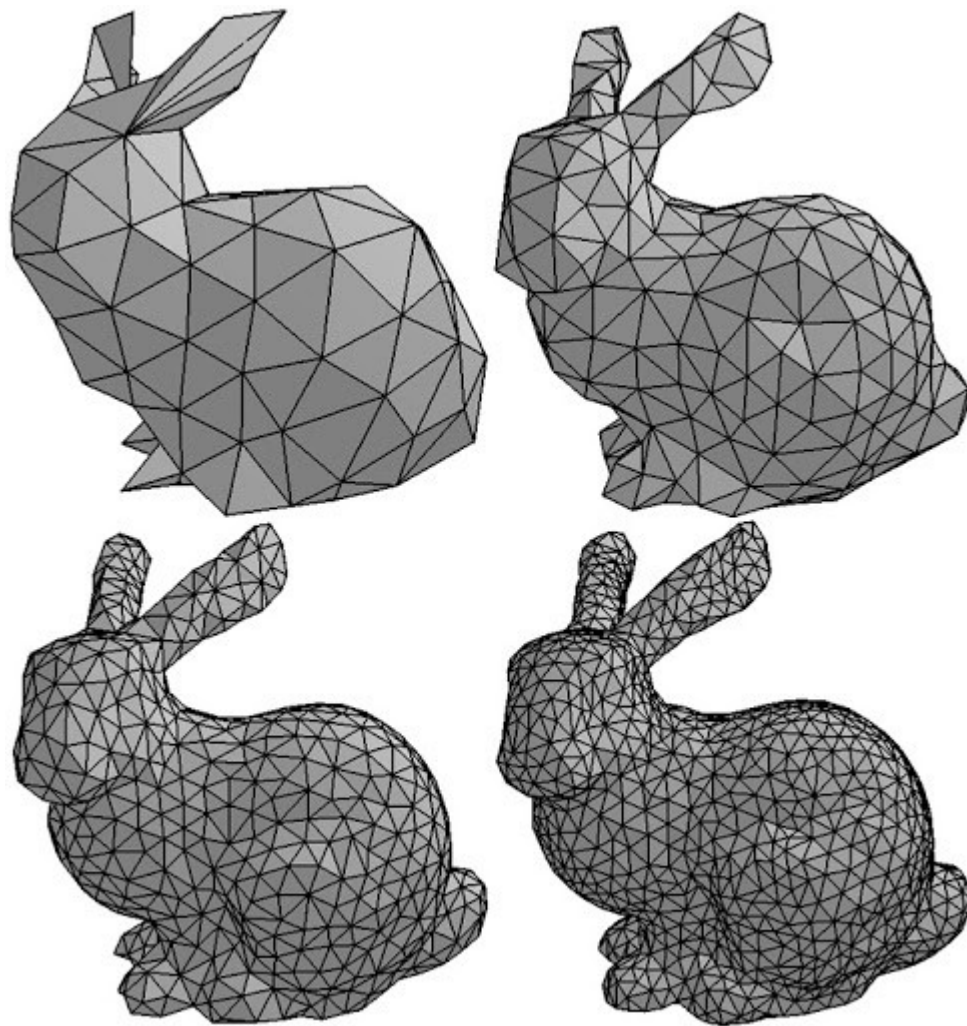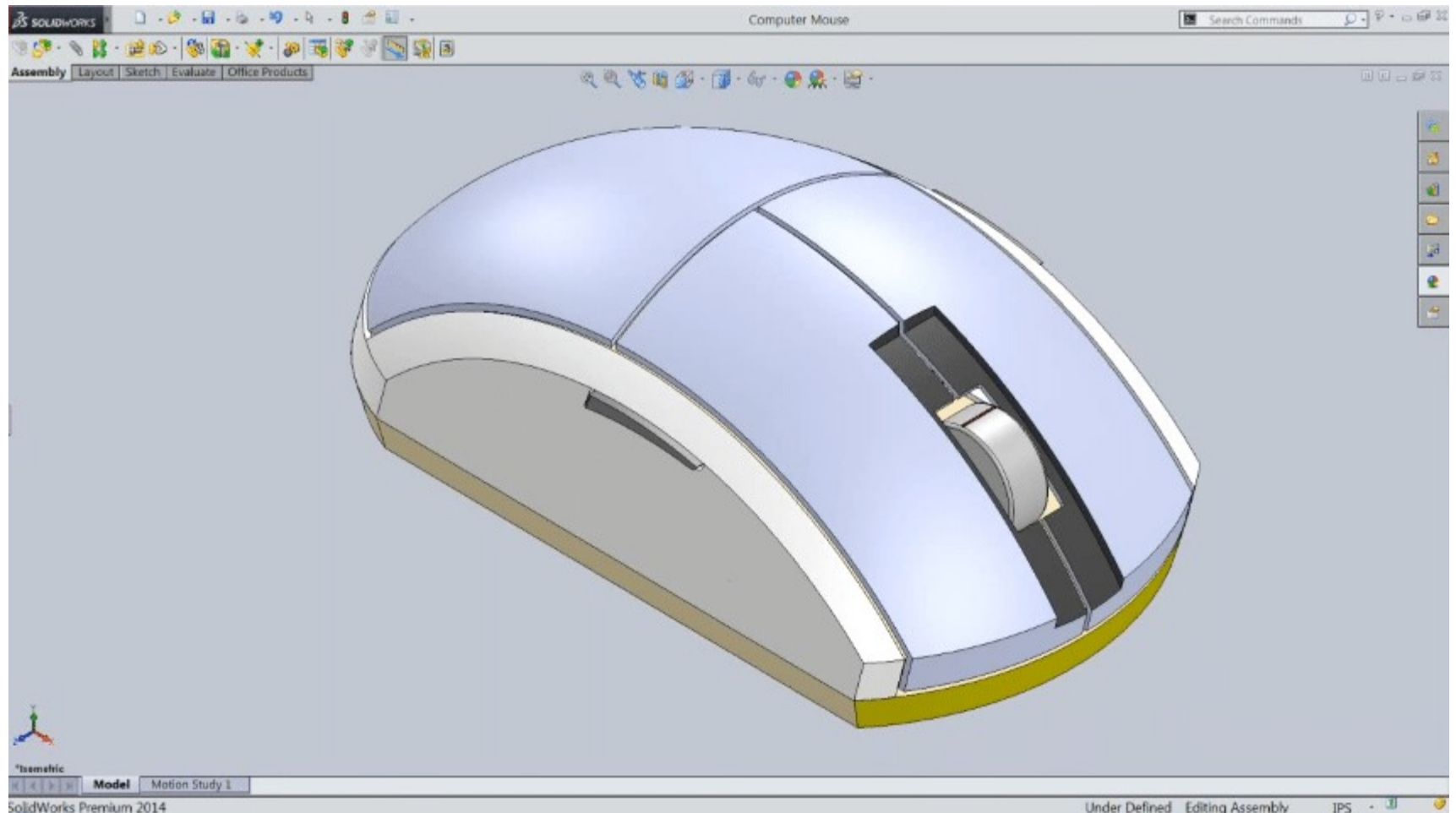
Unos sa perifernih uređaja

- void glutMouseFunc(void (*_func_)(int _button_, int _state_, int _x_, int _y_);

- void glutSpecialFunc(void (*func)(int key, int x, int y));

3D

3D mreža (mesh) – poligonski model

Computer Aided Design (CAD)

Programi za manipulaciju 3D modelima

- MeshLab, Blender
- SolidWorks, CATIA

Preporuka: MeshLab

- Besplatan
- Funkcionalnosti: prečišćavanje, filtriranje, editovanje, konverzija iz formata u format, mijenjanje rezolucije

- formati: .stl, .ply, .obj...
- Binarno i ASCII enkodovanje

Mesh (npr. STL format)

```
1   solid STL generated by MeshLab
2     facet normal -4.749331e-001 -7.393006e-001 4.773605e-001
3       outer loop
4         vertex  -2.766100e+000 1.697400e+000 1.667720e+001
5         vertex  -2.774700e+000 1.689300e+000 1.665610e+001
6         vertex  -2.751500e+000 1.675300e+000 1.665750e+001
7       endloop
8     endfacet
9     facet normal -4.493306e-001 -7.412990e-001 4.985757e-001
10      outer loop
11        vertex  -2.766100e+000 1.697400e+000 1.667720e+001
12        vertex  -2.751500e+000 1.675300e+000 1.665750e+001
13        vertex  -2.747600e+000 1.691500e+000 1.668510e+001
14      endloop
15    endfacet
16    facet normal -5.044552e-001 -7.444749e-001 4.373581e-001
17      outer loop
18        vertex  -2.774700e+000 1.689300e+000 1.665610e+001
19        vertex  -2.786200e+000 1.678000e+000 1.662360e+001
20        vertex  -2.759200e+000 1.659000e+000 1.662240e+001
21      endloop
22    endfacet
23    facet normal -4.802905e-001 -7.505236e-001 4.539112e-001
24      outer loop
25        vertex  -2.774700e+000 1.689300e+000 1.665610e+001
26        vertex  -2.759200e+000 1.659000e+000 1.662240e+001
27        vertex  -2.751500e+000 1.675300e+000 1.665750e+001
28      endloop
29    endfacet
```