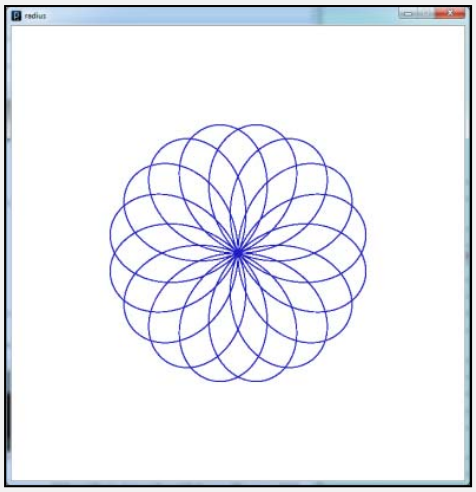
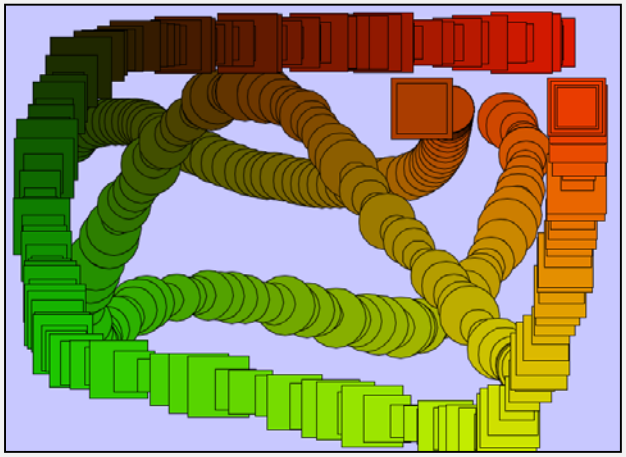
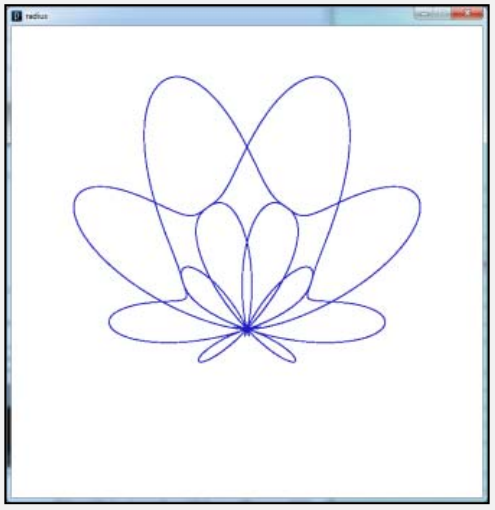
Three Dimensions







Oregon State University

Mike Bailey

mjb@cs.oregonstate.edu

The 3D Processing Functions You Will Care About

```
rotateX( radians );
rotateY( radians );
rotateZ( radians );

scale( sx, sy, sz );

translate( tx, ty, tz );

box( sizex, sizey, sizez );

sphereDetail( slices, stacks );
sphere( radius );

beginShape( );
vertex( x, y, z );
endShape( );
```

Sample 3D Program – the Global Variables at the top of the program


```
int LastMouseX;
Int LastMouseY;
int Udetail = 20;
Int Vdetail = 20;
float Yangle = 0.;
float Xrot = 0., Yrot = 0.;

boolean FillSphere = false;
boolean StillPressed = false;
boolean Animate = false;
```

Sample 3D Program – the setup( ) Function


```
void
setup( )
{
  size( 800, 800, P3D );
  background( 200, 200, 255 );
  stroke( 0, 0, 0 );
  fill( 255, 255, 0 );
}
```

This third argument to size( ) tells Processing to allow it to do 3D

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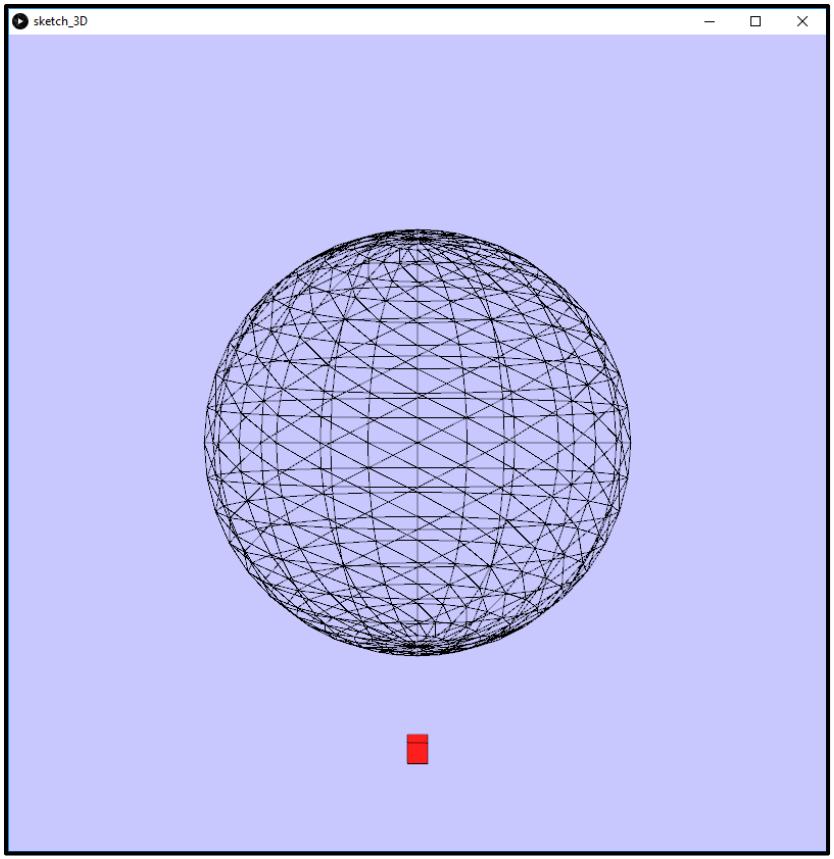
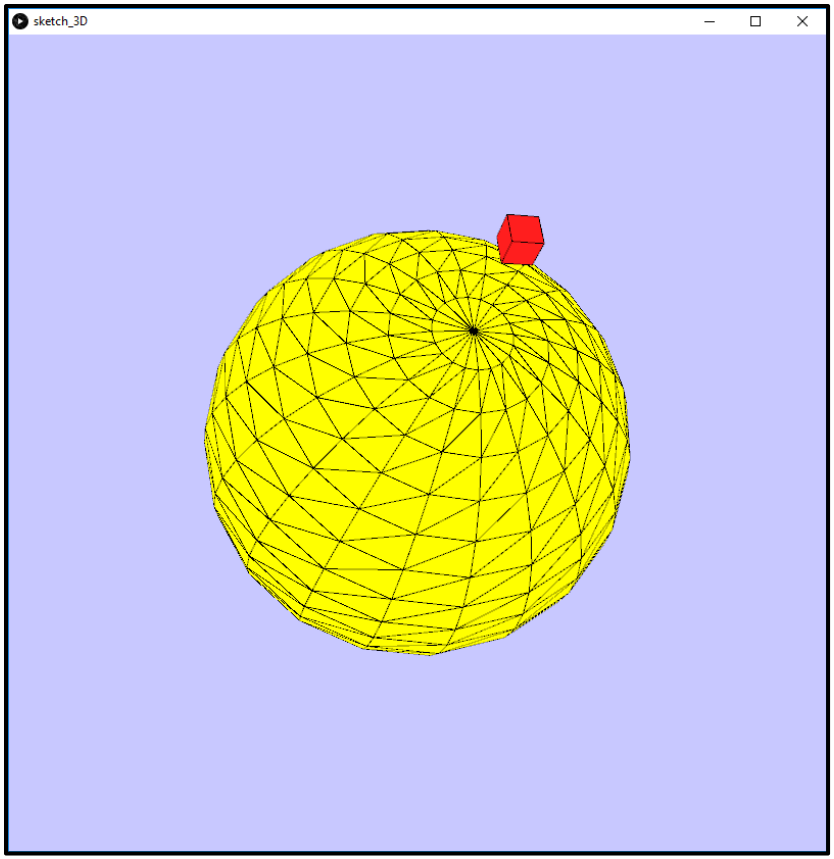
Sample 3D Program – the draw( ) Function, part I


```
void
draw( )
{
  background( 200, 200, 255 );
  if( keyPressed )
  {
     if( ! StillPressed )    // same as saying "if( StillPressed == false )"
     {
       switch( key )
       {
          case 'a':
            Animate = ! Animate;
            break;

          case 'f':
            FillSphere = ! FillSphere;
            break;

          case 'l':
            Udetail = Udetail - 1;
            Vdetail = Vdetail - 1;
            break;

          case 'm':
            Udetail = Udetail + 1;
            Vdetail = Vdetail + 1;
            break;
       }
     }
     StillPressed = true;
  }
  else
  {
    StillPressed = false;
  }
```

Sample 3D Program – the draw( ) Function, part II


```
  if( mousePressed )
  {
    int dx = mouseX - LastMouseX;
    int dy = mouseY - LastMouseY;
    Xrot = Xrot + dy;
    Yrot = Yrot + dx;
  }
  LastMouseX = mouseX;
  LastMouseY = mouseY;

  translate( width/2, height/2 );
  rotateY(  radians(Yrot) );
  rotateX(  radians(Xrot) );

  fill( 255, 30, 30 );
  pushMatrix( );
    rotateX(  radians(Yangle) );
    translate( 0, 300, 0 );
    box(20, 20, 20);
  popMatrix( );

  if( FillSphere )
     fill( 255, 255, 0 );
  else
     noFill( );

  pushMatrix( );
    rotateY( radians(Yangle) );
    sphereDetail( Udetail, Vdetail );
    sphere( 200. );
    if( Animate )
      Yangle = Yangle + 1.;
  popMatrix( );
}
```


sketch_3D


sketch_3D