1. Problem statement
    a. The problem was to develop a program which can load a bmp file and map it onto a rectangle as a texture. The rectangle can then be rotated and deformed by the user.
    b. The program is also able to load and display an obj file, allowing the object to be rotated and allowing the user to zoom in and out.
2. Algorithm design
    a. Teapot
        i. Loads an obj file and saves it as a list of faces and vertices
        ii. Renders obj file using GL_LINE_LOOP
        iii. Utilizes gl transformation functions to rotate and scale the teapot based on what keys user is pressing
    b. Flower
        i. Loads a bmp file and transforms it into a 2d vector (the vector part is probably unnecessary but appeared easier at first)
        ii. Splits the texture into 4 different triangles and creates a mapping of points to pixels for each triangle
        iii. changes the center point of the triangles as the user drags flower around, causing flower to deform
3. Important code
    - Code used to convert from barycentric coordinate to cartesian coordinates based on formula

```
float x = b.l1*p1.x + b.l2*p2.x + b.l3*p3.x;
float y = b.l1*p1.y + b.l2*p2.y + b.l3*p3.y;
return Point(x, y);
```

    - Code used to convert from cartesian coordinates to barycentric coordinates based on formula

```
float lam1_num =
   (p2.y - p3.y)*(p.x - p3.x) + (p3.x - p2.x)*(p.y - p3.y);
float lam1_denom =
   (p2.y - p3.y)*(p1.x - p3.x) + (p3.x - p2.x)*(p1.y - p3.y);
float lam2_num =
   (p3.y - p1.y)*(p.x - p3.x) + (p1.x - p3.x)*(p.y - p3.y);
float lam2_denom =
   (p2.y - p3.y)*(p1.x - p3.x) + (p3.x - p2.x)*(p1.y - p3.y);

float lam1 = lam1_num / lam1_denom;
float lam2 = lam2_num / lam2_denom;
float lam3 = 1 - lam1 - lam2;

return BaryCentric(lam1, lam2, lam3);
```

- Code for drawing each triangle in the flower

```
for(auto texel: texture){
    Point p = convert_bary(texel.first);
    p.rotate(p3, rot);
    Pixel color = texel.second;
    glColor3ub(color.r, color.g, color.b);
    glVertex2i(p.x + x_start, p.y + y_start);
```

4. Instructions
    a. make - compiles program
    b. ./main - runs program
    c. controls
        i. t - switch to teapot mode
        ii. f - switch to flower mode
        iii. teapot
            1. w, s - zoom
            2. click - begin rotating
            3. click again - end rotating
        iv. flower
            1. r - rotate
            2. click - begin deforming
            3. click again - end deforming
5. Images
    a. List of images showing:
        i. Flower
        ii. Flower deformed
        iii. Flower rotated
        iv. Teapot
        v. Teapot rotated

b.