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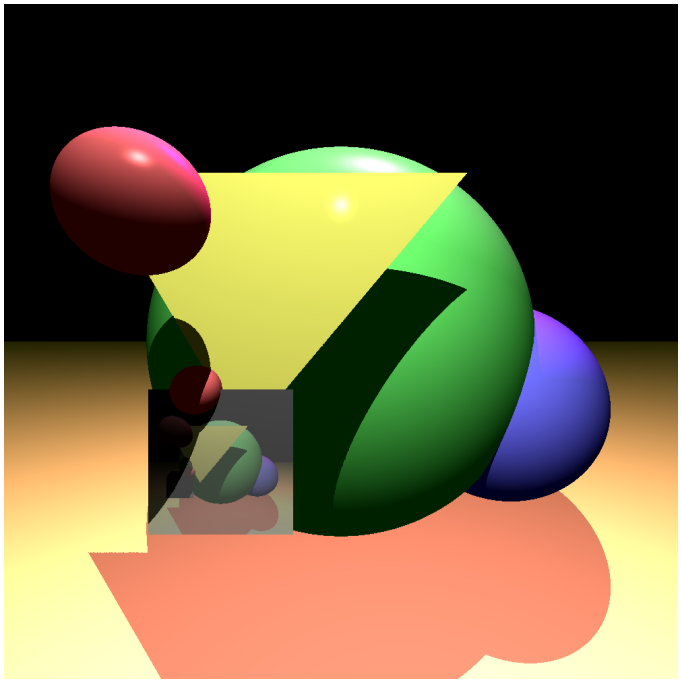
Ray Tracer Manual Test Plan

1. Initial Setup
    1. Change the settings file for the ray tracer
        1. Navigate to “Final Project”/src/rendering/TracingCoordinator.java
        2. In the constructor TracingCoordinator(), edit line
           “buildSettings(“src/config/settings1.txt");"
           to
           “buildSettings(“src/config/settingsTest.txt”);"
        3. This is the settings file for testing
    2. Open “Final Project”/src/config/settingsTest.txt
        1. This file specifies rendering options. For now, keep everything as is.

2. Rendering Orthographic & Perspective
    1. Run TracingCoordinator.java
    2. The output is “Final Project/testOut.png”

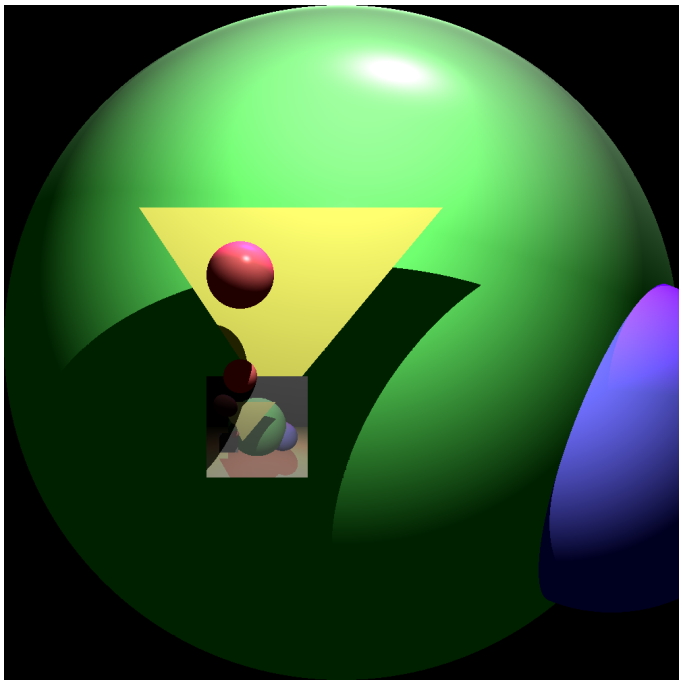


    3. Notice that this is a perspective rendering. It is possible to tell by the leftmost red sphere, it is slightly horizontally stretched. This is an artifact of perspective rendering.
    4. Change the mode to orthographic.
        1. Open “Final Project”/src/config/cameraTest.txt
        2. Modify line 8 to read “mode:orthographic”

5. Run “Final Project”/src/TracingCoordinator.java
6. The output is “Final Project”/testOut.png

7. That doesn’t look right, but not to worry. Our view plane is rater small. Perspective rendering spreads the rays out around the scene, where orthographic keeps them all facing the same way. We need to make our view plane larger to see the scene!
    1. Open “Final Project”/src/config/cameraTest.txt
    2. Change line 4 to “PixelWidth:5”
8. Run “Final Project”/src/TracingCoordinator.java
9. The output is “Final Project”/testOut.png

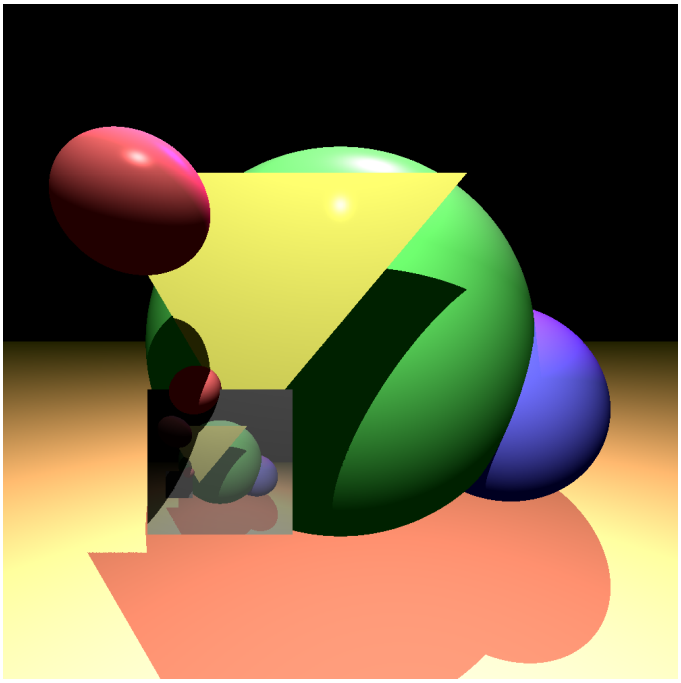
10. Better, but let's keep going!
    1. Open "Final Project"/src/config/cameraTest.txt
    2. Change line 4 to "PixelWidth:100"
11. Run "Final Project"/src/TracingCoordinator.java
12. The output is "Final Project"/testOut.png



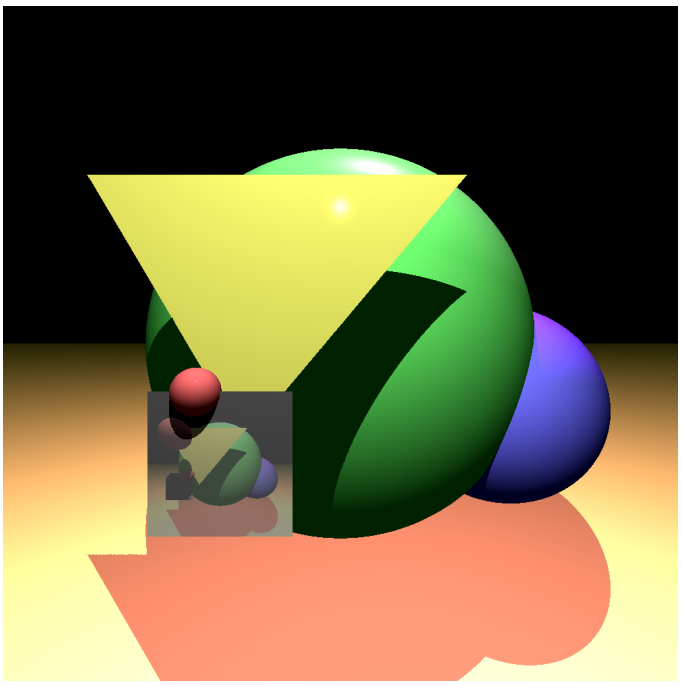
13. This looks right! Notice that the plane at the bottom is not visible despite the rest of the scene being in view. This is because the rays don't spread out downwards. In fact, the plane is perpendicular to every ray we shoot, we will never see it in this mode.
14. Open "Final Project"/src/config/cameraTest.txt
15. Change line 4 to "PixelWidth:1"
16. Change line 8 to "mode:perspective"

3. Shapes
    1. Run TracingCoordinator.java

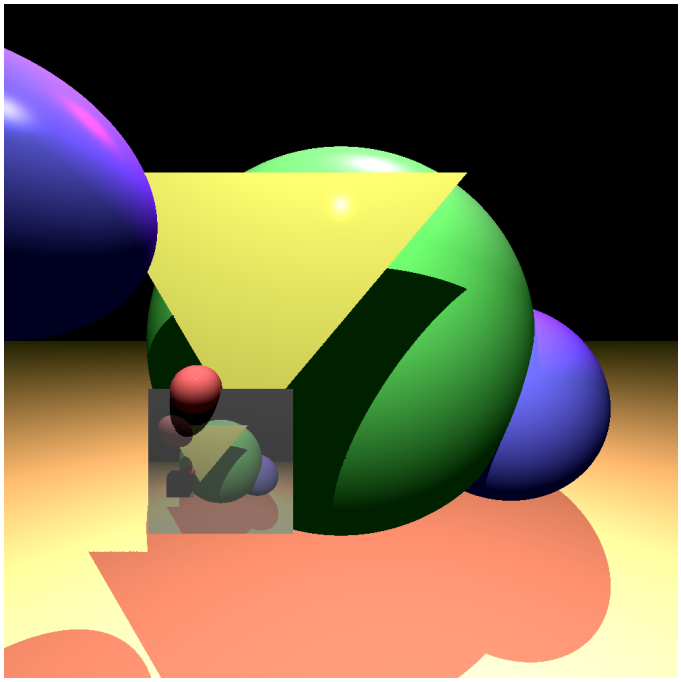
2. The output is “Final Project/testOut.png”



3. Let’s play with some of the shapes.
4. Open “Final Project”/src/config/sceneTest.txt
5. Let’s comment out a sphere.
    1. Change line 3 to “//Sphere:-30,20,-50 10.0 255,0,0 50”
    2. Run “Final Project”/src/TracingCoordinator.java
    3. The output is “Final Project”/testOut.png

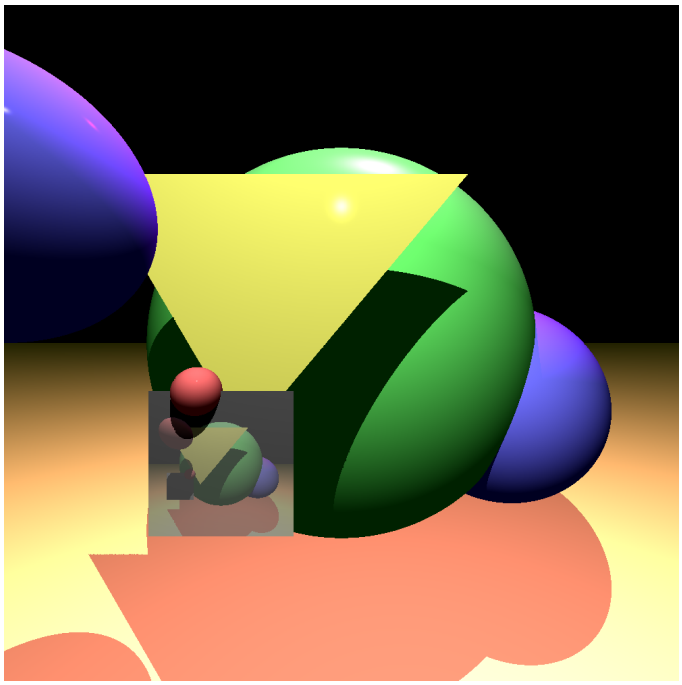


4. The leftmost red sphere is gone!
    1. This happens when the text before the ":" becomes anything but "Sphere". You can try this yourself.
6. Let's Edit a sphere's shape & color
    1. Open
    2. Change line 3 to "Sphere:-50,20,-50 20.0 0,0,255 50"
        1. This transforms the sphere left 20, doubles the radius, and turns it blue!
            1. The format of a sphere line is "Sphere:x,y,z radius r,g,b specular
    3. Run "Final Project"/src/TracingCoordinator.java
    4. The output is "Final Project"/testOut.png



5. Now let's change the specular component.
6. Change line 3 to "Sphere:-50,20,-50 20.0 0,0,255 1250"
    1. This makes the specular highlight much tighter
7. Run "Final Project"/src/TracingCoordinator.java

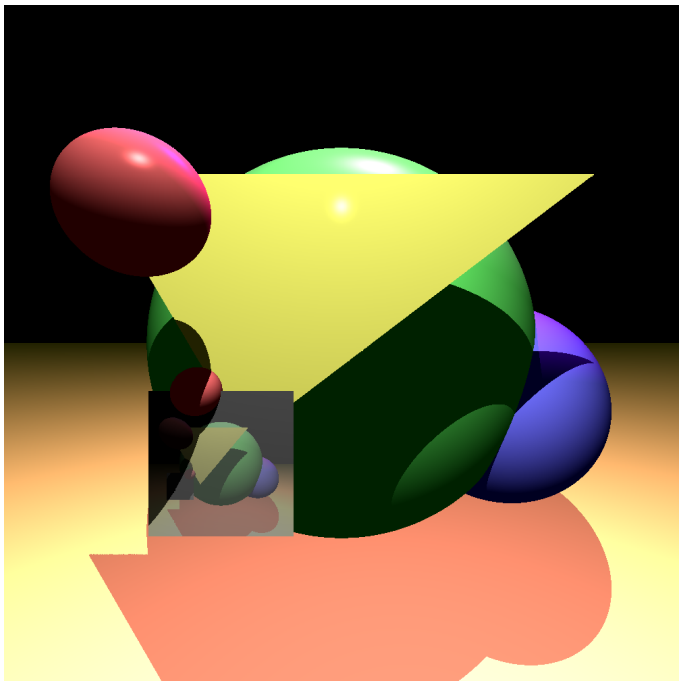
8. The output is “Final Project”/testOut.png



9. Return Line 3 to “Sphere:-30,20,-50 10.0 255,0,0 50”

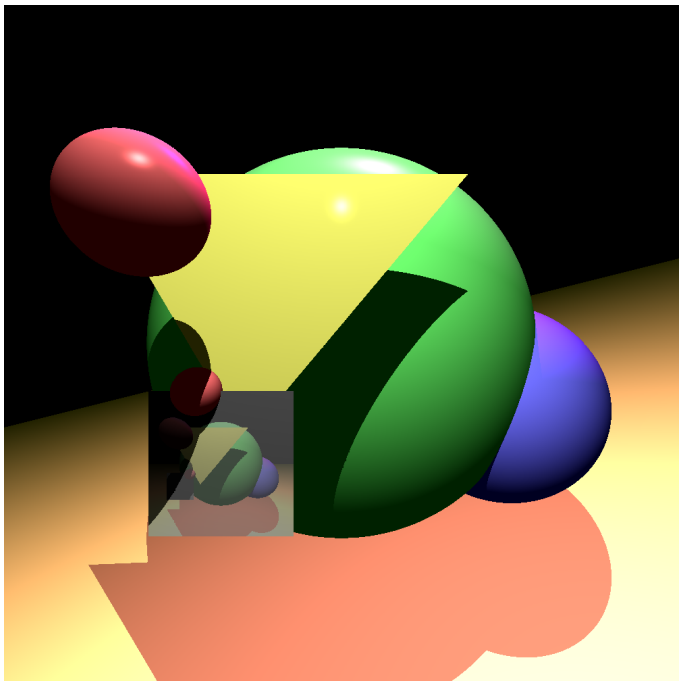
7. Let’s play with the triangle!
   1. The triangle is on line 5
      “Triangle:-60,40,-80, 30,40,-80 -20,-20,-70 255,255,0 1250.0”
   2. The format is:
      “Triangle:x1,y1,z1 x2,y2,z2 x3,y3,z3 r,g,b specular”
   3. We’ve already demonstrated color & specular with sphere, it works the same way here. Change it if you wish.
   4. Let’s stretch a corner. Change line 5 to
      “Triangle:-60,40,-80, 60,40,-80 -20,-20,-70 255,255,0 1250.0”
   5. Run “Final Project”/src/TracingCoordinator.java

6. The output is “Final Project”/testOut.png



7. Change line 5 back to
   “Triangle:-60,40,-80, 30,40,-80 -20,-20,-70 255,255,0 1250.0”
8. Let’s play with the plane!
   1. The plane is on line 7:
      “Plane:0,-500,0, 0,-1,0 255,255,0 -1”
   2. The format is:
      “Plane:x,y,z [normalxyz] r,g,b specular”
   3. To rotate the plane, change the line to
      Plane:0,-500,0, 0,-1,0 255,255,0 -1”
   4. Run “Final Project”/src/TracingCoordinator.java

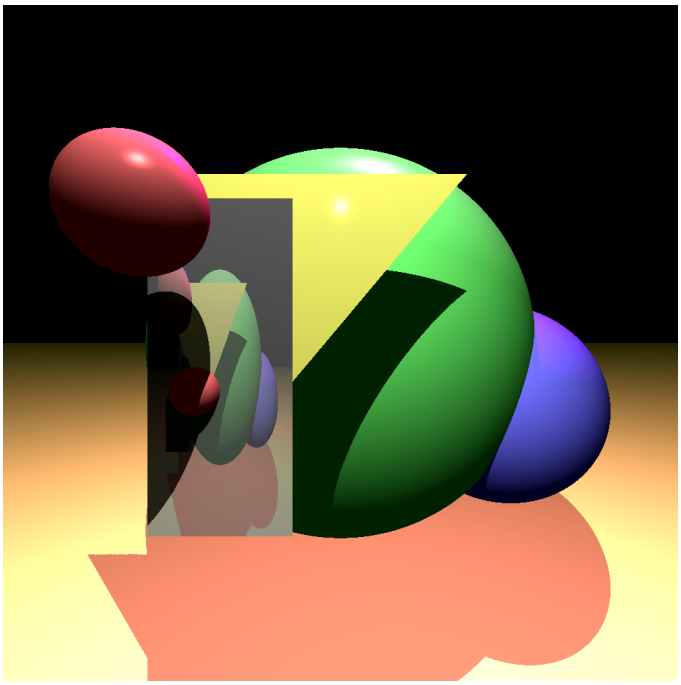
5. The output is “Final Project”/testOut.png



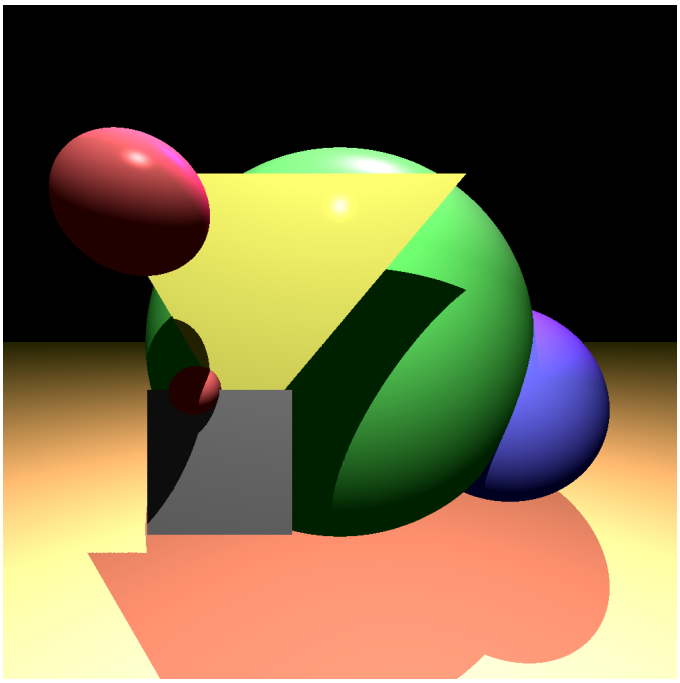
6. The ground has tilted!
7. Change line 7 back to:
   “Plane:0,-500,0, 0,-1,0 255,255,0 -1”

9. Let’s play with the rectangle!
   1. The rectangle is on line 6:
      “Rectangle:-40,-40,-70 0,30,0 30,0,0 100,100,100 src/images/testOut.png 1250.0”
   2. The format is complicated, see the “Final Project”/src/geometry/Rectangle.java for documentation.
   3. Let’s stretch the rectangle. Change the line to:
      “Rectangle:-40,-40,-70 0,70,0 30,0,0 100,100,100 src/images/testOut.png 1250.0”
   4. Run “Final Project”/src/TracingCoordinator.java

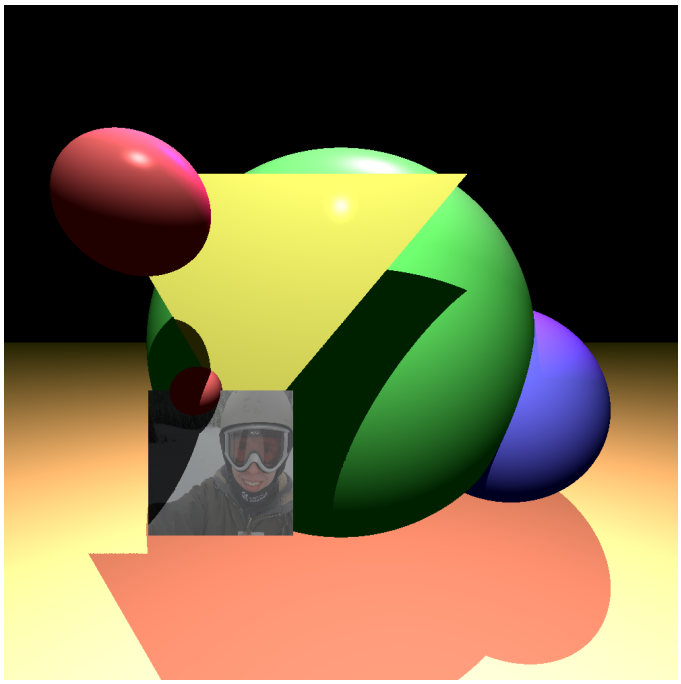
5. The output is “Final Project”/testOut.png



6. Let’s change the image. Change the line to:
   “Rectangle:-40,-40,-70 0,30,0 30,0,0 100,100,100 src/images/skiing2.png 1250.0”
7. Run as before

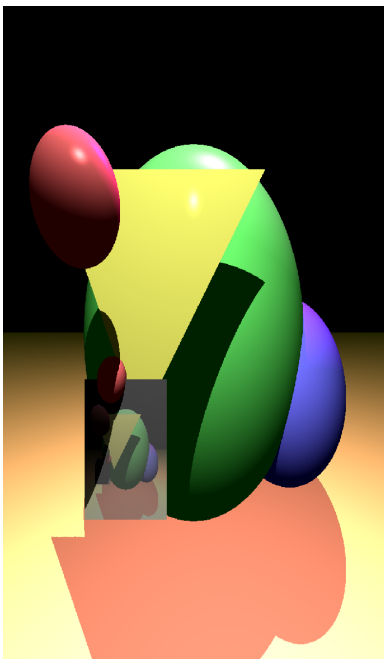


8. Whoops! That's not a valid file. Good thing it defaulted to the defaultColor. In the console, you should see this error:
   "Error! Unable to load image: src/images/skiing2.png. Continuing with default"
9. Let's fix this. Change the line to:
   "Rectangle:-40,-40,-70 0,30,0 30,0,0 100,100,100 src/images/skiing.png 1250.0"
10. Run as before



11. That's me skiing! Reset the line to:
    "Rectangle:-40,-40,-70 0,30,0 30,0,0 100,100,100 src/images/testOut.png 1250.0"

4. Let's briefly change the output dimensions while keeping the number of rays the same.
   1. In "Final Project"/src/config/settingsTest.txt, change line 3 to:
      "OutputDim:700 1200"
   2. Run as before



    3. The image is resized!
    4. Reset line 3 to:
       “OutputDim:1000 1000”
5. Feel free to change the config files however you choose.