Total structure description of our design

Ido Michael – 201157138

Dana Erlich - 200400950

All classes in our project extend the Initiable interface.

There are 4 main categories:

Surfaces - which represent primitive types which include: Sphere, Disc, ConvexPolygon, Plain, Triangle and Rectangle.

Lights - which represent different types of light sources which include: SpotLight, Omnilight and DirLight.

Math - which includes classes that perform mathematical calculations on vectors and 3D points.

Scene – explained below.

Steps of the rendering process:

1. Constructing ray through pixel:

Total structure description of your design and a short explanation for each class responsibility. Add a description of algorithm flow through your design (which methods are called from which classes) when you calculate the color of a pixel. Start from the RayTracer class renderLine method.

Starting from the RayTracer class renderLine method; This method Renders the given line to the given canvas. This method must be called only after init which initializes the renderer with scene description and sets the target canvas to size (width X height).

Each line is then sent to castRay which casts a ray through each pixel, constructs the intersection and gets the color, the it sets the pixel color. This is done by the Camera class which constructs rays through pixels.

2. Finding intersection with scene:

The Scene class contains all the scene objects including camera, lights and surfaces. The scene begins by initializing these elements and then finds the intersection using: findIntersection which sends a ray to the scene and returns the nearest intersection with the objects in the scene or null if there is no intersection. findIntersection also uses inside methods called intersect, which are individual for each object type in the scene.

3. Calculating color:

After an intersection is found, calcColor is responsible for calculating the color at the nearest intersection be it of an object or the background. It also uses getColor which calculated the color of individual light sources.

Implemented Bonuses:

- Super sampling
- Triangular mesh
- Bonus scene