

Mehakpreet Singh

Student ID: 40057337

I used the following algorithms to get the output shown below:

For the texture on sphere:

```
If(ray-sphere intersection happens at point p1)
{
    Compute reflected ray;
    If(this reflected ray intersects the plane at point p2)
    {
        Add p2's texture to the sphere at p1;
    }
}
```

For the reflection of sphere on the floor:

```
If(ray-plane intersection happens at point p1)
{
    Compute reflected ray;
    If(this reflected ray intersects the sphere at point p2)
    {
        add the desired value of sphere reflection to plane's texture color;
    }
}
```

For the shadow:

```
If(ray-plane intersection happens at point p1)
{
    Calculate the light beam hitting at p1;
    If(this light beam intersects sphere on its way)
    {
        Then the point p1 is in shadow of the sphere;
    }
}
```

For multiple point lights:

1. Created an array of vec3 light positions;
2. Fill this array with the position values using for loop
3. Run the whole program for each of the light positions
4. Keep adding the intensities of all the lights
5. Compute average of all the light intensities at a particular pixel by dividing it with number of light sources.

Output:

