Lab 8 DirectionalLight and Fake Shadows

1. DirectionalLight
DirectionalLights serve as global lighting. They provide light from one controllable direction which affects all areas to the same extent. Here is the syntax for DirectionalLight:

```
DirectionalLight {
    direction 0 0 -1
    on TRUE
    color 1 1 1
    intensity 1
    ambientIntensity 1
}
```

The `on` field contains one of two possible values TRUE or FALSE.
The `color` field contains three values, these being Red, Green and Blue in that order.
The `intensity` field determines the strength of the light.
The `direction` is a set of three points which determine the direction in which the DirectionalLight points in 3d space.

Exercise 1. Let’s get ‘spheres.wrl’ from http://www.soe.ucsc.edu/~pang/80v/f05/exercise. Create a new VRML world which has three DirectionalLights. In this exercise three DirectionalLights colored red, green and blue affect a group of spheres. The light is applied to all equally despite their being widely scattered. Here is each direction for three DirectionalLights:

- For red light, `direction -0.66 -0.74 -1`
- For green light, `direction 1 0.24 0.31`
- For blue light, `direction -1 0.56 0.47`

2. Fake Shadows
Even though a shadow is important in real world, shapes in VRML world don’t cast shadows. But you can still create fake shadows in your world.

Exercise 2. We have a box and a sphere in the following VRML world. For these objects, you will add fake shadows using some shapes. They will be appeared on the floor. Check the cheat sheet before you get started. Write codes on this sheet after you complete.

```vrml
#VRML V2.0 utf8
Group {
    children [  
        # Lighting 
        DirectionalLight {
            direction 0.0 -1.0 0.0
        }
    ]

```
ambientIntensity 0.5
},

# Floor
Shape {
  appearance Appearance {
    material Material { }
  }
  geometry Box { size 8.0 0.01 8.0 }
},

# Spheres and fake shadows
Transform {
  translation 0.0 4.0 2.0
  children [
    Shape {
      appearance Appearance {
        material Material { diffuseColor 1.0 1.0 0.0 }
      }
      geometry Sphere { }
    },
    # make a shadow for this sphere on the floor
  ],

},

Transform {
  translation 2.0 0.0 -2.0
  children [
    Shape {
      appearance Appearance {
        material Material { diffuseColor 0.0 1.0 0.0 }
      }
      geometry Box { }
    },
    # make a shadow for this box on the floor
  ],

},

]