Lab 5 Extrusion and NavigationInfo

1. Extrusion
Extrusion is a very powerful node which allows you to define very complex shapes using only a small amount of points. The crossSection and spine paths are both piecewise linear; that is, they're composed of straight line segments. You specify each of them as a series of vertices to be connected in order. An Extrusion node is defined by:

- a 2D crossSection piecewise linear curve (described as a series of connected vertices usually with vertices given in counterclockwise order when looking down at the xz plane).
- the spine: a 3D linear curve (a series of connected vertices)
- a list of 2D scale parameters
- a list of 3D orientation parameters

Let’s take a look at the example. Create a new VRML file and type the following source code. Sketch the result from the preview.

```vrml
#VRML V2.0 utf8
#extrusion example
Shape{
    appearance Appearance {
        material Material {}
    }
    geometry Extrusion{
        crossSection [ -1 -1, -1 1, 1 1, 1 -1, -1 -1]
        spine [0 -1 0, 0 1 0]
    }
}
Shape{
    appearance Appearance {
        material Material {}
    }
    geometry Extrusion{
        crossSection [
            1 0, .71 -.71,
            0 -1, -.71 -.71,
            -1 0, -.71 .71,
            0 1, .71 .71,
            1 0
        ]
        spine [ -2 0 0, -2 0 -4, 2 0 -4, 2 0 0]
        scale [ 1 1, 0.5 0.5, 0.5 0.5, 1 1]
        beginCap FALSE
        endCap FALSE
        solid FALSE
    }
}
```
2. NavigationInfo

The NavigationInfo node described the user and specifies the navigation model. NavigationInfo node has the following fields:

- **headlight** is a boolean field which determines if the headlight is turned on or off.
- **visibilityLimit** determines the maximum distance at which the user can see, the default value of 0.0 indicates that this distance is infinite.
- **speed** indicates the velocity at which the user moves in meters per second, well ideally at least.
- **type** defines the type of navigation for the user. Possible values are "WALK", "EXAMINE", "FLY", and "NONE".

Let’s change the field values of NavigationInfo on the example source code.

```
#VRML V2.0 utf8

Shape {
  appearance Appearance {
    material Material {
      diffuseColor 0 0.5 1
    } # end material
  } # end appearance

  geometry Extrusion {
    crossSection [ 0 1, 
                   -1 -1, 
                   1 -1, 
                   0 1],
  } # end cross section
  spine [ 0 0 0, 
           0 .2 0, 
  } # end spine
} # end extrusion
} # end shape

# force browser into 'examine mode'

NavigationInfo{
  #NavigationInfo fields and values
  type "EXAMINE"
  speed 1.0
  headlight TRUE
  visibilityLimit 0.0
}
```