



中山大學

ISE309 Virtual Reality Technology Assignment

虚拟现实技术考核作业

Deadline: 2019. 12.18 12:00 pm

提交截止日期: 2019.12.18 晚上 12 点

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Assignment Regulations(考核作业规章)

1. This is a personal assignment. Each group MUST submit only the soft copy of the report via sending an email to sysu_ise309@163.com and the topic of this email should be “Major_Your name1_ID1_name2_ID2_Assignment2”, otherwise, your email will be swallowed by hundreds of emails in the mailbox. 这是一次小组独立完成的考核作业，每一组其中一位同学应在提交截止日期前将作业的电子版通过邮件发送至 sysu_ise309@163.com。邮件主题应为“专业_你的姓名_学号_你的搭档姓名_学号_Assignment2”，否则主题不明的邮件将会被淹没在邮箱中的其他邮件中。该电子版作业将被直接批改计分，对于没有提交电子版的同学，后果请自负。
2. A coversheet can be created in your own way but the following information must be included: group members' full names, student ID numbers, and email addresses. 作业的封面可以设计，但请包含以下重要信息：小组成员的中文全名、学号和邮箱。
3. You may refer to textbooks, lecture notes, and the Internet to discover approaches to problems, however the assignment should be your own group work. Any plagiarism is NOT ACCEPTABLE. Once we find that, then you will get 0 mark on this assignment. 在作答过程中你也许需要参考课本、课件和网络，这是可以的。但是请确保这份作业是你们小组独立完成的。任何形式的抄袭或作弊都是不被接受的，一旦发现本作业将按 0 分处置。
4. Assignments may be accepted up to 5 days after the deadline has passed; a late penalty of 5% will apply for each day late without an extension being granted. Submissions over 5 days late will not be marked. Emailed submissions will NOT be accepted without exceptional circumstances. 晚于截止日期 5 个工作日内提交的电子版作业仍可受理，但每晚一天总成绩减少 5%（即晚一天提交满分为 95 分，晚两天提交满分为 90 分），以此类推。晚于截止日期 5 个工作日后的提交作业视同无效提交，将不会被批改和打分。
5. Once the group members are settled, for the following assignments, the group members can't be changed. Every time, the assignment only can be submitted by one member. 一旦小组组员（2 位）确定，不允许更改。后面的作业也都要两个人一起完成。并且，每次作业由一人上传一次即可，不需要两个人都上传。

相信大家在 Assignment1 中已经使用 3DSMAX 软件对自己想象的房间进行建模并导出了一个 HOME.WRL 文件。在本次作业中，请使用 VRMLPad 打开 HOME.WRL 文件。在该文件的基础上，使用 VRML 为房间添加下列物件和功能，参考效果如下图 1 所示。

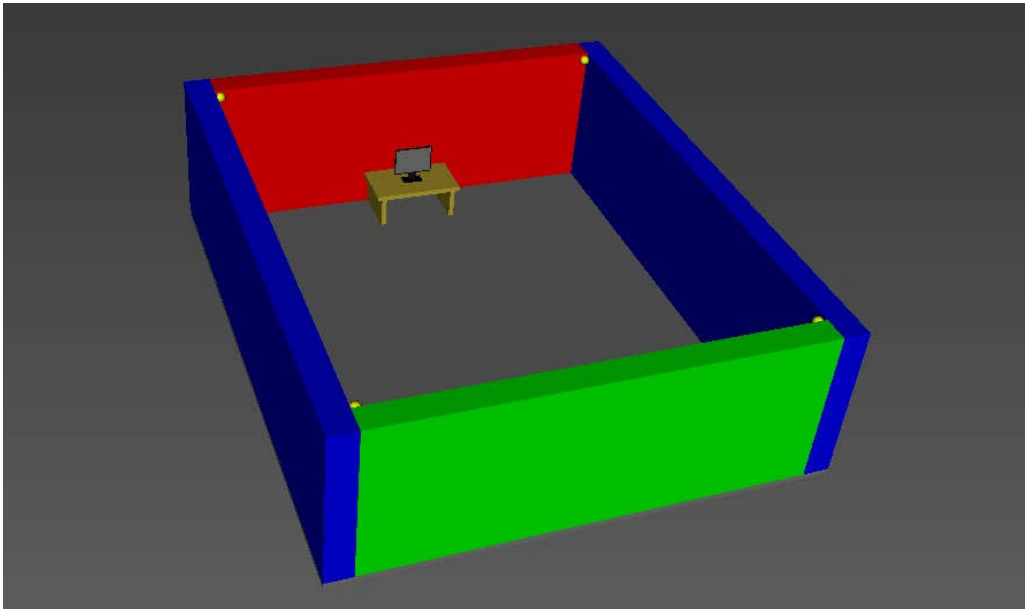


图 1 参考效果图

1. 为房间添加四面墙和地面。
2. 为房间添加一张书桌和一台显示器。
3. 为房间四个顶角添加四个球体以代表四个摄像头，并为每个摄像头添加点击事件，点击事件为将视点切换到该摄像头对应的视角，各摄像头视角的大致方向可见图 2。例如，3 号摄像头的视角参考效果如图 3 所示。

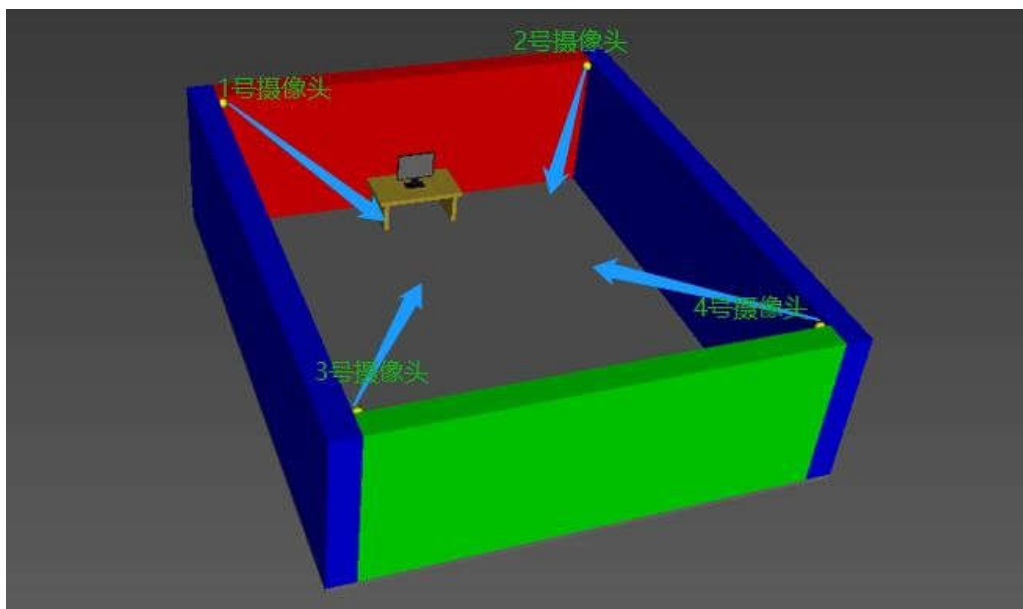


图 2 摄像头视角示意图

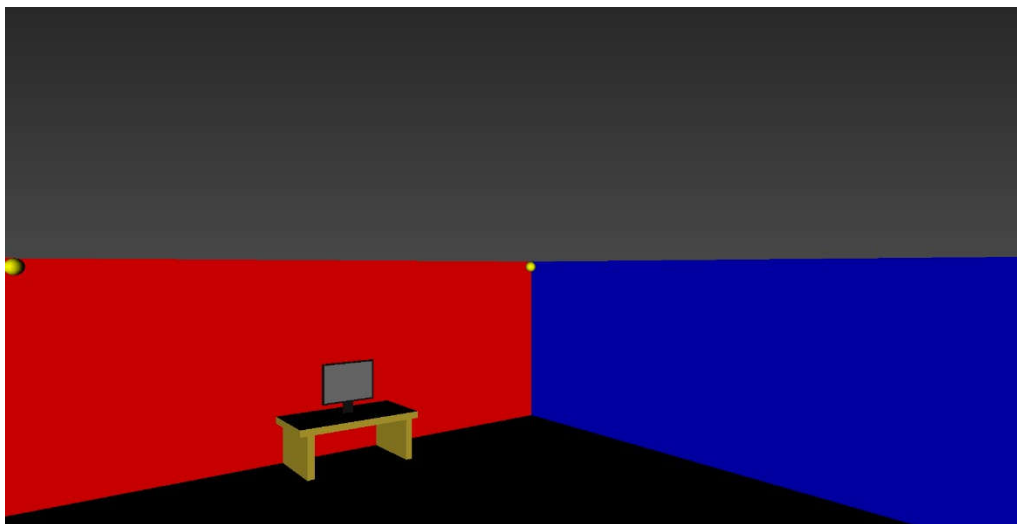
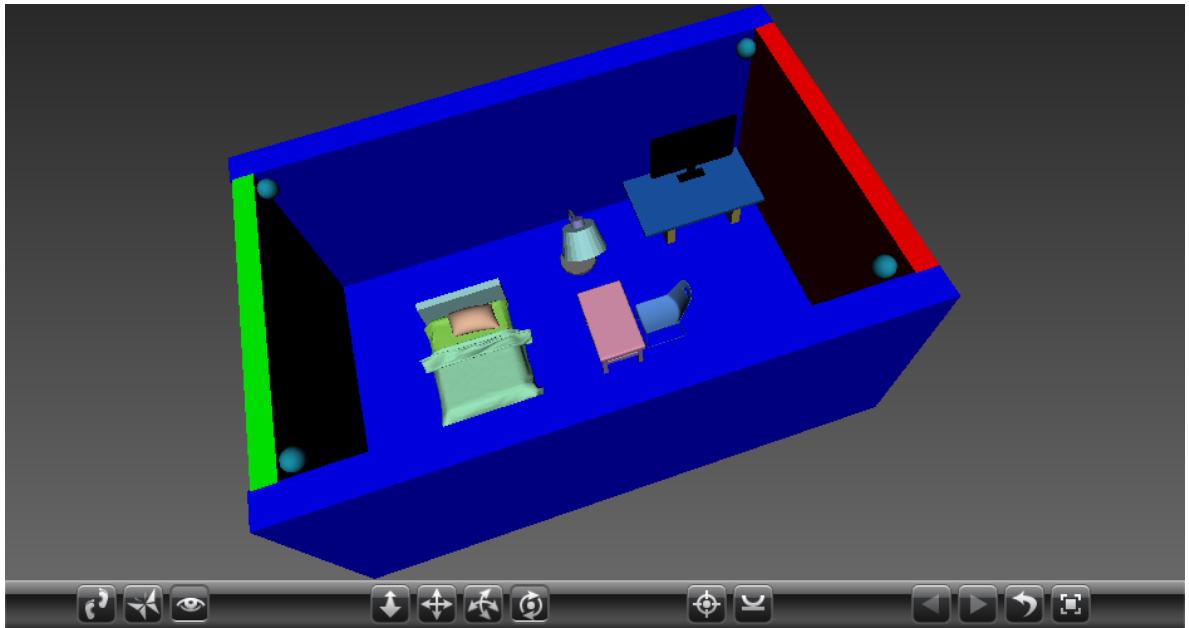


图 3 3 号摄像头视角 注意：

1. 如果在 Assignment1 中已经建模了墙壁或地面，请先使用 3DSMAX 软件将其删除并重新导出 HOME.WRL 文件。
2. 避免穿模现象，即一个几何造型穿过了另外一个几何造型或与另外一个几何造型有相交的共同部分。
3. 请保证 1 号和 2 号摄像头的视角下能看到 3 号和 4 号摄像头，3 号和 4 号摄像头的视角下能看到 1 号和 2 号摄像头。
4. 请自主选择墙壁、地面、书桌和显示器的基本组成造型（立方体、面集等简单或复杂造型），只要能构成最终效果即可。
5. 请自主选择物体的颜色和材质，但应使物体便于区分，避免所有物体都为同一颜色。
6. 请在作业文档中先展示整体的效果图，再分开描述各个物体的建模内容。该内容至少但不限于需要包含有简单的思路说明、各组成几何形状的尺寸、各组成几何形状所处位置坐标值的推导（和旋转参数，如果用到旋转）、物体或事件的关键代码、物体的近景结果图和远景结果图，在摄像头点击事件中还需要各个摄像头视角下的观测图，可参照下述样例。
7. 请将更新好的 HOME.WRL 重命名为 HOME2.WRL，并与原 HOME.WRL（不带墙壁和地面）和作业文档一起提交，请将三个文件直接上传邮箱发送，避免将其打包为一个压缩包后再上传邮箱发送。

整体结果



建模四面墙壁

```
DEF Box006 Transform {
  translation 32 -15 80
  children [
    Transform {
      translation 0 60 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 1
            }
          }
          geometry Box { size 270 120 15 }
        }
      ]
    }
  ]
}

DEF Box007 Transform {
  translation 32 -15 -84
  children [
    Transform {
      translation 0 60 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 1
            }
          }
          geometry Box { size 270 120 15 }
        }
      ]
    }
  ]
}
```

```

    ] }
  ]
}
DEF Box008 Transform {
  translation 162 -15 -2
  children [
    Transform {
      translation 0 60 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 1 0 0
            }
          }
          geometry Box { size 10 120 150 }
        }
      ] }
  ] }
}
DEF Box009 Transform {
  translation -97 -15 -2
  children [
    Transform {
      translation 0 60 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 1 0
            }
          }
          geometry Box { size 10 120 150 }
        }
      ] }
  ]
}

```

建模地面

```

DEF Box005 Transform {
  translation 32 0 -2
  children [
    Transform {
      translation 0 -7.5 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 1
            }
          }
          geometry Box { size 250 15 150 }
        }
      ] }
  ]
}

```

```
}
```

建模桌子

```
# 桌腿
DEF Box010 Transform {
  translation 100 0 -50
  children [
    Transform {
      translation 0 12.5 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0.8824 0.7765 0.3412
            }
          }
          geometry Box { size 5 25 25 }
        }
      ]
    }
  ]
}

DEF Box011 Transform {
  translation 140 0 -50
  children [
    Transform {
      translation 0 12.5 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0.8824 0.7765 0.3412
            }
          }
          geometry Box { size 5 25 25 }
        }
      ]
    }
  ]
}

# 桌面
DEF Box012 Transform {
  translation 117 25 -50
  children [
    Transform {
      translation 0 1 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0.1098 0.349 0.6941
            }
          }
          geometry Box { size 70 2 40 }
        }
      ]
    }
  ]
}
```

```
}
```

建模显示器

```
DEF Box013 Transform {
  translation 120 27 -60
  children [
    Transform {
      translation 0 0.5 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 0
            }
          }
          geometry Box { size 15 1 5 }
        }
      ]
    }
  ]
}

DEF Cylinder002 Transform {
  translation 120 28 -60
  children [
    Transform {
      translation 0 4 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 0
            }
          }
          geometry Cylinder { radius 2.5 height 8 }
        }
      ]
    }
  ]
}

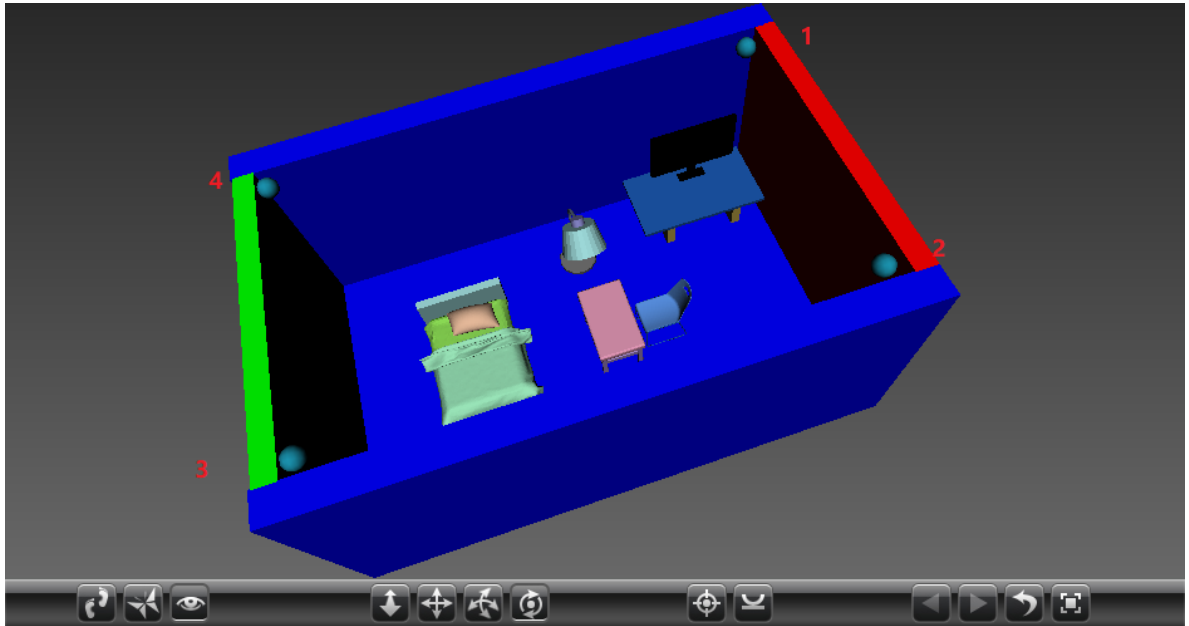
DEF Box014 Transform {
  translation 120 36 -60
  children [
    Transform {
      translation 0 15 0
      children [
        Shape {
          appearance Appearance {
            material Material {
              diffuseColor 0 0 0
            }
          }
          geometry Box { size 48 30 2 }
        }
      ]
    }
  ]
}
```


建模摄像头

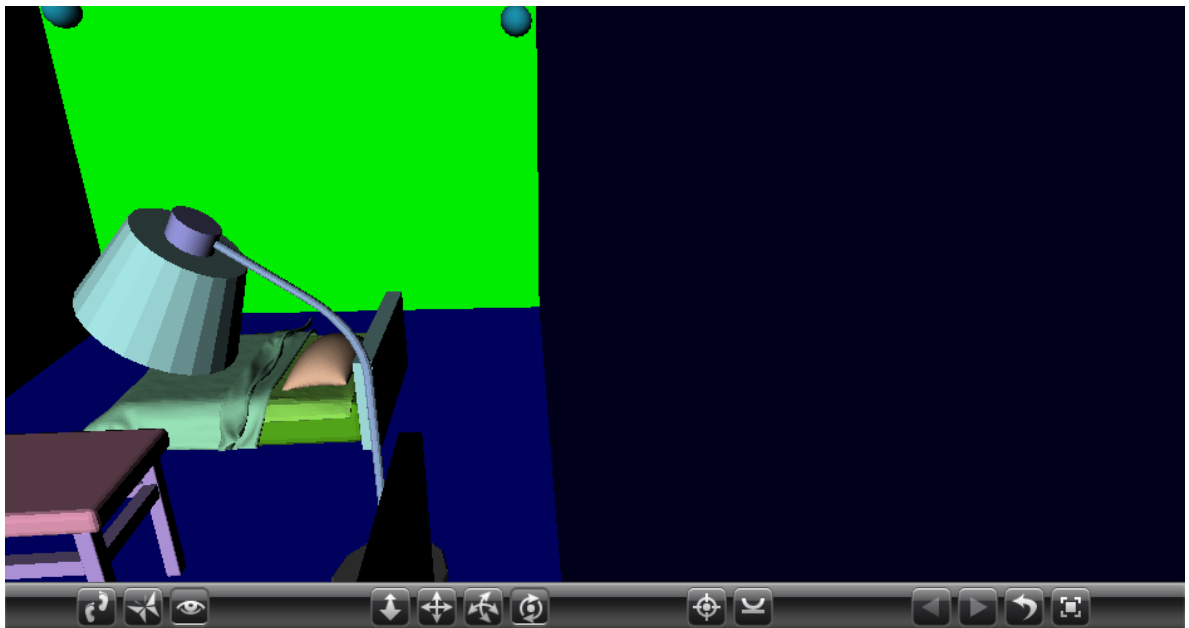
```
DEF Sphere001 Transform {
  translation 150 100 -70
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 0.1098 0.5843 0.6941
        }
      }
      geometry Sphere { radius 5 }
    }
    DEF sphere1TouchSensor TouchSensor {}
  ]
}
DEF Sphere002 Transform {
  translation 150 100 64
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 0.1098 0.5843 0.6941
        }
      }
      geometry Sphere { radius 5 }
    }
    DEF sphere2TouchSensor TouchSensor {}
  ]
}
DEF Sphere003 Transform {
  translation -88 100 64
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 0.1098 0.5843 0.6941
        }
      }
      geometry Sphere { radius 5 }
    }
    DEF sphere3TouchSensor TouchSensor {}
  ]
}
DEF Sphere004 Transform {
  translation -88 100 -70
  children [
    Shape {
      appearance Appearance {
        material Material {
          diffuseColor 0.1098 0.5843 0.6941
        }
      }
      geometry Sphere { radius 5 }
    }
    DEF sphere4TouchSensor TouchSensor {}
  ]
}
```

```
]
}
```

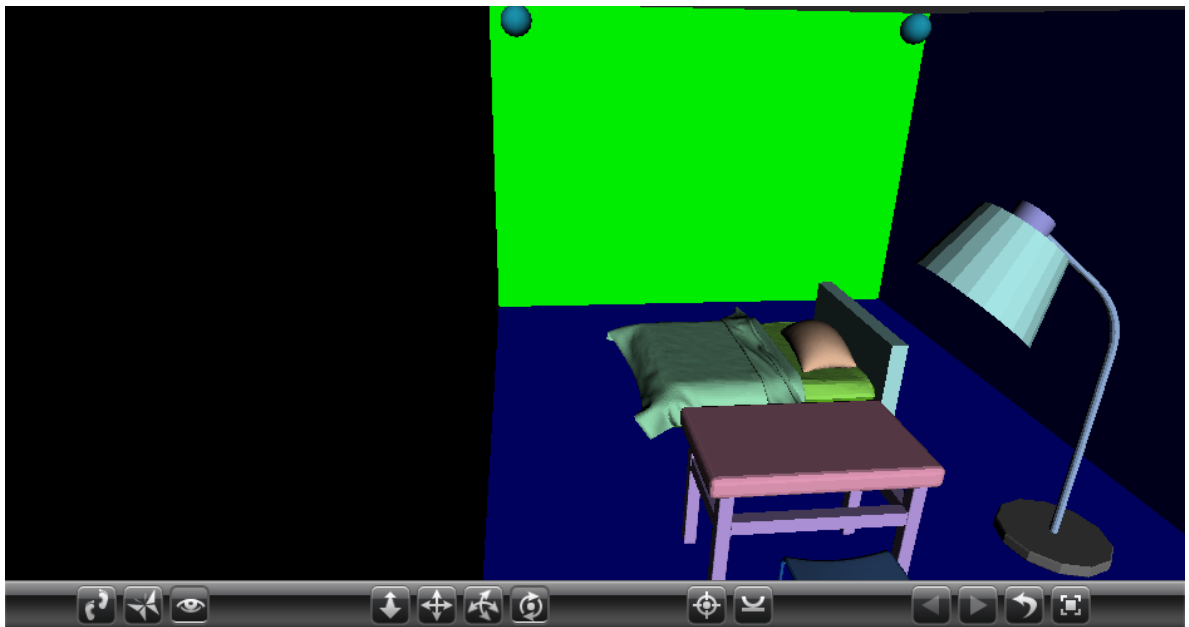
设置摄像头点击事件



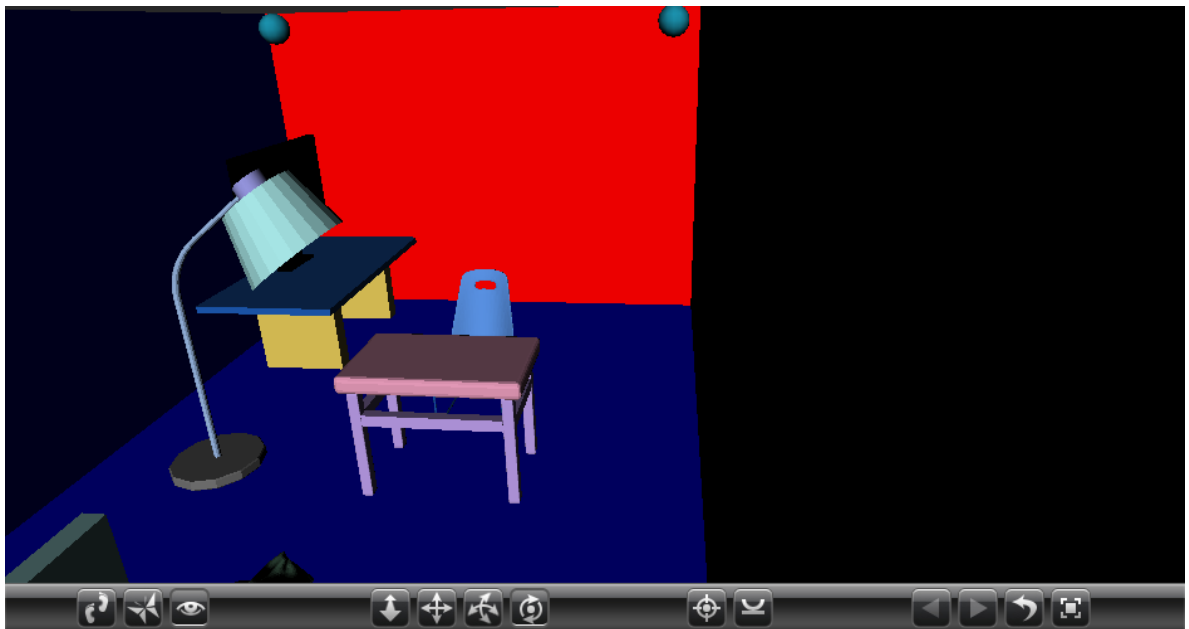
1号摄像头



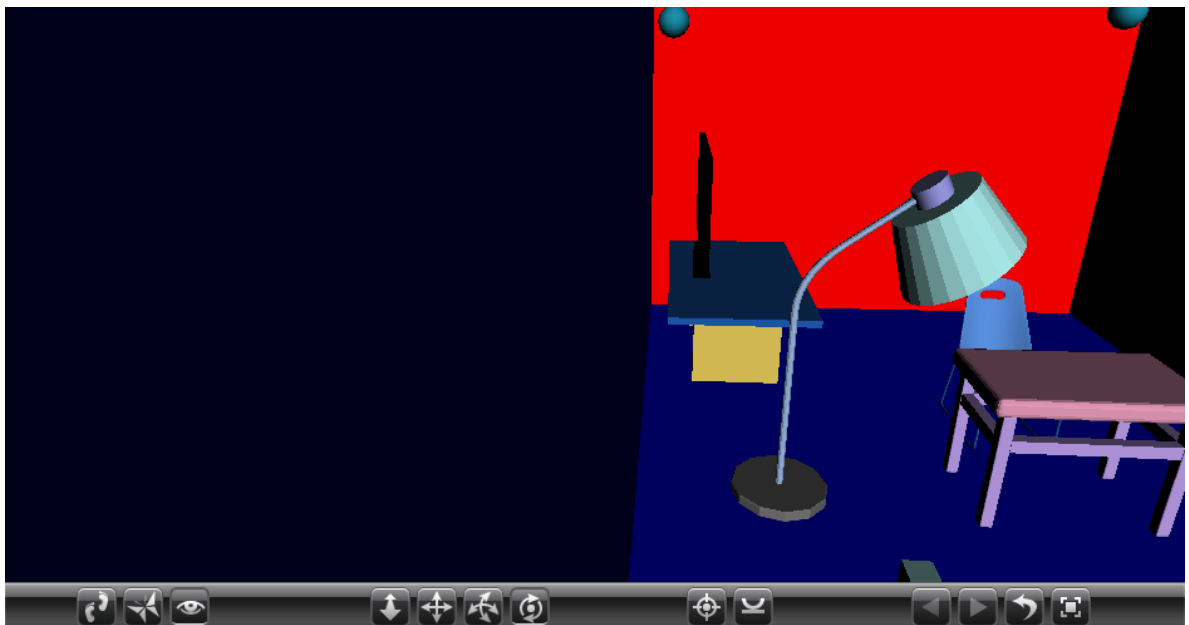
2号摄像头



3号摄像头



4号摄像头



定义视角

```
DEF View1 Viewpoint {  
    position 150 100 -70  
    orientation -0.2 1 0.2 1.5  
}  
  
DEF View2 Viewpoint {  
    position 150 100 64  
    orientation -0.2 1 0.2 1.5  
}  
  
DEF View3 Viewpoint {  
    position -88 100 64  
    orientation -0.2 -1 -0.2 1.5  
}  
  
DEF View4 Viewpoint {  
    position -88 100 -70  
    orientation -0.2 -1 -0.2 1.5  
}
```

添加函数

4个球体添加相应的代码

```
DEF Sphere001 Transform {  
    translation 150 100 -70  
    children [  
        Shape {  
            appearance Appearance {  
                material Material {  
                    diffuseColor 0.1098 0.5843 0.6941  
                }  
            }  
            geometry Sphere { radius 5 }  
        }  
        DEF sphere1TouchSensor TouchSensor {} # 设定按下时的函数  
    ]  
}  
# 其余三个同理
```

绑定函数

```
ROUTE sphere1TouchSensor.isActive TO View1.set_bind  
ROUTE sphere2TouchSensor.isActive TO View2.set_bind  
ROUTE sphere3TouchSensor.isActive TO View3.set_bind  
ROUTE sphere4TouchSensor.isActive TO View4.set_bind
```