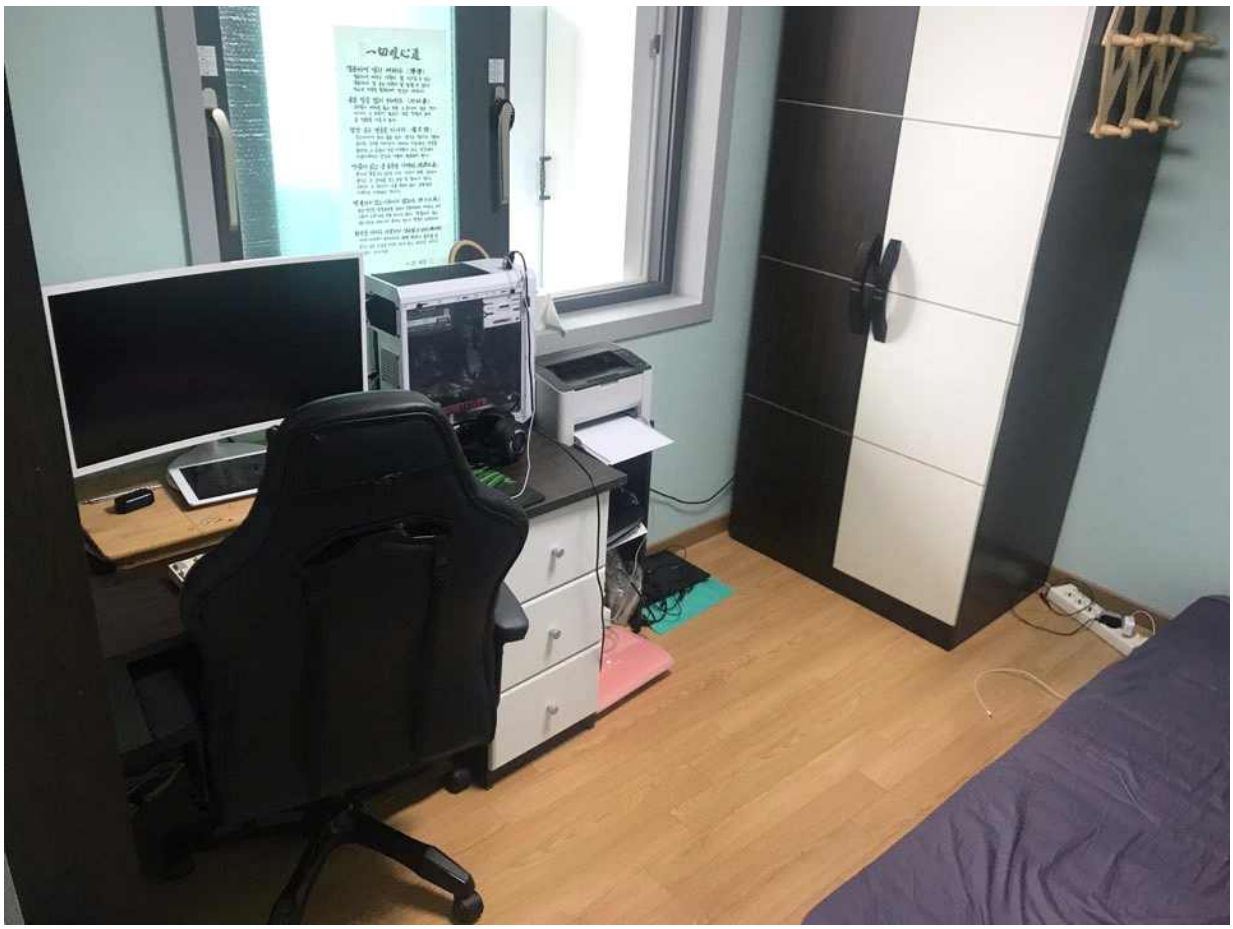
15012974 최태호 컴퓨터 그래픽스 4번 과제

Requirements

1. Take a picture / pictures of your own room.



위 사진에서 왼쪽의 책장, 모니터, 모니터 받침, 책상, 책상다리(서랍), 의자, 장롱, 침대, 두 개의 벽, 바닥을 opengl로 구현했습니다.

2.OpenGL program / Double Buffering & Showing a 3D scene

```
gluPerspective(45+zoom, 640/480, 1, 400);
```

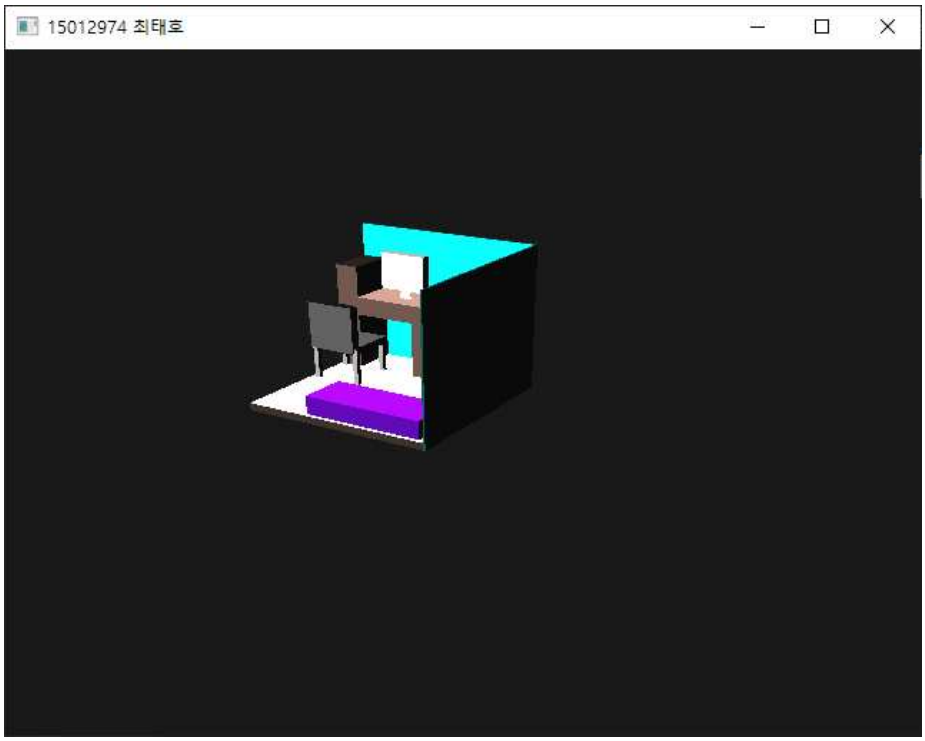
```
glEnable(GL_DEPTH_TEST);
```

```
glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGBA | GLUT_DEPTH);
```

3.You should implement scene rotation with the left mouse button, translation with the middle mouse button, and zoom-in-out with the right mouse button.

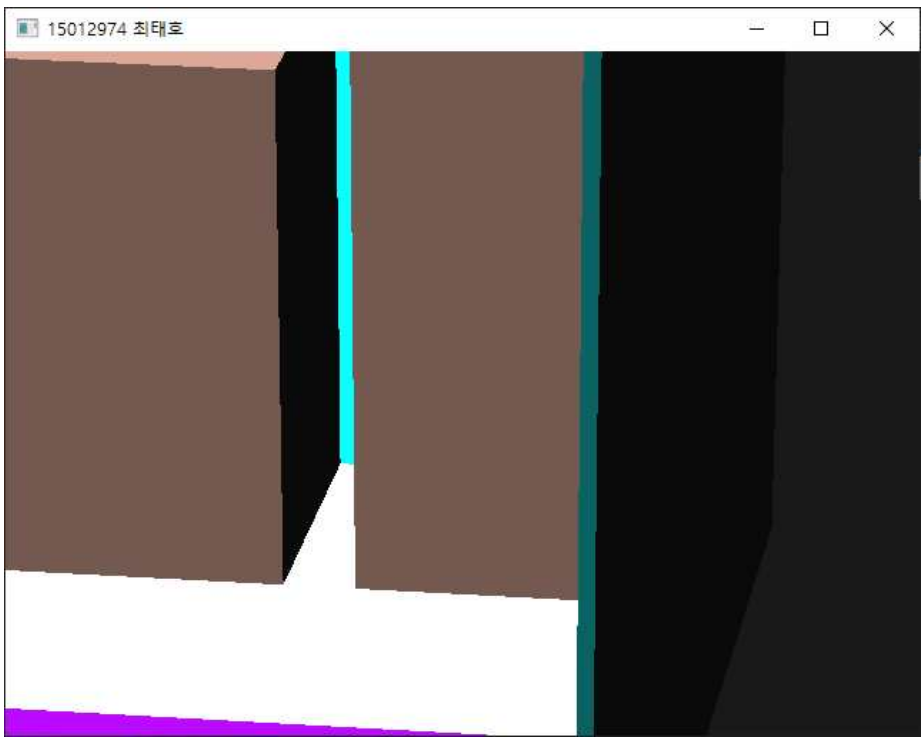
3차 과제에서 학습한 glutMotionFunc을 사용하여 left mouse button drag를 통해 spin값의 변화를 주어서 rotation 기능을 구현하였고 <math.h>라이브러리를 추가하여 다음과 같이 구현했습니다.

```
gluLookAt(sin(spin) * radius, 5.0, cos(spin) * radius, 0.0, 0.0, 0.0, 0.0, 1.0, 0.0);
```



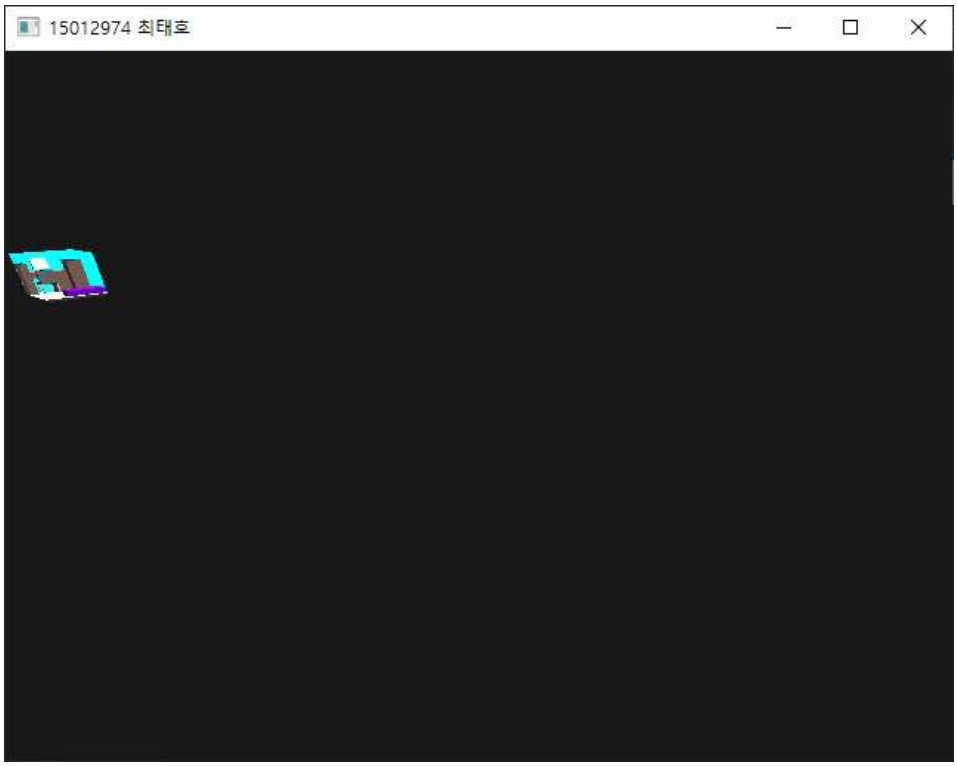
right mouse button drag를 통해 zoom값의 변화를 주어서 zoom in and out 기능을 다음과 같이구현하였습니다.

```
gluPerspective(45+zoom, 640/480, 1, 400);
```



<gl/freeglut.h>라이브러리를 추가하여 glutMouseWheelFunc을 사용하였고
wheelup시 rotate_y증가 wheeldown시 감소로하여 다음과 같이 구현했습니다.

```
glTranslated(0+ rotate_y, 0, 0);
```



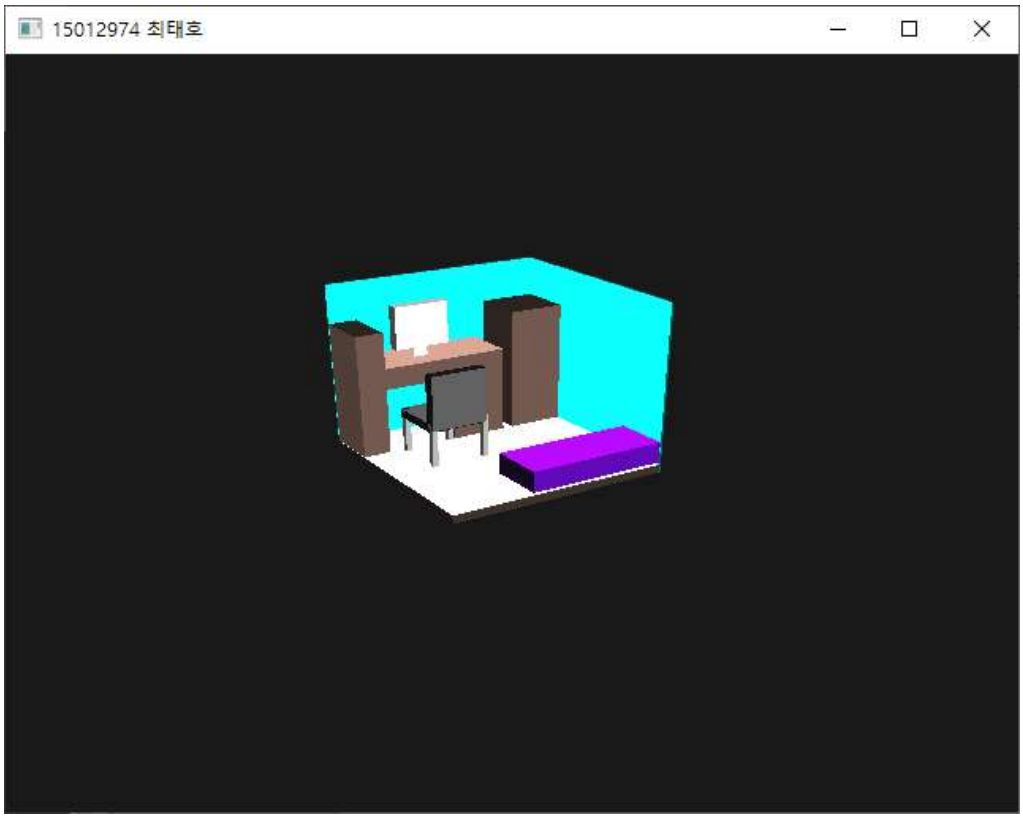
4.You should add lighting effects. Use OpenGL smooth shading with a point light source (main light source) including ambient, diffusion, specular lights.

init함수에 ambient, diffusion, specular를 포함한 3가지 빛을 다음과 같이 정의했습니다.

```
glLightfv(GL_LIGHT0, GL_AMBIENT, ambient);
glLightfv(GL_LIGHT0, GL_DIFFUSE, diffuse);
glLightfv(GL_LIGHT0, GL_DIFFUSE, specular);
glLightfv(GL_LIGHT0, GL_POSITION, position);
glLightfv(GL_LIGHT1, GL_AMBIENT, ambient1);
glLightfv(GL_LIGHT1, GL_DIFFUSE, diffuse1);
glLightfv(GL_LIGHT1, GL_DIFFUSE, specular1);
glLightfv(GL_LIGHT1, GL_POSITION, position1);
glLightfv(GL_LIGHT2, GL_AMBIENT, ambient2);
glLightfv(GL_LIGHT2, GL_DIFFUSE, diffuse2);
glLightfv(GL_LIGHT2, GL_DIFFUSE, specular2);
glLightfv(GL_LIGHT2, GL_POSITION, position2);
```

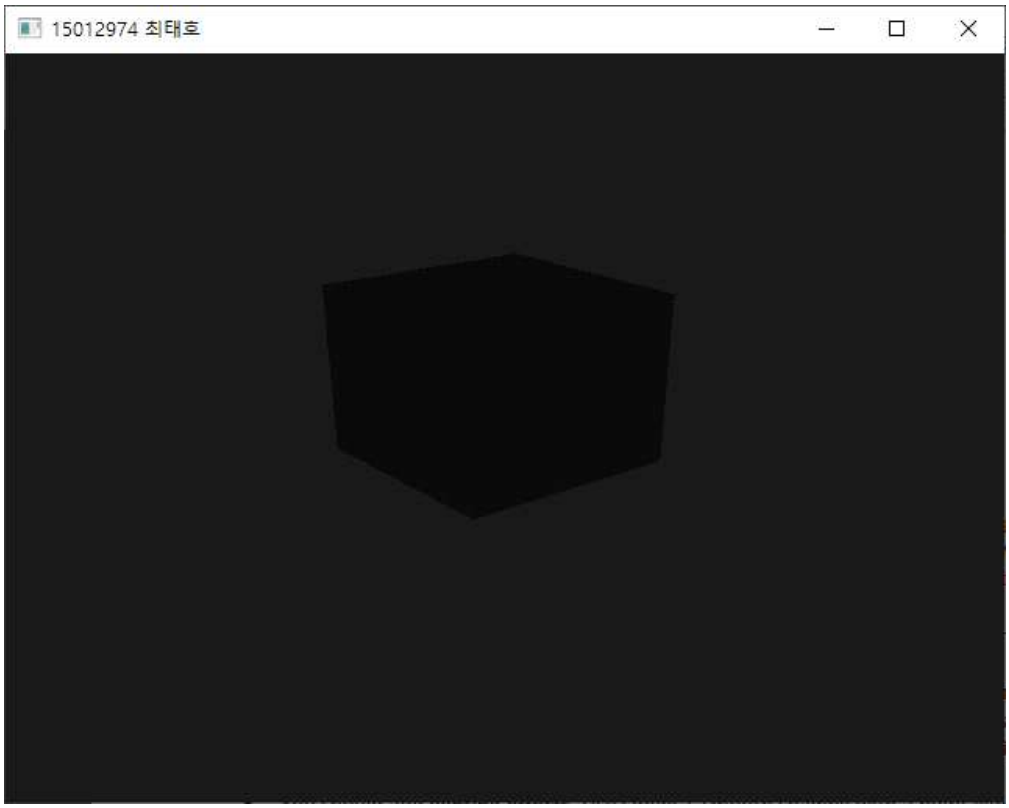
glutKeyboardFunc으로 아래와 같이 4가지 빛의 변화를 구현했습니다.

main light source



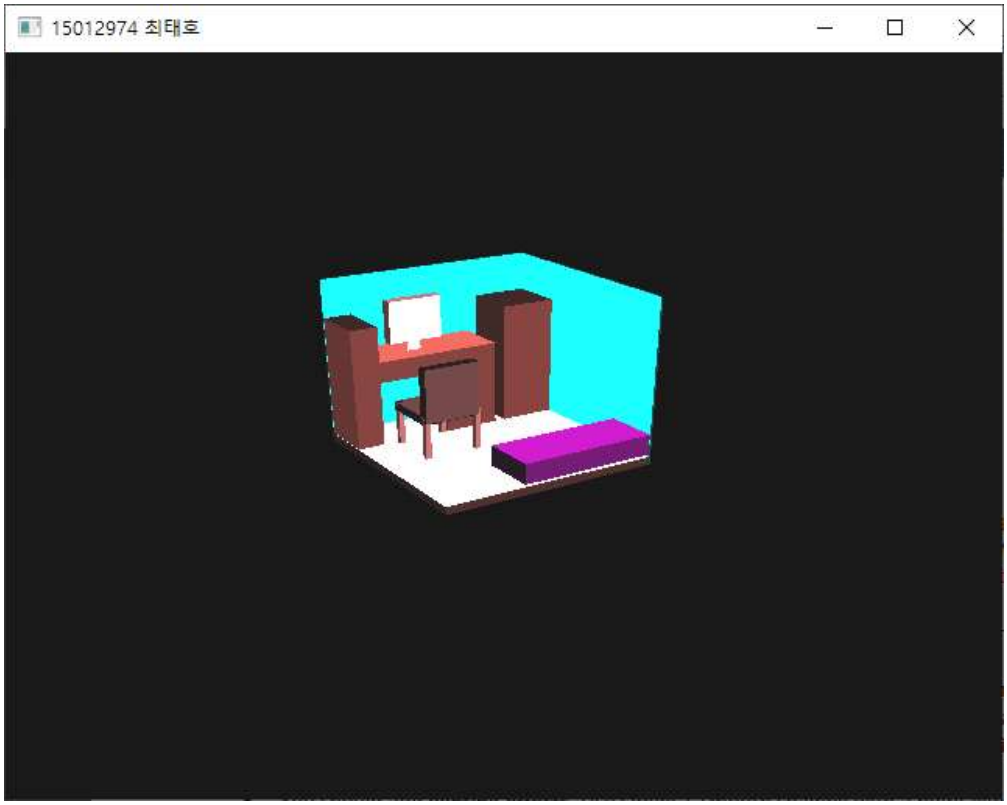
case key '0':

If type "0", then no light source



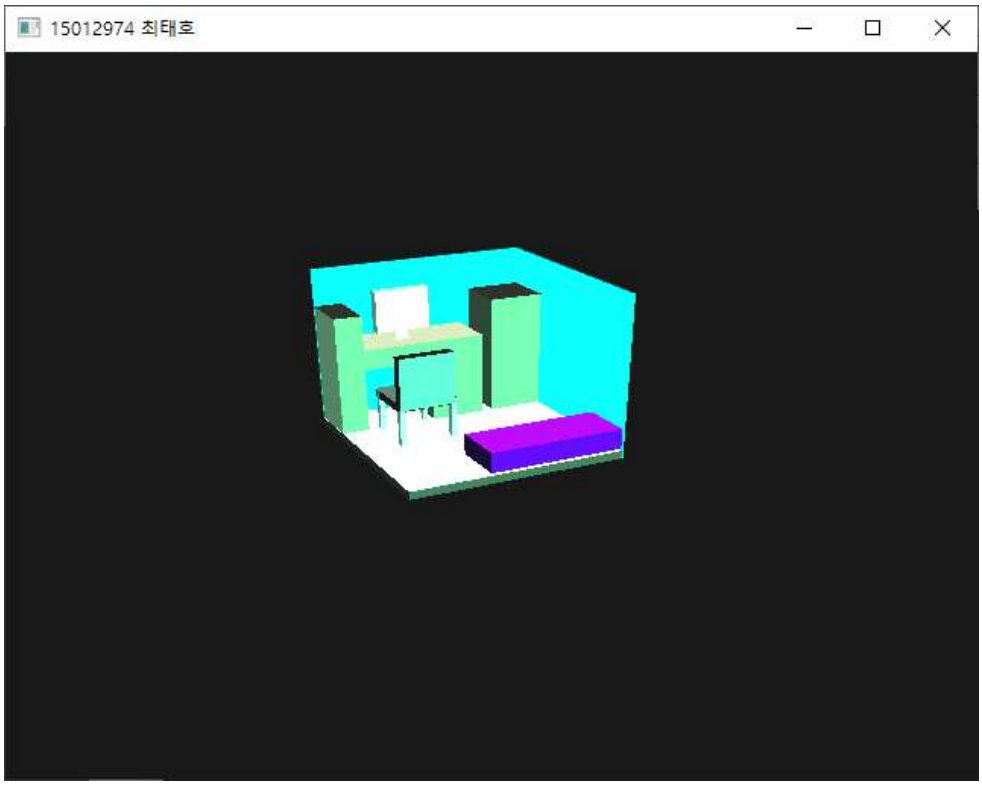
case key ‘1’:

If type “1”, then show only one light source (light 1)



case key ‘2’:

If type “2”, then show only two light sources (main light source + light 2)



case key '3':

If type "3", then show only three light sources (main light + light 1 + light 2)