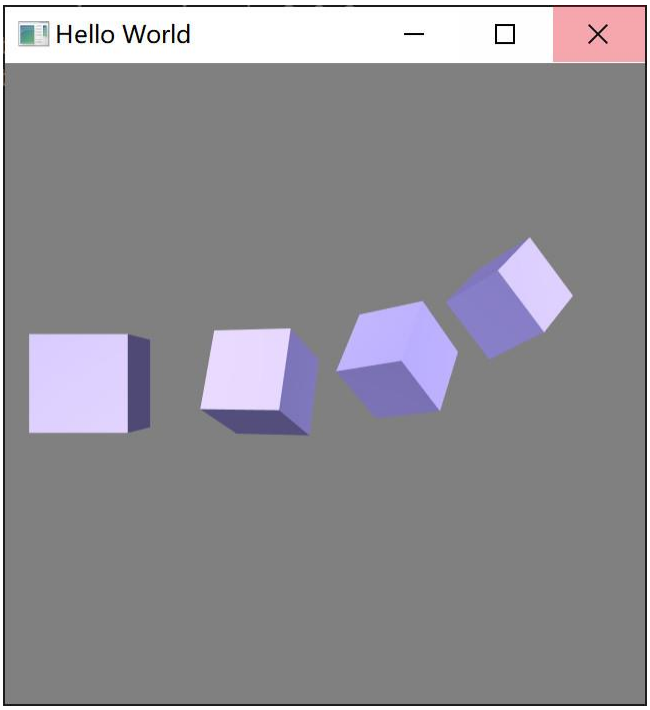
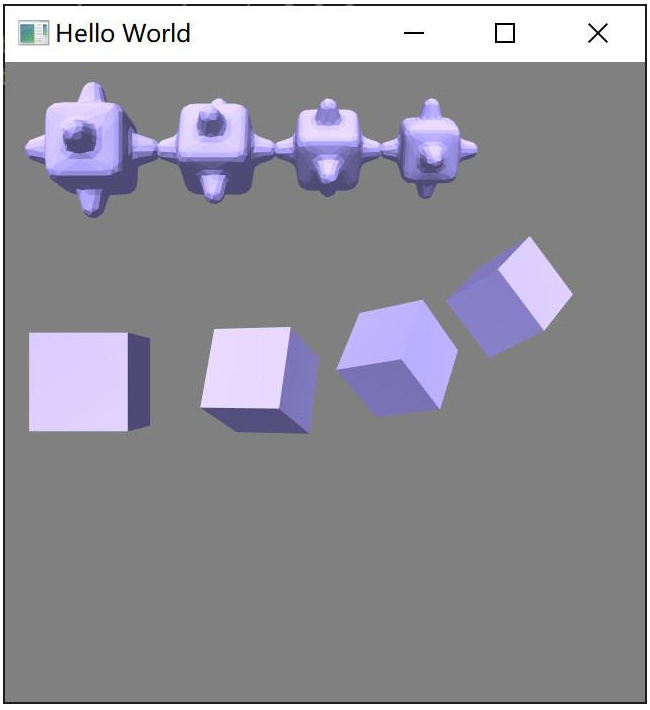
3D Editor

2.1 Scene Editor

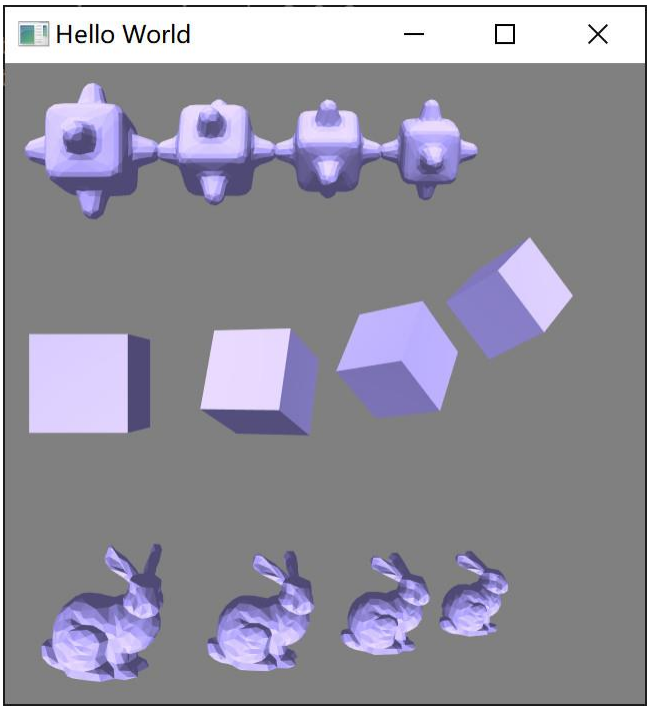
Press ’1’ on the keyboard to add a unit cube.



Press ’2’ to import a bumpy cube.off.



Press ’3’ to import a mesh ’bunny.off.



All of objects have their own scale, rotation and position. In order to uploaded the vertex positions of each object only once to the GPU, the vertex shader is

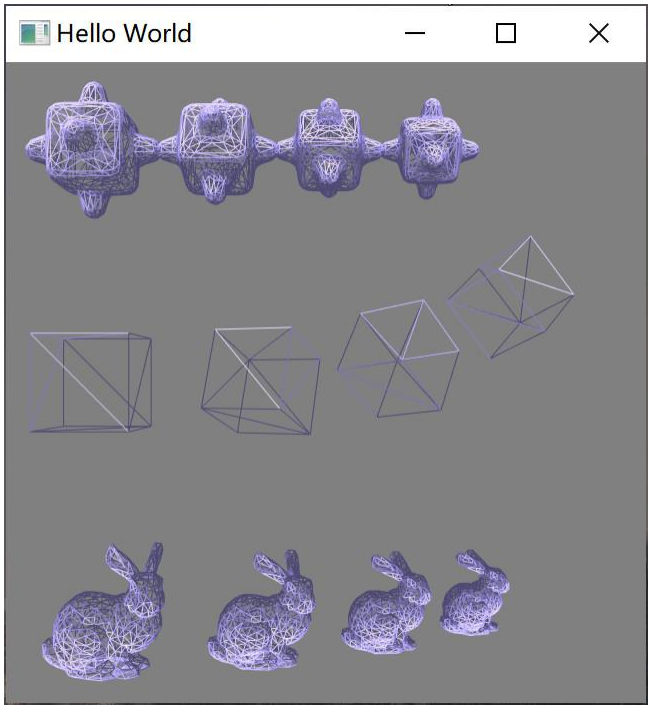
```
Program program;
const GLchar* vertex_shader =
    "#version 150 core\n"
    "in vec3 position;"
    "in vec3 aNormal;"
    "out vec3 FragPos;"
    "out vec3 Normal;"

    "uniform mat4 model;"
    "uniform mat4 view;"
    "uniform mat4 projection;"
    "void main()"
    "{"
    "FragPos = vec3(model * vec4(position, 1.0f));"
    "Normal = mat3(transpose(inverse(model))) * aNormal;"
    "gl_Position = projection * view * vec4(FragPos, 1.0);"
    "}";
```

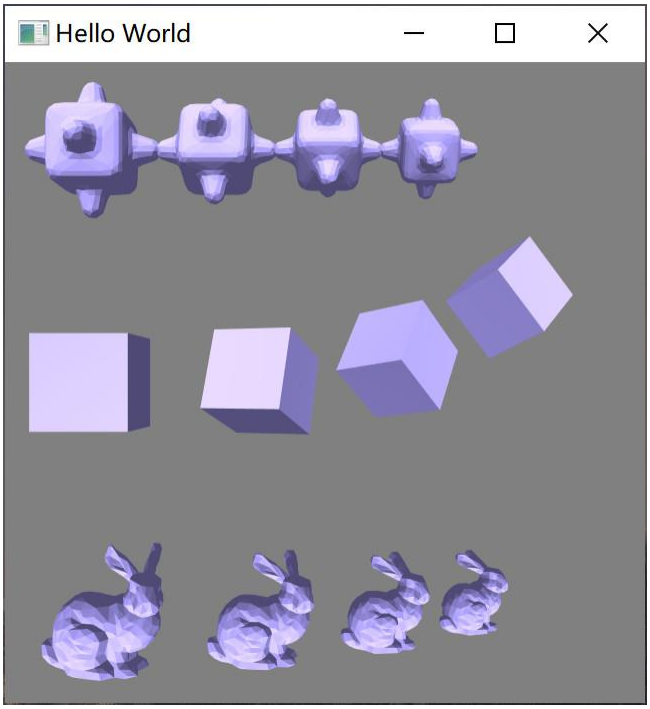
Model is to control the transformation of objects. View is to control camera, projection is to choose orthographic or perspective.

2.2 Object Control

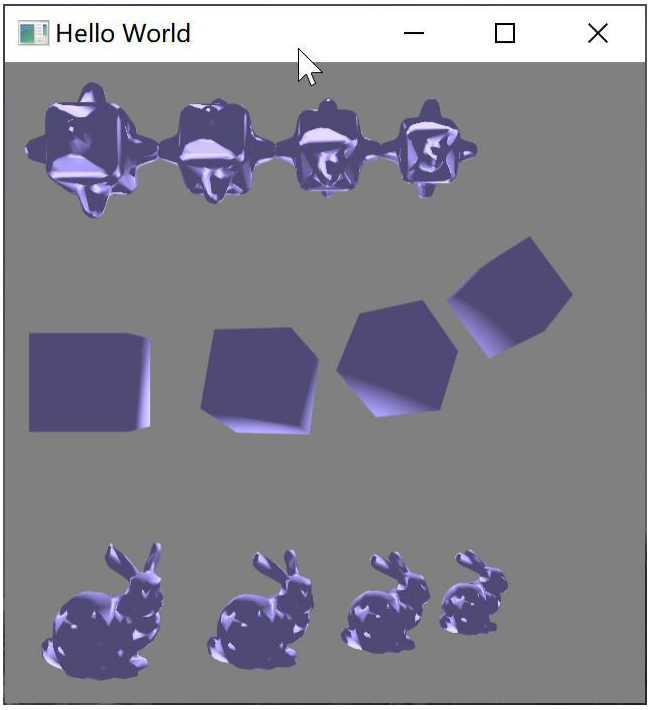
Press ‘b’ to show effect of wireframe (perspective):



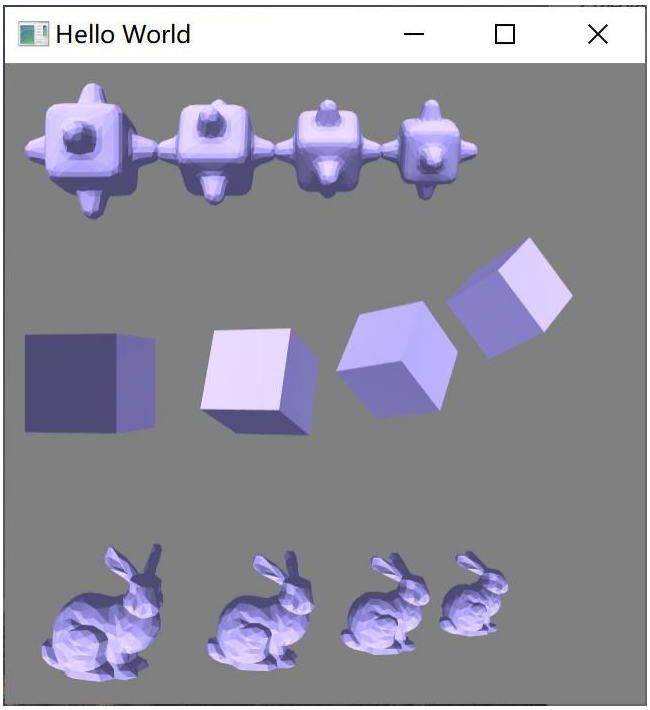
Press ‘n’ to show effect of flat Shading:



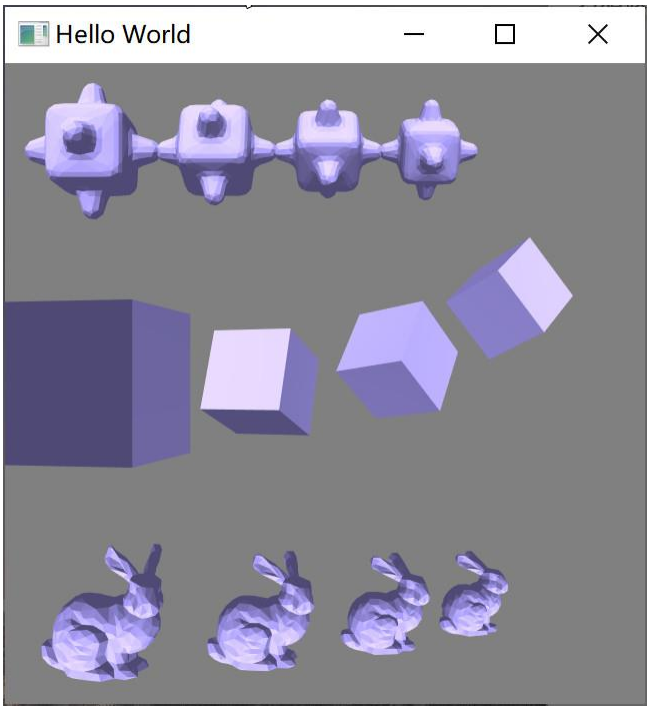
Press ‘m’ to show effect of phong Shading:



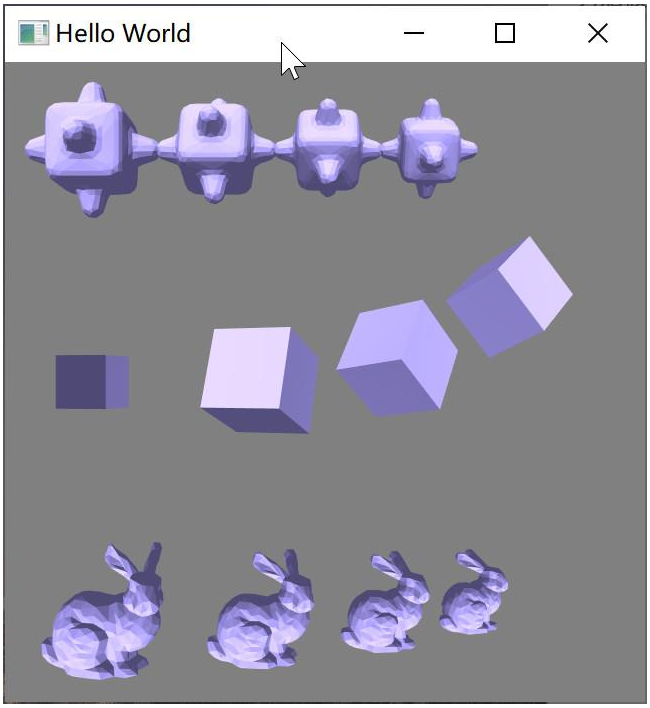
Press ‘l’ to rotate the first object:



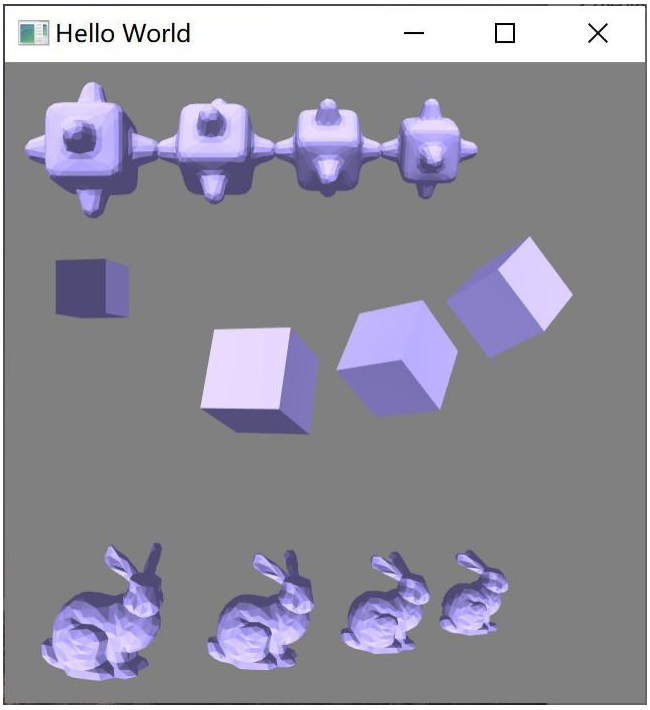
Press ‘+’ to scale up the first triangle:



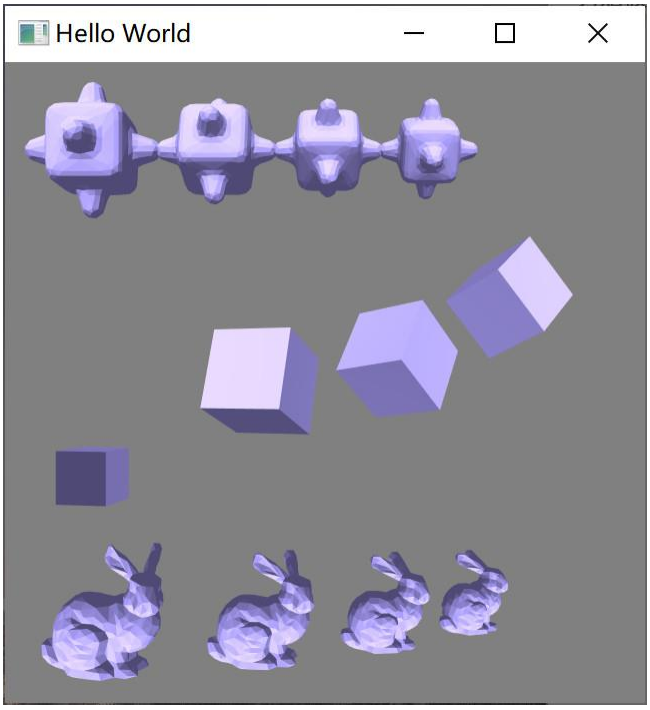
Press ‘+’ to scale down the first triangle:



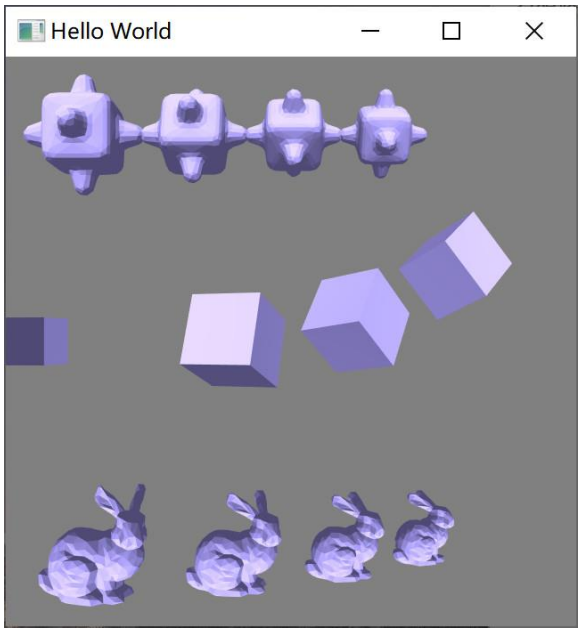
Press ‘up’ to let first triangle go up:



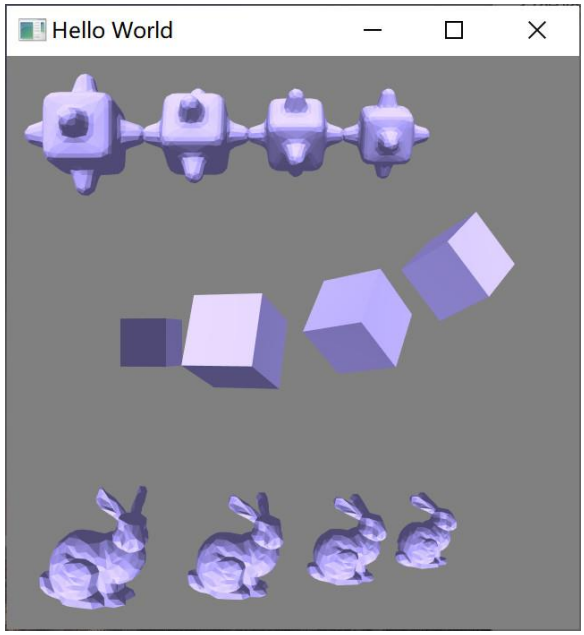
Press ‘down’ to let first triangle go down:



Press ‘left to let first triangle go left:



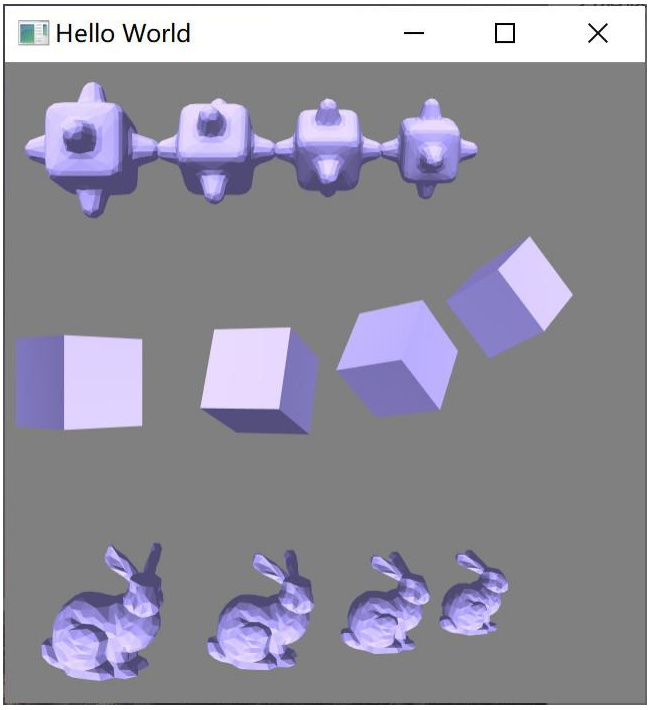
Press ‘right’ to let first triangle go right:



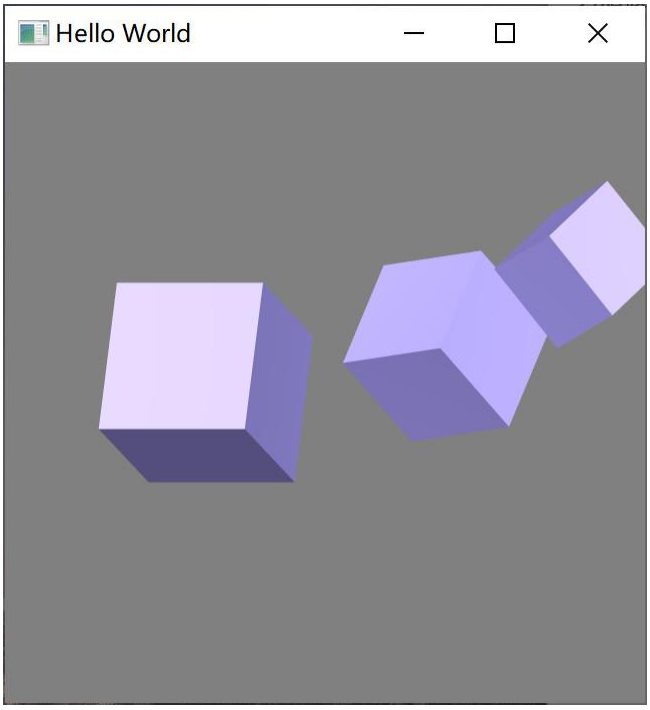
Select object: I try two ways to make object selection. The first way is ray-tracing in hw1, and second is project the space points on the plane to show the object. You can check my corresponding code, but neither of them worked. So I have to only select the first object.

2.3 Camera Control

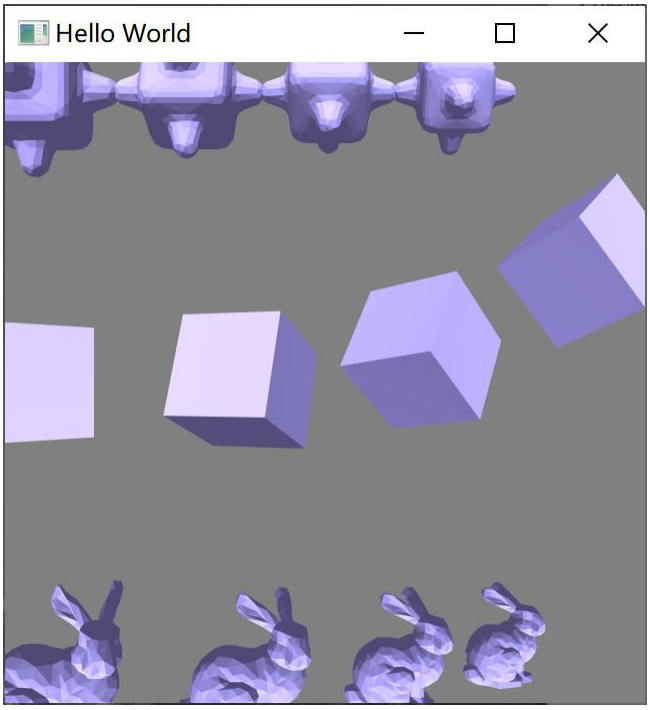
Press ‘p’ to show perspective view,



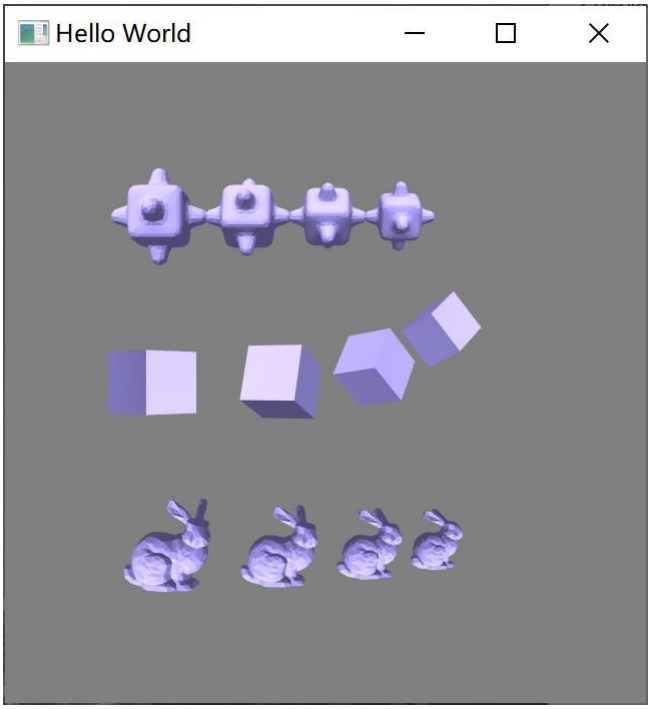
Press ‘o’ to show orthographic view,



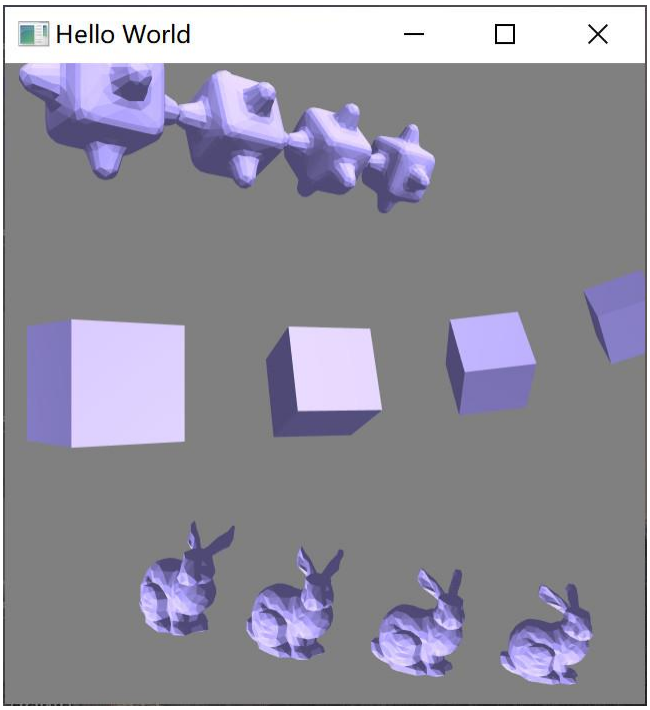
Press ‘i’ to let camera go near to object.



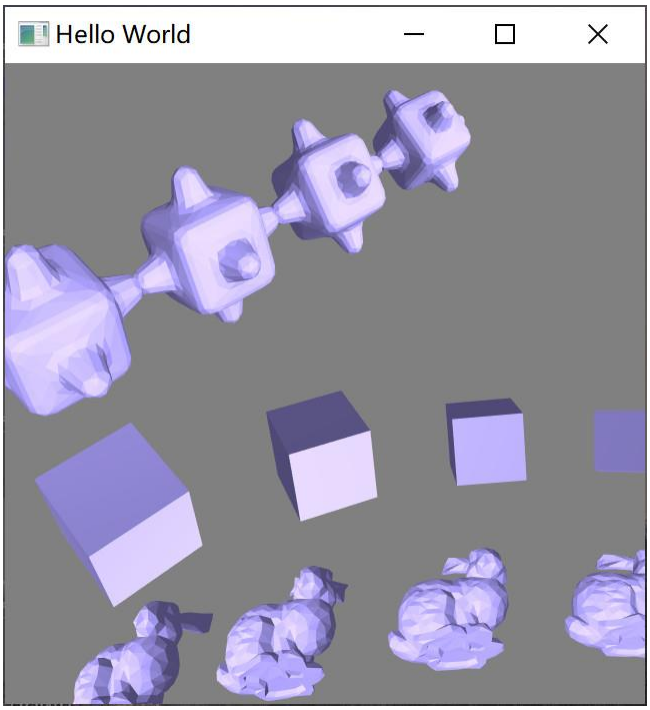
Press ‘k’ to let camera go far to object.



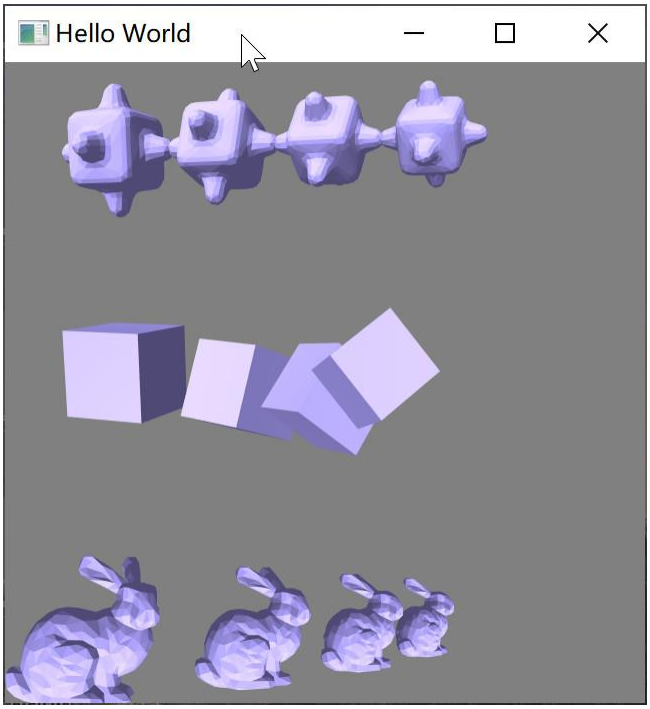
press ‘a’ to turn camera left.



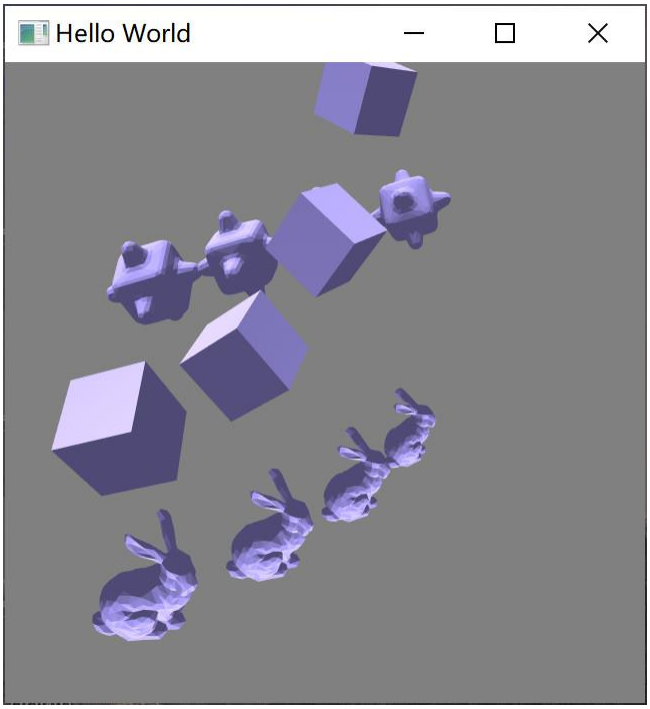
Press ‘s’ to turn down the camera.



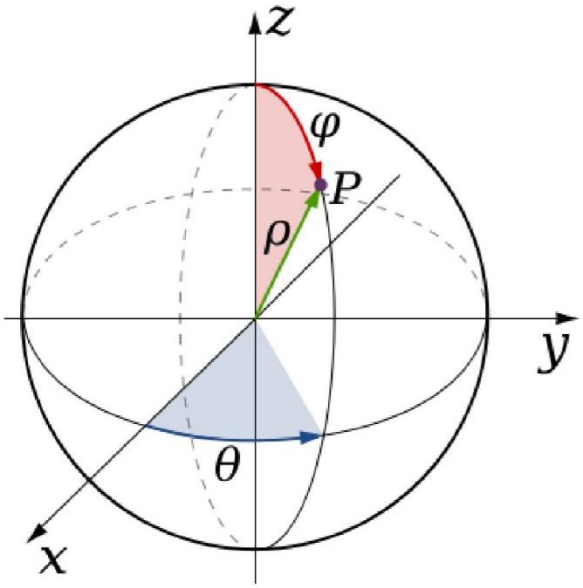
Press ’d’ to turn right.



press ‘w’ to turn up.



optional task 3



I can implement this function by camera control above.

‘w’ and ‘s’ is to decrease and increase the angle φ Separately.

‘a’ and ‘d’ is to decrease and increase the angle θ Separately.

‘i’ and ‘k’ is to decrease and increase the ρ.

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