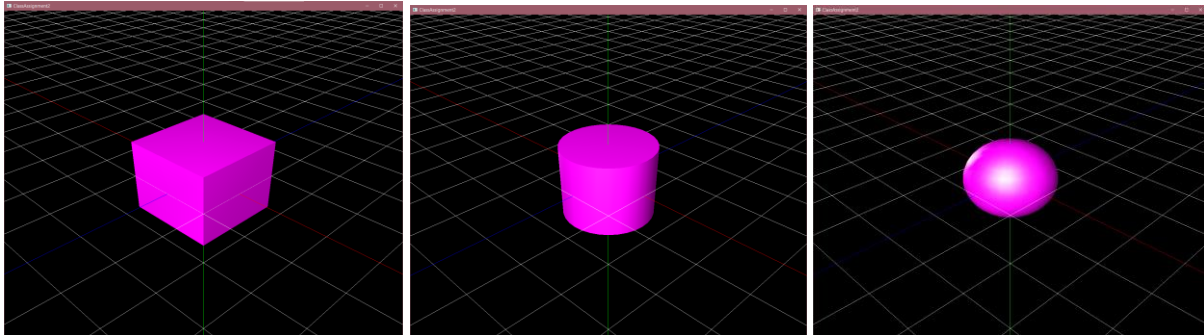i. Which requirements you implemented (5 pts)

  a. single mesh rendering mode (Flat Shading)



```
C:/Users/home/google 느ㅂ 이느/Univ/3-1/Computer Graphics/2021_cse4020_2017029870/ClassAssignment2/main.py
file name :  C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\cube-tri.obj
totalNumberOfFaces :  12
numberOfFacesWith3Vertices :  12
numberOfFacesWith4Vertices :  0
numberOfFacesWithMorethan4Vertices :  0
file name :  C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\cylinder-tri.obj
totalNumberOfFaces :  124
numberOfFacesWith3Vertices :  124
numberOfFacesWith4Vertices :  0
numberOfFacesWithMorethan4Vertices :  0
file name :  C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\sphere-tri.obj
totalNumberOfFaces :  960
numberOfFacesWith3Vertices :  960
numberOfFacesWith4Vertices :  0
numberOfFacesWithMorethan4Vertices :  0
```

  b. Animating hierarchical model rendering mode (50 pts)

    i. 아래 유투브 링크 참고

    ii. 달 모양이 폴리곤이 많아서 로딩하는 데에 시간이 걸릴 수 있음

      1. 본인 컴퓨터에서 약 5 초

    iii. 지구, 달, 돌 obj 파일을 연결시킴
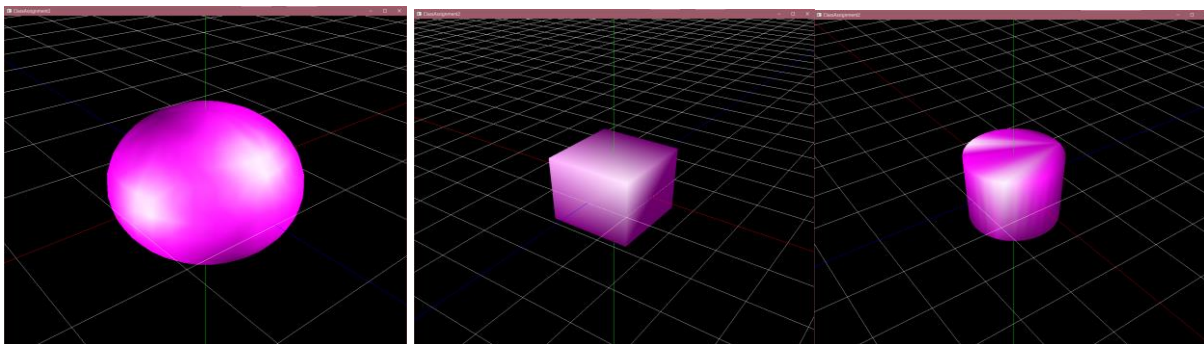
  c. Use multiple light sources (not a single light) to better visualize the meshes (10 pts). & Toggle [shading using normal data in obj file] / [forced smooth shading] by pressing 's' key (+10 pts)

    i. 위 사진들은 서로 다른 광원 2 개에서 smooth shading 을 하는 모습

  d. Toggle wireframe / solid mode by pressing 'z' key (similar to pressing 'z' key in Blender) (10 pts).
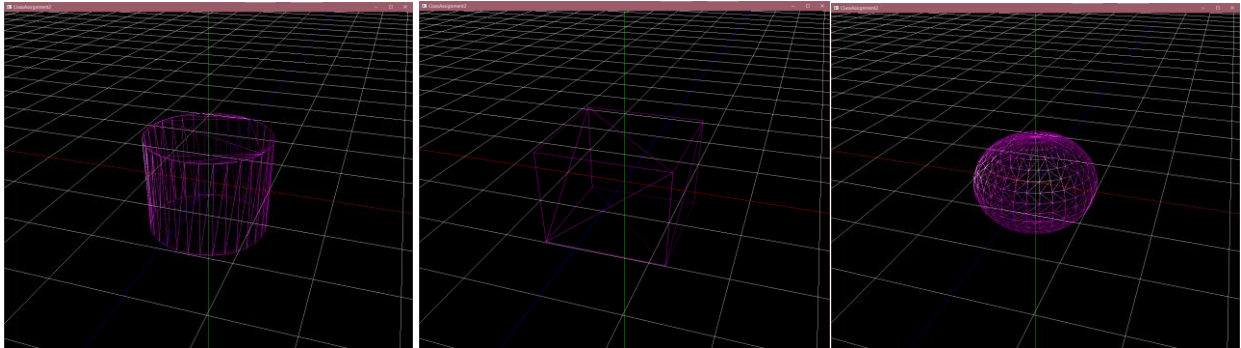
e. Load & render a mesh that does not have the same number of vertices of all polygons using glDrawArrays() or glDrawElements() (+10 pts)
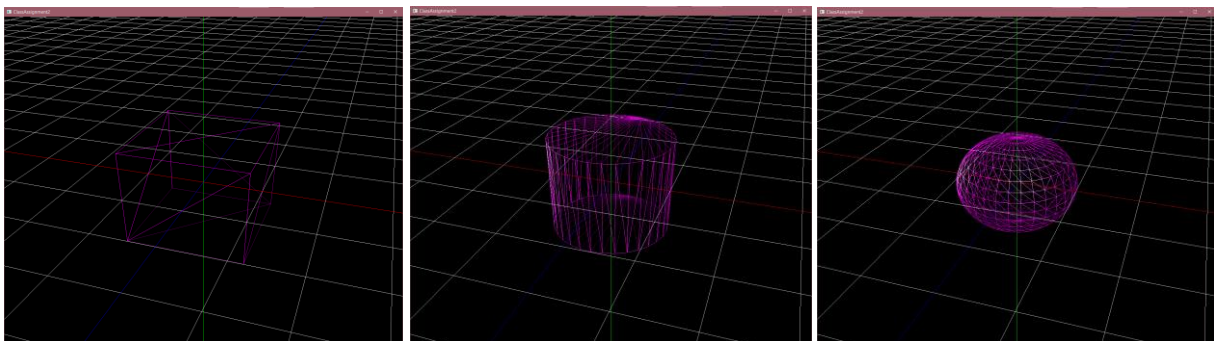

```
numberOfFacesWithMorethan4Vertices : 0
file name : C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\cube-tri-quad.obj
totalNumberOfFaces :  10
numberOfFacesWith3Vertices :  8
numberOfFacesWith4Vertices :  2
numberOfFacesWithMorethan4Vertices :  0
file name : C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\cylinder-tri-quad-n.obj
totalNumberOfFaces :  45
numberOfFacesWith3Vertices :  22
numberOfFacesWith4Vertices :  21
numberOfFacesWithMorethan4Vertices :  2
file name : C:\Users\home\Google 드라이브\Univ\3-1\Computer Graphics\2021_cse4020_2017029870\ClassAssignment2\obj\sphere-tri-quad.obj
totalNumberOfFaces :  524
numberOfFacesWith3Vertices :  88
numberOfFacesWith4Vertices :  436
numberOfFacesWithMorethan4Vertices :  0
```

차례로 cube-tri-quad, cylinder-tri-quad-n, sphere-tri-quad

ii. A hyperlink to the video uploaded to Internet video streaming services (such as YouTube and Vimeo) by capturing the animating hierarchical model as a video (10 pts).
   a. https://www.youtube.com/watch?v=3YkkPQo_g7U
iii. Lighting configuration (5 pts):
   a. How many light sources?
      i. 2 light sources
   b. Where do you put the light sources?

```
lightPos = (3., 4., 5. ,1.)
lightPos2 = (-3., 0., 0. ,1.)
```

   c. What is the type of each light source (point light or directional light)?
      i. LightPos = directional light
      ii. LightPos2 = directional light