Assignment-1

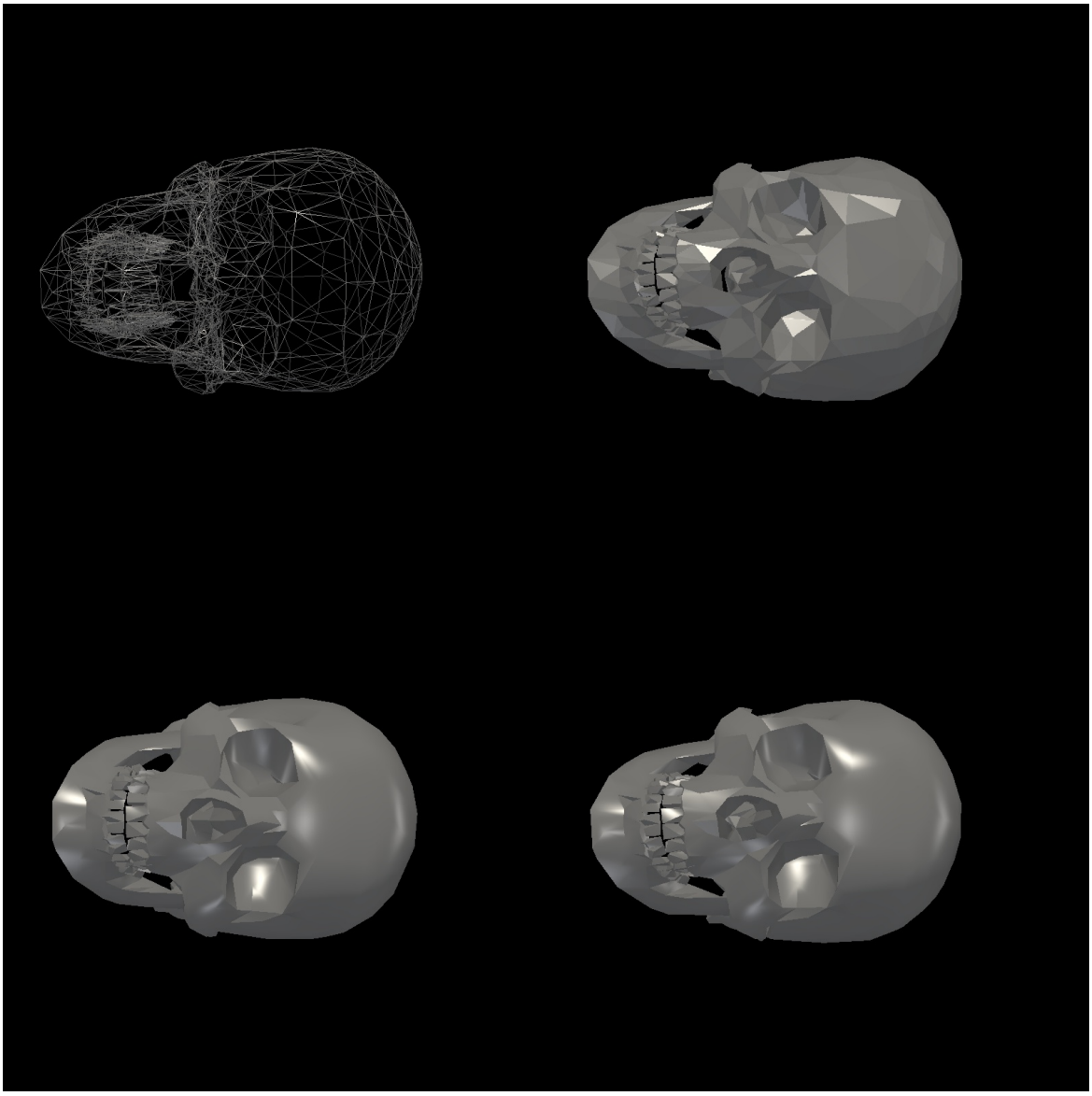
Graphics and Animation

7 February 2023

Model used:

Name: Low_Poly_Skull
File Size: 1,26,984 bytes
Number of vertices: 1327
Link: https://www.thingiverse.com/thing:518109

Output:



Source Code:

```
#Import VTK
import vtk
from stl import mesh
import numpy as np
```

```
# Read the STL file
reader = vtk.vtkSTLReader()
reader.SetFileName("Low_Poly_Skull.stl")
reader.Update()

# Compute Normals
teanormals = vtk.vtkPolyDataNormals()
teanormals.SetInputConnection(reader.GetOutputPort())

# Set Actor and Mapper
mapper = [vtk.vtkPolyDataMapper() for i in range(4)]
actor = [vtk.vtkActor() for i in range(4)]
for i in range(4):
    mapper[i].SetInputConnection(teanormals.GetOutputPort())
    actor[i].SetMapper(mapper[i])

    # Set Actor Properties
    prop = actor[i].GetProperty()
    prop.SetAmbient(0.2)
    prop.SetDiffuse(0.3)
    prop.SetSpecular(0.8)
    prop.SetSpecularPower(40.0)
    if i == 0:
        prop.SetRepresentationToWireframe()
    if i == 1:
        prop.SetInterpolationToFlat()
    if i == 2:
        prop.SetInterpolationToGouraud()
    if i == 3:
        prop.SetInterpolationToPhong()
    prop.ShadingOn()

# Render Window
renWin = vtk.vtkRenderWindow()
renWin.SetSize(1600, 1600)

# Set Renderer
ren = [vtk.vtkRenderer() for i in range(4)]

# Set Viewport Dimensions
xmins = [0, 0.5, 0, 0.5]
xmaxs = [0.5, 1, 0.5, 1]
ymins = [0.5, 0.5, 0, 0]
ymaxs = [1, 1, 0.5, 0.5]
```

```
for i in range(4):
    ren[i].AddActor(actor[i])

    # Add light
    lightkit = vtk.vtkLightKit()
    lightkit.AddLightsToRenderer(ren[i])

    ren[i].SetViewport(xmins[i], ymins[i], xmaxs[i], ymaxs[i])
    renWin.AddRenderer(ren[i])

# Set Interactor and Render loop
iren = vtk.vtkRenderWindowInteractor()
iren.SetRenderWindow(renWin)
renWin.Render()
iren.Start()

# Save Render window to jpeg file
writer = vtk.vtkJPEGWriter()
filter = vtk.vtkWindowToImageFilter()
filter.SetInput(renWin)
filter.ReadFrontBufferOff()
filter.Update()

writer.SetFileName("output.jpeg")
writer.SetInputConnection(filter.GetOutputPort())
writer.Write()
```

Readme Section:

VTK version: latest(9.2.5)
Step 1: Load model in source code.
Step 2: Load and save source code in .py format and run python file.
Step 3: You can see output as shown above and if you exit the code then output is saved in jpeg format.