

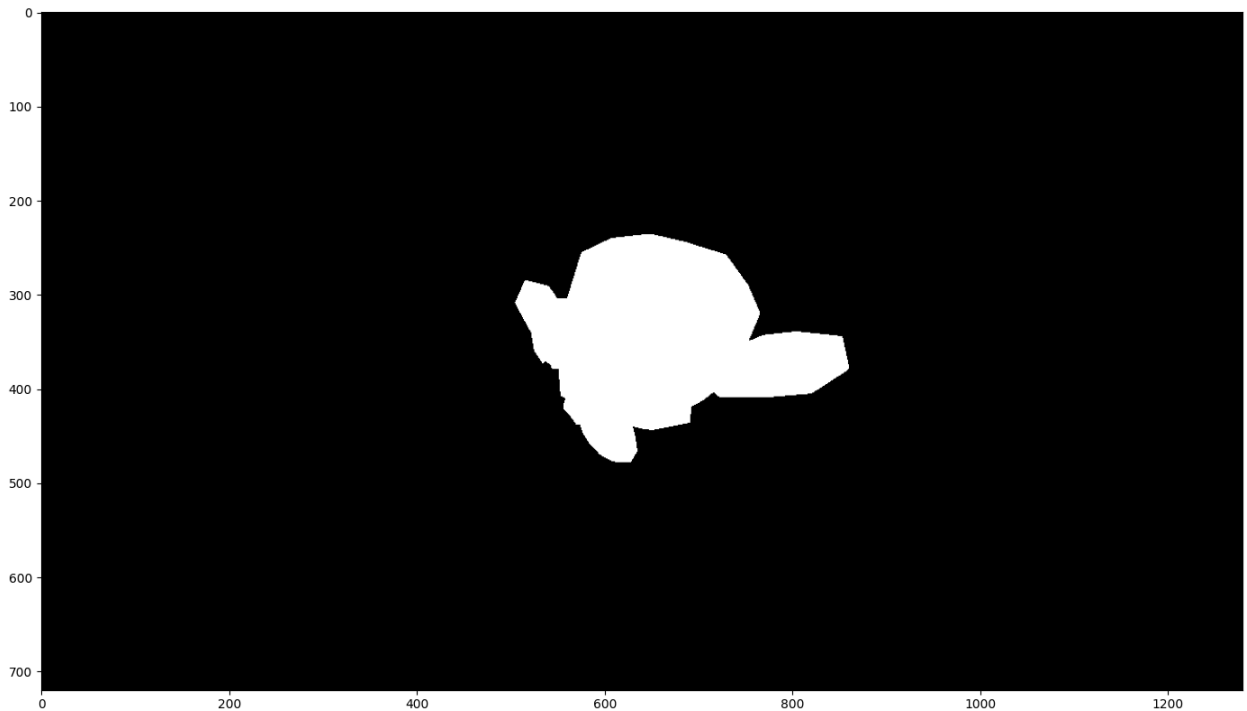
TP4 Graphic 3D

Fragment shader & Phong shading

- 1) For each fragment call the fragment shader. Then if the fragment passes the depth test store its output in the final image using the following command:

```
self.image[f.y][f.x] = f.output
```

Now if you run the main.py file, you should get the following image :

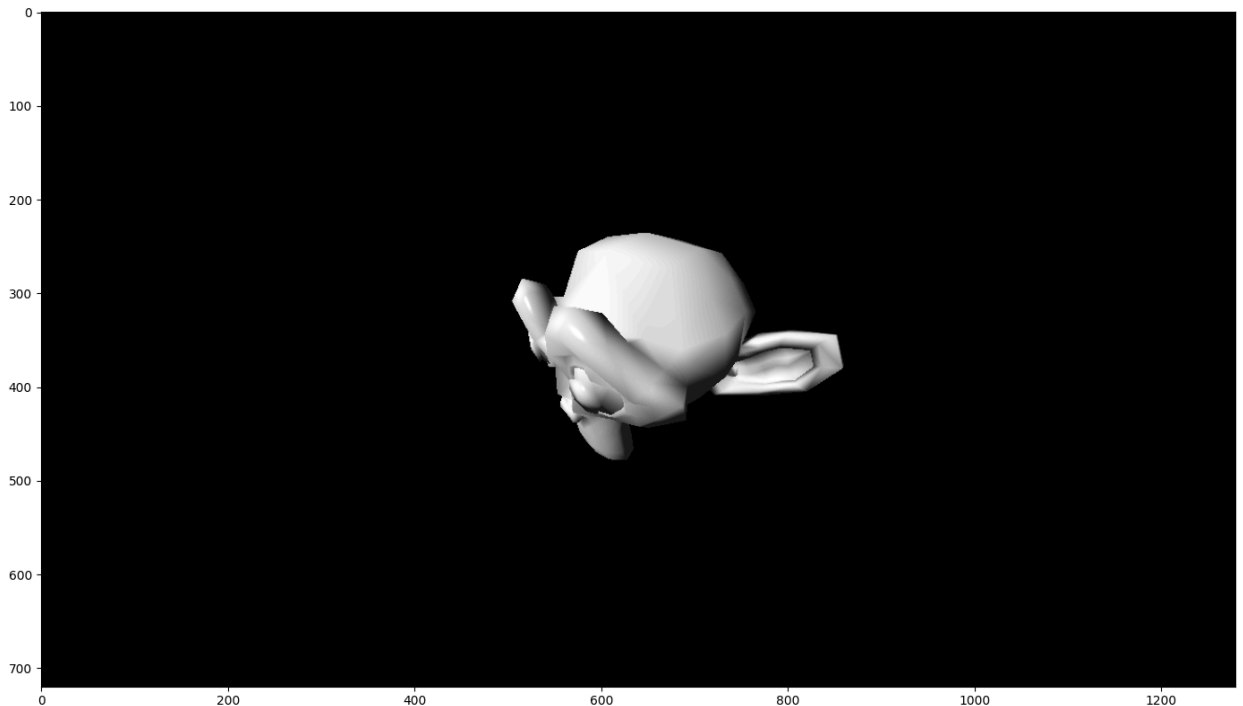


This result is normal, if you look at the fragmentShader function, it creates a white output in each fragment, we need to change that to improve our result.

- 2) Modify the vertex shader to compute the vectors N and L, and store N, V, and L at the end of the projected vertex.
(the camera position and light position are stored in the data variable)
- 3) Modify the rasterizer to compute the interpolation of the vertex data for each fragment. To do so compute the 3D barycentric coordinate using the edgeSide3D function. Then interpolate the vertex data to find their value at the point p, and store it in the associated fragment.
- 4) In the fragmentShader function unpack the vectors N, V, and L from the fragment interpolated data and use them to compute the phong illumination.

For the moment use `modelColor = [1,1,1]`, $\alpha=32$, $k_i = 0.1$, $k_d = 0.9$, and $k_s = 0.3$

Now if you run `main.py` you should obtain the following image:



Try modifying the `fragmentShader` function only to show the effect of the ambient light. Do the same for the diffuse light, and the specular light. What part of the result is affected by the different parts of the phong shading? Now try to change the value of k_i , k_d , and k_s to see how it affects the result

Stylization

The result above is nice, it is close to how a real object would look. In some cases, we want to be able to render objects in a non-realistic way this is called Expressive rendering.

One method to render objects to give them a more cartoonish aspect is the cel-shading, It makes rendered object appears more flat by reducing the number of shades present in the image

Try to modify your fragment shader to obtain the following result:

