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Texture Mapping and Off-screen Rendering

Purpose of this assignment was to make us familiar with different texture mapping techniques in practice. I learned how to render object s and use cube map as a mirror or as an environment, and with framebuffer we can save any frames and project them in some figure.

I divided my code into three parts; 1st is 2D texture mapping (20points), 2nd is Environment mapping using static cube mapping (30 points), 3rd is 3. Environment mapping using dynamic cube mapping (50 points).

To run each part of my code you need to define their names. For the first task name is TASK1, second is STATIC_CUBEMAP, and third is DYNAMIC_CUBEMAP. By default TASK1 is defined.

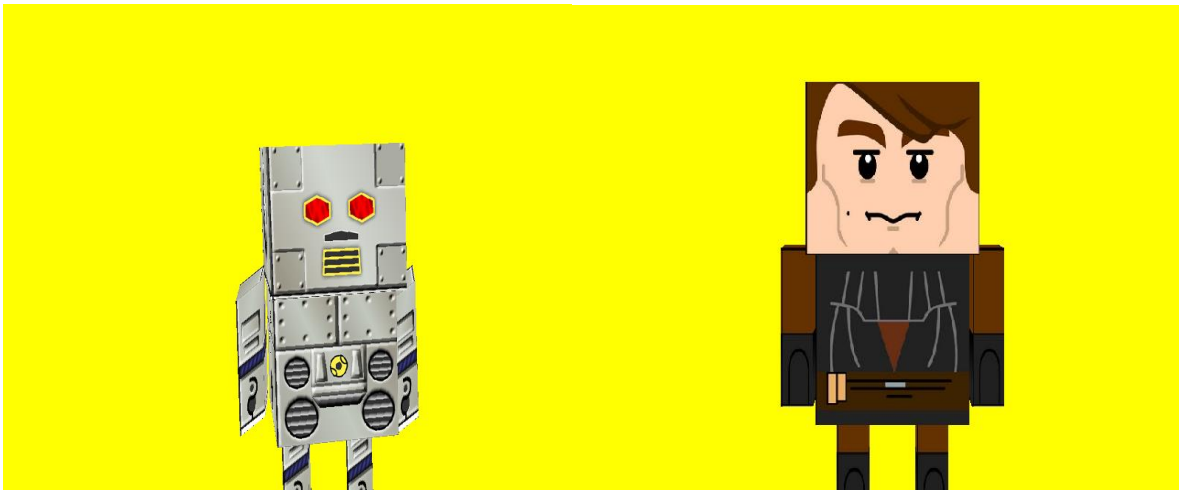
Note: I used glm in my code

1st is 2D texture mapping (20points)

- Render accurate texture-mapped Minecraft character (10pts)

- Virtual trackball to rotate the object (10pts)

I rendered Minecraft character and used trackball for rotating it.



Environment mapping using static cube mapping (30 points)

Render a box and an object as shown above figure (10 pts)

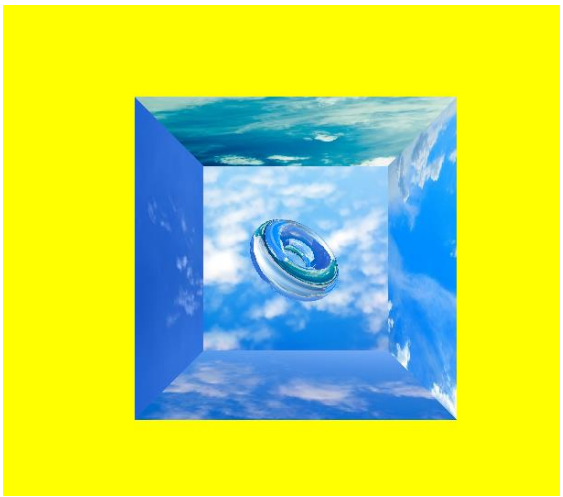
Correctness of reflection (10 pts)

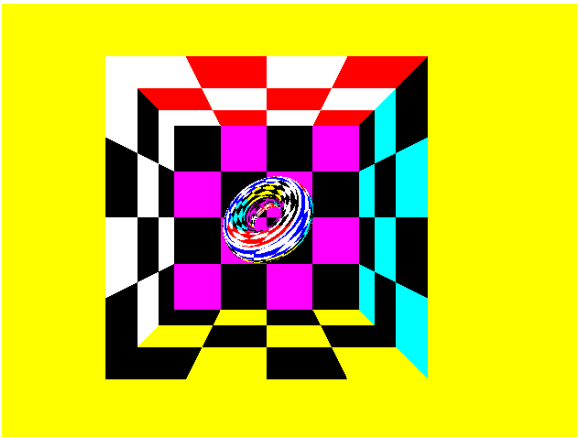
Virtual trackball to rotate the object only (not the outer box) (10 pts)

Extra points:

Find interesting cube map textures on the Internet and use them instead of checkerboard textures. You can google “cube map image” (20 pts)

All five parts are done. For extra points I used images of sky from internet. As you see from examples, there is rotation occurred, which I did by using trackball. Correctness of reflection can be checked with second example more precisely.





Environment mapping using dynamic cube mapping (50 points)

- Dynamic cube mapping using FBO (25 pts)

- Correctness of reflection (15 pts)

- Animation of objects (10 pts)

Extra points:

- Create at least three complete minecraft characters (complete means a character having head, body, arms, legs) and use them as moving objects. Use interesting minecraft images found on the Internet (30 pts)

I rendered four different Minecraft characters and used teapot and solid sphere to render them for dynamic cube map. I animated them by rotating them and at the same time they were moving from right to left and then again from left to right. Reflection was all correct, you can check reflection from last pictures.