Computer Graphic

Assignment No.2

Deadline: 2021.10.20, 11:59 PM

1. (**Texture Mapping**): 2Point

Consider we have an image to be used as a texture map with width 30 pixels and heigh 30 pixels.

a) Find the homogeneous coordinates matrix(3X3) that maps Texel coordinates to texture coordinates (that is the unit square $0 \leq s \leq 1, 0 \leq t \leq 1$)
b) Find the homogeneous coordinates matrix that maps Texture coordinates to Texel coordinates

2. (**line rasterization**): 1 Point

Draw the line from (-2,6) to (2,12) by using the midpoint algorithm.

3. (**homogeneous coordinates**): 1 Point

Consider a camera located at position (8,2) in a game world defined in the canonical world coordinate system. The camera's orientation is specified by a right vector $(\frac{4}{5}, -\frac{3}{5})$ and an up vector $(\frac{3}{5}, \frac{4}{5})$. Consider it that all the positions and vectors are defined in the world coordinate system.

Find the 3X3 homogeneous coordinates matrix for transforming points defined in world coordinate system to the camera coordinate system (hint: first make the camera to world coordinate then inverse it)

>> Submit your answer by the deadline

- If you want to do it by hand (maybe on the computer or on paper), please don't forget that you should write the equations that you used, if the question is too easy to do (for example draw the line by hand or just transfer the point to other position), it's not meaning do it like simple drawing, you should use the methods and equation that newly learned, and make your answer by using them. And please don't skip the steps, write all of them

- If you want to submit the code, please don’t forget that your code should be runnable without error and also contain reasonable comments and it would be great if you make a document for your code but it’s not mandatory! And you can use the arbitrary image(texture)

Good Luck! 😊