CSE-4303 CSE5365 Computer Graphics
Practice Problems 04

Assuming a right-handed 3-d coordinate system, solve the following problems.
The viewing parameters for a perspective projection are given as

VRP(WC)=(**1,5,7**) VPN(WC)=(**2,5,8**)
VUP(WC)=(**3,-2,6**) PRP (VRC)=(**-2,4,-20**)
u_{min} (VRC) = **10** u_{max} (VRC) = **18**
v_{min} (VRC) = **-10** v_{max} (VRC) = **-2**
n_{min} (VRC) = **-5** n_{max} (VRC) = **80**

Find the sequence of transformations which will transform this viewing volume into a standard perspective view volume which is bounded by the planes: x=z ; x=-z ; y=z ; y=-z ; z=1 ; z=zmin

a. Find the **sequence of matrices**
b. Find the **zmin** after all transformations are done.

Matrix #2: Rx

Matrix #1: Translate

Matrix #4: Rz

Matrix #3: Ry

Matrix #6: Shear

Matrix #5: Translate

Scale2

Scale1

Zmin =

CSE-4303 CSE5365 Computer Graphics
Practice Problems 04

Point **A(-5, 50)** is given in a two dimensional world coordinate system. Find the coordinates of the point A on the screen after it is mapped from window to viewport.

$x_{wmin} = -10$ $y_{wmin} = 20$ $x_{wmax} = -2$ $y_{wmax} = 120$

Normalized device coordinate of the viewport:

$x_{vmin} = 0.2$ $y_{vmin} = 0.25$ $x_{vmax} = 0.6$ $y_{vmax} = 0.8$

The origin of the screen coordinate system is defined in the **upper left** corner of the screen and the screen resolution is 800 by 600.

Use rounding to convert from float to integer.

Find the parametric equation of a line in a 3-dimensional Cartesian coordinate system which is passing through points $A\ (2, 5, -4)$ and point $B\ (-3, 10, 1)$

CSE-4303 CSE5365 Computer Graphics
Practice Problems 04

Given points **A(9.8, -6.9, 6.2)** and **B(-10.2 , 7.1 , -5.8)**

Clip line AB against the standard perspective volume. Assume $z_{min} = 0.2$

Clip line AB against the standard parallel volume (Unit cube).

Equation of line AB

CSE-4303 CSE5365 Computer Graphics
Practice Problems 04

The viewing parameters for a parallel projection are given as:

VRP(WC)=(**2,5,1**)　　VPN(WC)=(**8,6,10**)
VUP(WC)=(**5,9,2**)　　PRP (VRC)=(**3,6,-10**)

u_{min} (VRC) = **-8**　　u_{max} (VRC) = **-3**

v_{min} (VRC) = **-2**　　v_{max} (VRC) = **8**

n_{min} (VRC) = **2**　　n_{max} (VRC) = **12**

Find the sequence of transformations which will transform this viewing volume into a unit cube which is bounded by the planes: x=0 ; x=1 ; y=0 ; y=1 ; z=0 ; z=1

Matrix #2: Rx

Matrix #1: Translate

Matrix #4: Rz

Matrix #3: Ry

Matrix #6: Translate

Matrix #5: Shear

Matrix #7: Scale

CSE-4303 CSE5365 Computer Graphics
Practice Problems 04