CSE-4303 CSE5365 Computer Graphics
Practice Parallel Projections

The viewing parameters for a parallel projection are given as

VRP(WC)=(3,4,5) VPN(WC)=(8,6,12)

VUP(WC)=(1,2,3) PRP (VRC)=(2,5,-5)

u_{min} (VRC) = -4 u_{max} (VRC) = 6

v_{min} (VRC) = 24 v_{max} (VRC) = 26

n_{min} (VRC) = 10 n_{max} (VRC) = 20

Given all other transformations, find the **Shear** matrix 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 #1: Translate

1.000	0.000	0.000	-3.000
0.000	1.000	0.000	-4.000
0.000	0.000	1.000	-5.000
0.000	0.000	0.000	1.000

Matrix #2: Rx

1.000	0.000	0.000	0.000
0.000	0.894	-0.447	0.000
0.000	0.447	0.894	0.000
0.000	0.000	0.000	1.000

Matrix #3: Ry

0.859	0.000	-0.512	0.000
0.000	1.000	0.000	0.000
0.512	0.000	0.859	0.000
0.000	0.000	0.000	1.000

Matrix #4: Rz

0.417	0.909	0.000	0.000
-0.909	0.417	0.000	0.000
0.000	0.000	1.000	0.000
0.000	0.000	0.000	1.000

Matrix #5: Shear

Matrix #6: Translate

1.000	0.000	0.000	4.000
0.000	1.000	0.000	-24.000
0.000	0.000	1.000	-10.000
0.000	0.000	0.000	1.000

Matrix #7: Scale

0.100	0.000	0.000	0.000
0.000	0.500	1.000	0.000
0.000	0.000	0.100	0.000
0.000	0.000	0.000	1.000

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The viewing parameters for a parallel projection are given as

VRP(WC)=(0,0,0) VPN(WC)=(0, 0,1)
VUP(WC)=(0,1,0) PRP (VRC)=(4,7,10)
u_{min} (VRC) = 6 u_{max} (VRC) = 11
v_{min} (VRC) = -3 v_{max} (VRC) = 5
n_{min} (VRC) = 12 n_{max} (VRC) = 20

Given all other transformations, find the **Shear** matrix 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 #2: Rx

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #1: Translate

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #4: Rz

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #3: Ry

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #6: Shear

Matrix #5: Shear

Matrix #8: Scale

1/5	0	0	0
0	1/8	0	0
0	0	1/8	0
0	0	0	1

Matrix #7: translate

1	0	0	-6
0	1	0	3
0	0	1	-12
0	0	0	1

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The viewing parameters for a parallel projection are given as

VRP(WC)=(3,4,5) VPN(WC)=(8,6,12)

VUP(WC)=(1,2,3) PRP (VRC)=(2,5,5)

u_{min} (VRC) = -4 u_{max} (VRC) = 6

v_{min} (VRC) = 8 v_{max} (VRC) = 12

n_{min} (VRC) = 3 n_{max} (VRC) = 5

Given all other transformations, find the **Scale** matrix 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

1.000	0.000	0.000	0.000
0.000	0.894	-0.447	0.000
0.000	0.447	0.894	0.000
0.000	0.000	0.000	1.000

Matrix #1: Translate

1.000	0.000	0.000	-3.000
0.000	1.000	0.000	-4.000
0.000	0.000	1.000	-5.000
0.000	0.000	0.000	1.000

Matrix #4: Rz

0.417	0.909	0.000	0.000
-0.909	0.417	0.000	0.000
0.000	0.000	1.000	0.000
0.000	0.000	0.000	1.000

Matrix #3: Ry

0.859	0.000	-0.512	0.000
0.000	1.000	0.000	0.000
0.512	0.000	0.859	0.000
0.000	0.000	0.000	1.000

Matrix #6: Shear

1.000	0.000	0.000	0.000
0.000	1.000	1.000	0.000
0.000	0.000	1.000	0.000
0.000	0.000	0.000	1.000

Matrix #5: Shear

1.000	0.000	-0.200	0.000
0.000	1.000	0.000	0.000
0.000	0.000	1.000	0.000
0.000	0.000	0.000	1.000

Matrix #8: Scale

Matrix #7: Translate

1.000	0.000	0.000	4.000
0.000	1.000	0.000	-8.000
0.000	0.000	1.000	-3.000
0.000	0.000	0.000	1.000

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The viewing parameters for a parallel projection are given as

VRP(WC)=(3,4,5) VPN(WC)=(8,6,12)

VUP(WC)=(1,2,3) PRP (VRC)=(5,2,1)

u_{min} (VRC) = 2 u_{max} (VRC) = 6

v_{min} (VRC) = 16 v_{max} (VRC) = 24

n_{min} (VRC) = 15 n_{max} (VRC) = 20

Given all other transformations, find the **Shear** matrix and **Scale** matrix which will transform this viewing volume into a volume which is bounded by the planes: x=-1 ; x=1 ; y=-1 ; y=1 ; z=0; z=1

Matrix #2: Rx

1.000	0.000	0.000	0.000
0.000	0.894	-0.447	0.000
0.000	0.447	0.894	0.000
0.000	0.000	0.000	1.000

Matrix #1: Translate

1.000	0.000	0.000	-3.000
0.000	1.000	0.000	-4.000
0.000	0.000	1.000	-5.000
0.000	0.000	0.000	1.000

Matrix #4: Rz

0.417	0.909	0.000	0.000
-0.909	0.417	0.000	0.000
0.000	0.000	1.000	0.000
0.000	0.000	0.000	1.000

Matrix #3: Ry

0.859	0.000	-0.512	0.000
0.000	1.000	0.000	0.000
0.512	0.000	0.859	0.000
0.000	0.000	0.000	1.000

Matrix #6: Translate

1.000	0.000	0.000	-4.000
0.000	1.000	0.000	-20.000
0.000	0.000	1.000	-15.000
0.000	0.000	0.000	1.000

Matrix #5: Shear

Matrix #7: Scale

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1. The viewing parameters for a parallel projection are given as

   VRP(WC)=(1,3,4) **VPN(WC)=(6,0,8)**
   VUP(WC)=(10,0,0) **PRP (VRC)=(0,4,5)**
   u_{min} (VRC) = 13 **u_{max} (VRC) = 17**
   v_{min} (VRC) = -7 **v_{max} (VRC) = 3**
   n_{min} (VRC) = 12 **n_{max} (VRC) = 14**

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

Matrix #2

Matrix #1

Matrix #4

Matrix #3

Matrix #6

Matrix #5

Matrix #8

Matrix #7

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Practice Parallel Projections

The viewing parameters for a parallel projection are given as:

VRP(WC)=(**0,0,0**) VPN(WC)=(**0, 0,1**)
VUP(WC)=(**0,1,0**) PRP (VRC)=(**10,20,50**)

u_{min} (VRC) = **-6** u_{max} (VRC) = **-2**
v_{min} (VRC) = **-2** v_{max} (VRC) = **6**
n_{min} (VRC) = **-4** n_{max} (VRC) = **1**

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

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #1: Translate

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #4: Rz

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #3: Ry

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #6: Translate

Matrix #5: Shear

Matrix #7: Scale

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Practice Parallel Projections

The viewing parameters for a parallel projection are given as

VRP(WC)=(0,0,0) VPN(WC)=(0, 0,1)
VUP(WC)=(0,1,0) PRP (VRC)=(4,5,10)
u_{min} (VRC) = 1 u_{max} (VRC) = 5
v_{min} (VRC) = -6 v_{max} (VRC) = 2
n_{min} (VRC) = 30 n_{max} (VRC) = 40

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

Matrix #2: Rx

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #1: Translate

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #4: Rz

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #3: Ry

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Matrix #6

Matrix #5:

Matrix #7

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Practice Parallel Projections

The viewing parameters for a parallel projection are given as

VRP(WC)=(0,0,0) **VPN(WC)=(0, 2, 0)**

VUP(WC)=(0,1,2) **PRP (VRC)=(12,25,60)**

u_{min} (VRC) = -13 **u_{max} (VRC) = -17**

v_{min} (VRC) = -7 **v_{max} (VRC) = 9**

n_{min} (VRC) = 58 **n_{max} (VRC) = 62**

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

Show the matrices for Problem 2

Matrix #2

Matrix #1

Matrix #4

Matrix #3

Matrix #6

Matrix #5

Matrix #8

Matrix #7
