演習課題 08 (05月31日）レポート

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課題 8

基本課題8

[1]

[2]

x=y=15 M=100 Tx=Ty=Tz=200

[3]

*// Created by Jho on 31/05/2019.*

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#include <stdlib.h>

#include <stdio.h>

#include <math.h>

#include "cglec.h"

#define WIDTH 400

#define HEIGHT 400

#define PI 3.14

**struct** Point3D *//3*次元の座標点

{

**double** x;

**double** y;

**double** z;

};

**void** AffineTransform(Point3D p[], **int** n, **double** m[][4]) *//n*個の点をアフィン行列*m*で変換

{

**int** i;

**for** (i = 0; i < n; i++)

{

**double** x = p[i].x, y = p[i].y, z = p[i].z;

p[i].x = m[0][0] \* x + m[0][1] \* y + m[0][2] \* z + m[0][3];

p[i].y = m[1][0] \* x + m[1][1] \* y + m[1][2] \* z + m[1][3];

p[i].z = m[2][0] \* x + m[2][1] \* y + m[2][2] \* z + m[2][3];

}

}

**int** main()

{

*//stack size over*

**unsigned** **char**\*\* data = (**unsigned** **char**\*\*)malloc(**sizeof**(**unsigned**\*) \* WIDTH);

**for** (**int** i = 0; i < WIDTH; i++)

{

data[i] = (**unsigned** **char**\*)malloc(HEIGHT \* **sizeof**(**char**));

}

Image img = { (**unsigned** **char**\*)data, WIDTH, HEIGHT };

Point3D cube[] = { *//*立方体の線図形データ

{1, -1, 1}, {1, -1, -1}, {1, -1, -1}, {-1, -1, -1}, *//*底面

{-1, -1, -1}, {-1, -1, 1}, {-1, -1, 1},{1, -1, 1},

{1, 1, 1}, {1, 1, -1}, {1, 1, -1}, {-1, 1, -1}, *//*上面

{-1, 1, -1}, {-1, 1, 1}, {-1, 1, 1},{1, 1, 1},

{1, -1, 1}, {1, 1, 1}, {1, -1, -1}, {1, 1, -1}, *//*縦線

{-1, -1, -1}, {-1, 1, -1}, {-1, -1, 1}, {-1, 1, 1} };

**int** N = 24; *//* 点データの数は*24*個

*// ==============* ここで基本課題*8[2]*で求めたアフィン変換行列を定義する

**double** mat[][4] = { 96.6,6.7,25.0,200.0,0,96.6,-25.9,200.0,-25.9,25.0,93.3,200.0,0,0,0,1

};

CglSetAll(img, 0);

AffineTransform(cube, N, mat); *//* アフィン変換を実行

Point p[24]; *//* 正投影後の点データを入れる*2*次元の配列

**for** (**int** i = 0; i < N; i++)

{

p[i].x = cube[i].x;

p[i].y = cube[i].y;

}

CglDrawLines(img, p, N, 255);

CglSaveGrayBMP(img, "cube.bmp");

}

