

**Name- YASHRAJ DEEPAK  
DEVIRAT**

**Roll no- 11**

```
#include<iostream>
```

```
#include<math.h>
```

```
#include<GL/glut.h>
```

```
using
```

```
namespace std; typedef
```

```
float Matrix4 [4][4];
```

```
Matrix4 the Matrix;
```

```
static
```

```
GLfloat
```

```
input[8][3]=
```

```
{40,40,-50},{90,40,-50},{90,90,-50},{40,  
90,-50},
```

```
{30,30,0},{80,30,0},{80,80,0},{30  
,80,0}
```

```
float output[8][3];
```

```
float
```

```
tx,ty,tz; float sx,sy,sz;  
float
```

```
angle; int  
choice,choiceRot;
```

```
void setidentityM(Matrix4 m)
```

```
for(int  
i=0;i<4;i++)
```

```
for(int  
j=0;j<4;j++)
```

```
m[i][j]=(i==j);
```

```
void translate(int tx,int ty,int  
tz)
```

```
for(int  
i=0;i<8;i++)
```

```
output[i][0]=input[i][0]+  
tx;
```

```
output[i][1]=input[i][1]+t
```

y;

output[i][2]=input[i][2]+tz;

void scale(int sx,int sy,int  
sz)

the

Matrix[0][0]=sx;

the

Matrix[1][1]=sy;

theMatrix[2][2]=s

z;

void RotateX(float angle)

angle =

angle\*3.142/180;

theMatrix[1][1] =

cos(angle);

the Matrix[1][2] =

-sin(angle);

```
the Matrix[2][1] =  
sin(angle);
```

```
the Matrix[2][2] =  
cos(angle); } void  
RotateY(float angle)  
angle =  
angle*3.14/180;
```

```
theMatrix[0][0] =  
cos(angle);
```

```
theMatrix[0][2] =  
-sin(angle);
```

```
theMatrix[2][0] =  
sin(angle);
```

```
theMatrix[2][2] =  
cos(angle);
```

```
void RotateZ(float  
angle)
```

```
angle =  
angle*3.14/180;
```

```
theMatrix[0][0] =  
cos(angle);
```

```
the Matrix[0][1] =  
sin(angle); the  
Matrix[1][0] =  
-sin(angle);  
theMatrix[1][1] =  
cos(angle);
```

```
void multiplyM()
```

```
for(int  
i=0;i<8;i++)
```

```
for(int  
j=0;j<3;j++)
```

```
output[i][j]=  
0;
```

```
for(int  
k=0;k<3;k++)
```

```
output[i][j]=output[i][j]+input[i][k]*the  
Matrix[k][j];
```

```
void Axes(void)
```

```
glColor3f (0.0, 0.0,  
0.0);
```

```
glBegin(GL_LIN  
ES);
```

```
glVertex2s(-1000,  
0);
```

```
glVertex2s(  
1000,0);
```

```
glend();  
glBegin(GL_LINES);
```

```
glVertex2s(0,-10  
00);
```

```
glVertex2s(0,
```

```
1000);
```

```
glend();
```

```
void draw(float  
a[8][3])
```

```
glBegin(GL_QUA  
DS);
```

```
glColor3f(0.7,0.4,0  
.5);
```

```
glVertex3fv(a[0  
]);
```

```
glVertex3fv(a[1]);
```

```
glVertex3fv(a[2  
]);
```

```
glVertex3fv(a[3  
]);
```

```
glColor3f(0.8,0.2,  
0.4);
```

```
glVertex3fv(a[0]);
```

```
glVertex3fv(a[1]);
```

```
glVertex3fv(a[5]  
);
```

```
glVertex3fv(a[4]  
);
```

```
glColor3f(0.3,0.6,0.  
7);
```

```
glVertex3fv(a[0]  
);
```

```
glVertex3fv(a[4]);
```

```
glVertex3fv(a[7]  
);
```

```
glVertex3fv(a[3]  
);
```

```
glColor3f(0.2,0.8,0.  
2);
```

```
glVertex3fv(a[1]  
);
```

```
glVertex3fv(a[2]);
```

```
glVertex3fv(a[6])  
;
```

```
glVertex3fv(a[5]  
);
```



```
glColor3f(0.7,0.7,0.  
2);
```

```
glVertex3fv(a[  
2]);
```

```
glVertex3fv(a[3]  
);
```

```
glVertex3fv(a[7]  
);
```

```
glVertex3fv(a[  
6]);
```

```
glColor3f(1.0,0.1,0.  
1);
```

```
glVertex3fv(a[  
4]);
```

```
glVertex3fv(a[5]  
);
```

```
glVertex3fv(a[  
6]);
```

```
glVertex3fv(a[7]);  
glEnd();
```

```
} void
```

```
init()
```

```
glClearColor(1.0,1.0,1.0,1.0);  
glOrtho(-454.0,454.0,-250.0,250.0,  
250.0,250.0);  
glEnable(GL_DEPTH_TEST);
```

```
void  
display()
```

```
glClear(GL_COLOR_BUFFER_BIT|GL_DEPTH_  
BUFFER_BIT);
```

```
Axes();  
glColor3f(1.0,0.0,0.0);
```

```
draw(input);
```

```
setidentityM(the Matrix);
```

```
switch(choice)
```

```
case 1:
```

```
translate(tx,ty,tz);
```

```
break; case
```

2:

scale(sx,sy,s

z);

multiplyM()

;

break; case 3:

switch

(choiceRot) {

case 1:

RotateX(angle);

break;

case 2:

RotateY(angle);

break; case 3:

Rotate (angle);

break;

default: break;

multiplyM();

break;

```
draw(output);  
glFlush();
```

```
int main(int argc, char**  
argv)
```

```
glutinit(&argc,argv  
);
```

```
glutinitDisplayMode(GLUT_SINGLE  
GLUT_RGB|GLUT_DEPTH);  
glutinitWindowSize(1362,750); glutinitWindow  
Position(0,0); glutCreate Window("3D  
TRANSFORMATIONS");  
.
```

```
init();
```

```
cout<<"Enter your choice  
number:\n1.Translation\n2.Scaling\n3.  
Rotation\n=>"; cin>>choice; switch  
(choice) { case 1:
```

```
cout<<"\nEnter Tx, Ty  
&Tz: \n";
```

```
cin>>tx>>ty>>tz; break;
```

case

```
cout<<"\nEnter Sx,Sy &  
Sz: \n";
```

```
cin>>sx>>sy>>sz  
;
```

```
break;
```

case 3:

```
cout<<"Enter your choice for Rotation about  
axis:\n1.parallel to X-axis."
```

```
<<"(y& z)\n2.parallel to Y-axis.(x& z)\n3.parallel  
to Z-axis."
```

```
<<"(x& y)\n  
=>";
```

```
cin>>choiceRot;  
switch
```

```
(choiceRot) { case  
1:
```

```
cout<<"\nEnter Rotation angle:  
";
```

```
cin>>angle; break;
```

case 2:

```
cout<<"\nEnter Rotation  
angle: ";
```

```
cin>>angle; break;
```

case 3:

```
cout<<"\nEnter Rotation  
angle: ";
```

```
cin>>angle; break;
```

default:

```
break;
```

```
break;
```

default:

```
break;
```

```
glutDisplayFunc(dis  
play);
```

```
glutMainLoop();
```

```
return
```

```
0;}
```

# Input(Translation)

EXCOMPUTER GRAPHICSICGL\_Assignment-5.exe Enter your choice number: 1. Translation 2. Scaling 3. Rotation ->1

Enter Tx, Ty &Tz: se se 150

Process exited after 45.89 seconds with return value 0 Press any key to continue..4

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# Output(Translation)

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# Input(Rotation

# Input(Scaling).

ENCOMPUTER GRAPHICSICGL\_Assignment-5.exe Enter your choice number: 1. Translation 2. Scaling 3. Rotation ->2

Enter Sx, Sy & Sz:

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# Output(Scaling)

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# parallel to X-axis)

E:\COMPUTER GRAPHICS\CGL\_Assignment-5.exe Enter your choice number: 1. Translation 2. Scaling  
3. Rotation

Enter your choice for Rotation about axis: 1.parallel to X-axis. (y & z) 2. parallel to  
Y-axis. (x & z) B.parallel to Z-axis. (x & y),  
=>1

Enter Rotation angle: 50

Process exited after 36.48 seconds with return value 0 Press any key to continue..

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## Input(Rotation

## Output

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# Input(Rotation parallel to Y-axis)

E:\COMPUTER GRAPHICS\ICGL\_Assignment-5.exe Enter your choice number: 1. Translation 2. Scaling 3. Rotation

Enter your choice for Rotation about axis: 1.parallel to X-axis. (y& z) 2.parallel to Y-axis.  
(x& z) 3.parallel to Z-axis. (x& y)

=>2

Enter Rotation angle: 50

Process exited after 22.24 seconds with return value 0 Press any key to continue..

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**Input(Rotation Output**  
**parallel to Z-axis)**

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# Input(Rotation

Select EXCOMPUTER GRAPHICS CGL\_Assignment-5.exe Enter your choice number: 1.

Translation 2. Scaling 3. Rotation

Enter your choice for Rotation about axis: 1.parallel to X-axis. (& z 2.parallel to Y-axis.  
(x& z 3.parallel to Z-axis. (x& y)

Enter Rotation angle: 50

Process exited after 21.14 seconds with return value 0 Press any key to continue

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**Output**