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SUBJECT: COMPUTER GRAPHICS

Experiment No: 05

PAGE NO.:

DATE.: / / 20

Aim :- Program to perform 3D transformation.

Theory

3D Transformation.

The ~~geo~~ geometric transformation play a vital role in generating of 3D dimensional object with the help of these transformation. The location of object relative to other can be easily expressed.

Types

- Translating
- Scaling
- Rotation ... etc

Algorithm 3D Transformation.

1. START
2. Initialize the graphic mode.
3. Draw a 3D object.
4. A) Translation
 - a) Get the translation value tx, ty .
 - b) Move the object with tx, ty . ($x' = x + tx, y' = y + ty, z' = z + tz$)
 - c) Plot (x', y') .

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Teachers Signature _____

5. B) Scaling

a) Get the scaling value 'sx', 'sy'

b) Resize the object with sx, sy. ($x' = s * x$, $y' = s * y$)

c) Plot (x' , y').

6. C) Rotation

a) Get the Rotation angle

b) Rotate the object by angle ϕ

1. $x' = x \cos \phi - y \sin \phi$

2. $y' = x \sin \phi + y \cos \phi$

c) Plot (x' , y').

Conclusion :-

Here, we understand about 3D transformation and its implementation process.

AIM: Program to perform 3D transformation.

Input:

Translation:

```
1 #include<stdio.h>
2 #include<conio.h>
3 #include<graphics.h>
4 #include<math.h>
5 int maxx,maxy,midx,midy;
6 void axis()
7 {
8     getch();
9     cleardevice();
10    line(midx,0,midx,maxy);
11    line(0,midy,maxx,midy);
12 }
13 void main()
14 {
15    int x,y,z,o,x1,x2,y1,y2;
16    int gd=DETECT,gm;
17    detectgraph(&gd,&gm);
18    initgraph(&gd,&gm,"C:\\TurboC3\\BGI");
19    //setfillstyle(0,getmaxcolor());
20    maxx=getmaxx();
21    maxy=getmaxy();
22    midx=maxx/2;
23    midy=maxy/2;
24    axis();
25    bar3d(midx+50,midy-100,midx+60,midy-90,10,1);
26    printf("Enter translation factor");
27    scanf("%d%d",&x,&y);
28    //axis();
29    printf("After translation:");
30    bar3d(midx+x+50,midy-(y+100),midx+x+60,midy-(y+90),10,1);
31    getch();
32    closegraph();
33 }
```

AIM: Program to perform 3D transformation.

Output:-



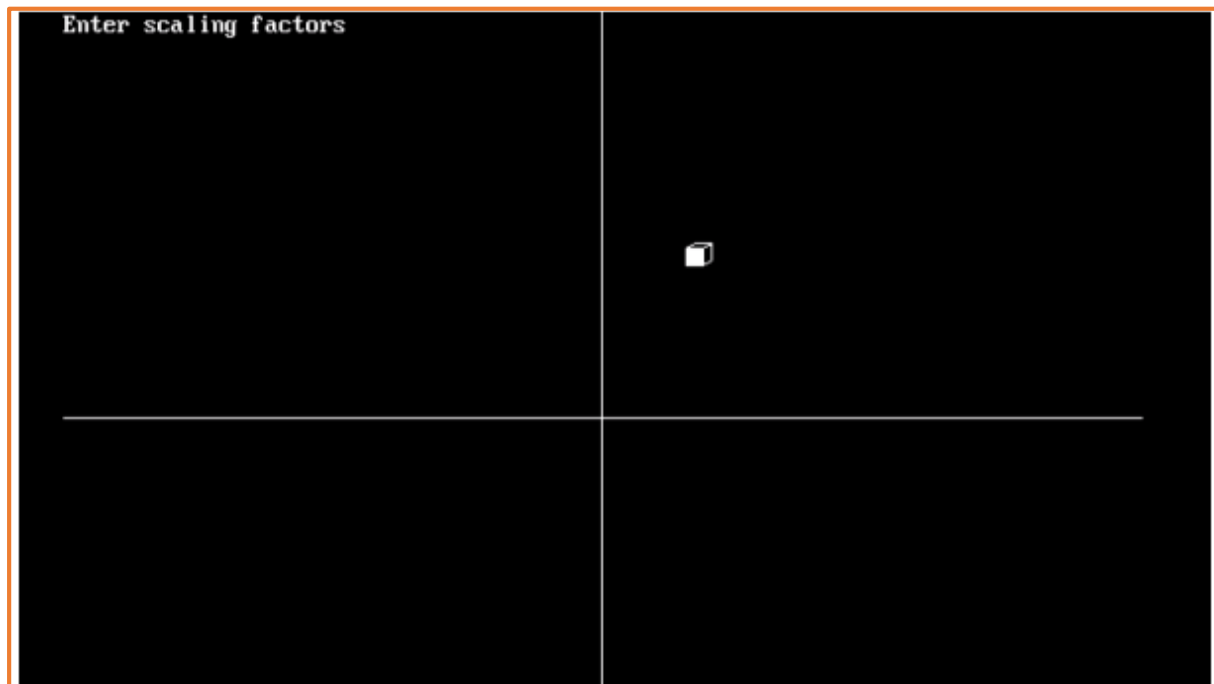
AIM: Program to perform 3D transformation.

Scaling:

```
1 #include<stdio.h>
2 #include<conio.h>
3 #include<graphics.h>
4 #include<math.h>
5 int maxx,maxy,midx,midy;
6 void axis()
7 {
8     getch();
9     cleardevice();
10    line(midx,0,midx,maxy);
11    line(0,midy,maxx,midy);
12 }
13 void main()
14 {
15    int x,y,z,o,x1,x2,y1,y2;
16    int gd=DETECT,gm;
17    detectgraph(&gd,&gm);
18    initgraph(&gd,&gm,"C:\\TurboC3\\BGI");
19    //setfillstyle(0,getmaxcolor());
20    maxx=getmaxx();
21    maxy=getmaxy();
22    midx=maxx/2;
23    midy=maxy/2;
24    axis();
25    bar3d(midx+50,midy-100,midx+60,midy-90,5,1);
26    printf("Enter scaling factors");
27    scanf("%d%d%d", &x,&y,&z);
28    //axis();
29    printf("After scaling");
30    bar3d(midx+(x*50),midy-(y*100),midx+(x*60),midy-(y*90),5*z,1);
31    //axis();
32    getch();
33    closegraph();
34 }
```

AIM: Program to perform 3D transformation.

Output:



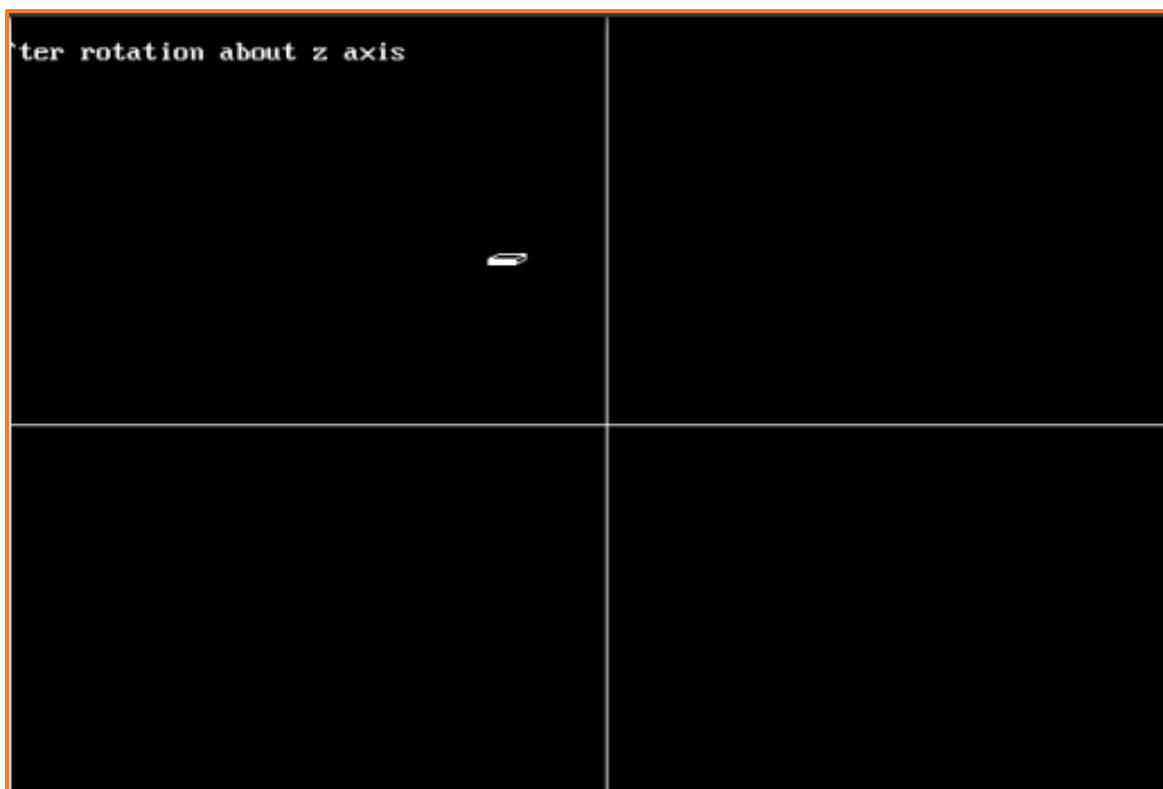
AIM: Program to perform 3D transformation.

Rotation:

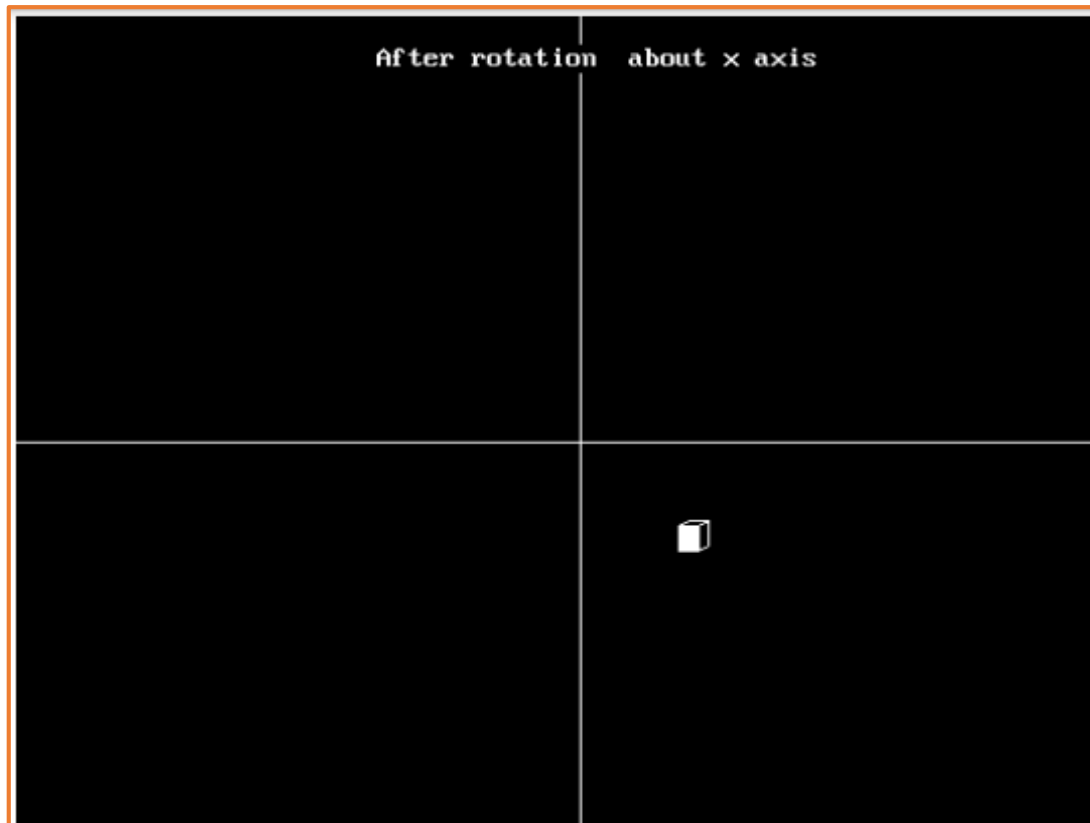
```
1 #include<stdio.h>
2 #include<conio.h>
3 #include<graphics.h>
4 #include<math.h>
5 int maxx,maxy,midx,midy;
6 void axis()
7 {
8     getch();
9     cleardevice();
10    line(midx,0,midx,maxy);
11    line(0,midy,maxx,midy);
12 }
13 void main()
14 {
15    int x,y,z,o,x1,x2,y1,y2;
16    int gd=DETECT,gm;
17    detectgraph(&gd,&gm);
18    initgraph(&gd,&gm," C:\\\\TurboC3\\BGI ");
19    //setfillstyle(0,getmaxcolor());
20    maxx=getmaxx();
21    maxy=getmaxy();
22    midx=maxx/2;
23    midy=maxy/2;
24    axis();
25    bar3d(midx+50,midy-100,midx+60,midy-90,5,1);
26    printf("Enter rotating angle");
27    scanf("%d",&o);
28    x1=50*cos(o*3.14/180)-100*sin(o*3.14/180);
29    y1=50*sin(o*3.14/180)+100*cos(o*3.14/180);
30    x2=60*cos(o*3.14/180)-90*sin(o*3.14/180);
31    y2=60*sin(o*3.14/180)+90*cos(o*3.14/180);
32    axis();
33    printf("After rotation about z axis");
34    bar3d(midx+x1,midy-y1,midx+x2,midy-y2,5,1);
35    axis();
36    printf("After rotation about x axis");
37    bar3d(midx+50,midy-x1,midx+60,midy-x2,5,1);
38    axis();
39    printf("After rotation about yaxis");
40    bar3d(midx+x1,midy-100,midx+x2,midy-90,5,1);
41    getch();
42    closegraph();
43 }
```


AIM: Program to perform 3D transformation.

OUTPUT:



AIM: Program to perform 3D transformation.



Conclusion: - Here, we understanding about 3D Transformation and its implementation process .