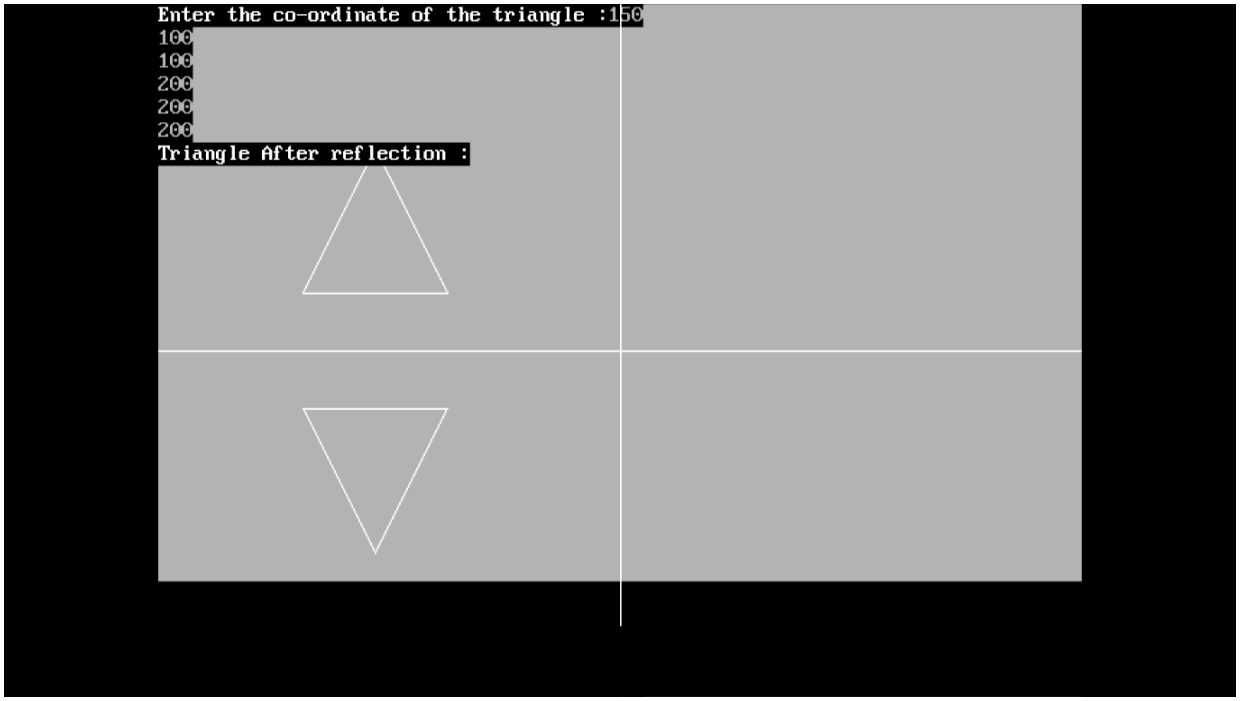
6. Programs for reflection about x-axis :-

```
//Reflection about x-axis;
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
void main()
{
        int gd=DETECT,gm;
        int x1,y1,x2,y2,x3,y3;
        initgraph(&gd,&gm,"C:\\TURBOC3\\bgi");
        clrscr();
        printf("Enter the co-ordinate of the triangle :");
        scanf("%d%d%d%d%d%d",&x1,&y1,&x2,&y2,&x3,&y3);
        line(x1,y1,x2,y2);
        line(x2,y2,x3,y3);
        line(x3,y3,x1,y1);
        line(320,0,320,430);
        line(0,240,640,240);
        x1=x1;  //y1=y1;  //for about y-axis
        x2=x2;  //y2=y2;
        x3=x3;  //y3=y3;
        y1=240+240-y1; // x1=x1+320;       // for about y-axis
        y2=240+240-y2; // x2=x2+320;
        y3=240+240-y3; // x3=x3+320;
        printf("Triangle After reflection :");
        line(x1,y1,x2,y2);
        line(x2,y2,x3,y3);
        line(x3,y3,x1,y1);
        getch();
```

}

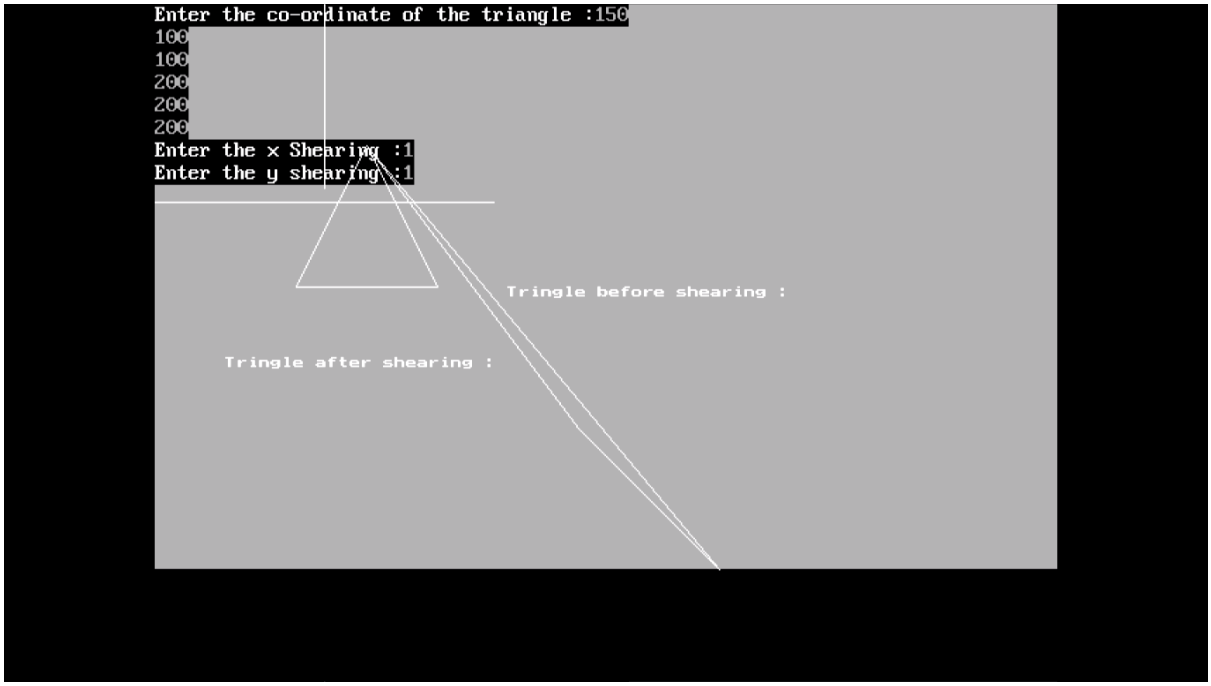

Enter the co-ordinate of the triangle :150
100
100
200
200
200
Triangle After reflection :

7.Program for shearing :

```
//Shearing programs of computer Graphics:
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
void main()
{
        int gd=DETECT,gm;
        int x1,y1,x2,y2,x3,y3,a,b;
        int a2,b2,a3,b3;
        initgraph(&gd,&gm,"C:\\TURBOC3\\bgi");
        clrscr();
        printf("Enter the co-ordinate of the triangle :");
        scanf("%d%d%d%d%d%d",&x1,&y1,&x2,&y2,&x3,&y3);
        printf("Enter the x Shearing :");
        scanf("%d",&a);
        printf("Enter the y shearing :");
        scanf("%d",&b);
        line(120,0,120,130);
        line(120,0,120,130);
        line(0,140,240,140);
        outtextxy(250,200,"Tringle before shearing :");
        line(x1,y1,x2,y2);
        line(x2,y2,x3,y3);
        line(x3,y3,x1,y1);
        getch();
        outtextxy(50,250,"Tringle after shearing :");
        a2=x2+a*y2;
        b2=b*x2+y2;
```

```
        a3=x3+a*y3;
        b3=b*x3+y3;

        line(x1,y1,a2,b2);
        line(a2,b2,a3,b3);
        line(a3,b3,x1,y1);
        getch();
}
```



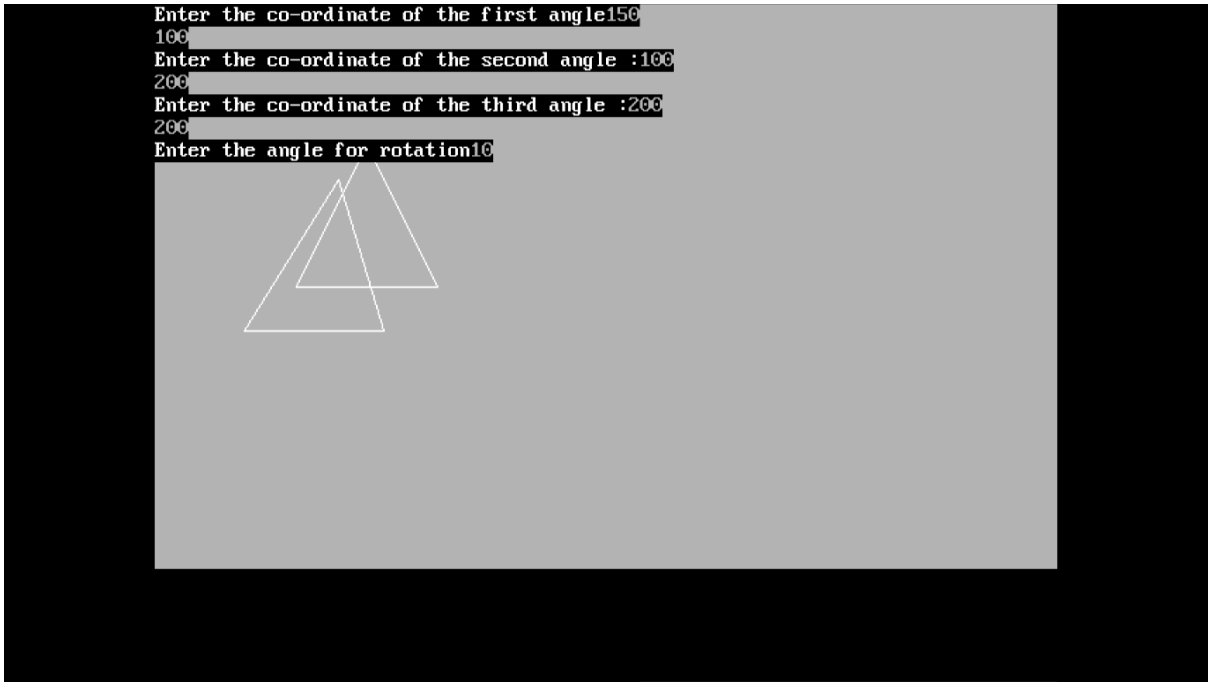
8. Program for Rotation :

```
//Rotation programs of computer Graphics:
#include<stdio.h>
#include<conio.h>
#include<math.h>
#include<graphics.h>
void main()
{
      int gd=DETECT,gm;
      int x1,y1,x2,y2,x3,y3;
      int a1,b1,a2,b2,a3,b3;
      float angle;
      initgraph(&gd,&gm,"C:\\TURBOC3\\bgi");
      clrscr();
      printf("Enter the co-ordinate of the first angle");
      scanf("%d%d",&x1,&y1);
      printf("Enter the co-ordinate of the second angle :");
      scanf("%d%d",&x2,&y2);
      printf("Enter the co-ordinate of the third angle :");
      scanf("%d%d",&x3,&y3);

     line(x1,y1,x3,y3);
     line(x3,y3,x2,y3);
     line(x2,y3,x1,y1);

    printf("Enter the angle for rotation");
    scanf("%f",&angle);
    angle=(angle*3.14)/180;
```

```
  a1=x1*cos(angle)-y1*sin(angle);
  b1=x1*sin(angle)+y1*cos(angle);
  a2=x2*cos(angle)-y2*sin(angle);
  b2=x2*sin(angle)+y2*cos(angle);
  a3=x3*cos(angle)-y3*sin(angle);
  b3=x3*sin(angle)+y3*cos(angle);
  line(a1,b1,a3,b3);
  line(a3,b3,a2,b3);
  line(a2,b3,a1,b1);
  getch();
}
```



9. Program for 3D Transformation :

```
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
#include<math.h>
void trans();
void scale();
void rotate();
int maxx,maxy,midx,midy;
void main()
{
 int ch;
 int gd=DETECT,gm;
detectgraph(&gd,&gm);
initgraph(&gd,&gm,"C:\\turboc3\\bgi");
printf("\n 1.Translation \n 2.Scaling\n 3.Rotation \n 4.exit\n");
printf(" Enter your choice");
scanf("%d",&ch);
do
{
switch(ch)
{
case 1 : trans();
getch();
break;
case 2 : scale();
getch();
break;
case 3 :  rotate();
```

```
getch();
break;
case 4 :break;
}
printf("enter your choice");
scanf("%d",&ch);
} while(ch<4);
}
void trans()
{
int x,y,z,o,x1,x2,y1,y2;
maxx=getmaxx();
maxy=getmaxy();
midx=maxx/2;
midy=maxy/2;
bar3d(midx+50,midy-100,midx+60,midy-90,10,1);
printf("Enter translation factor");
scanf("%d%d",&x,&y);
printf("After translation:");
bar3d(midx+x+50,midy-(y+100),midx+x+60,midy-(y+90),10,1);
}
void scale()
{
int x,y,z,o,x1,x2,y1,y2;
maxx=getmaxx();
maxy=getmaxy();
midx=maxx/2;
midy=maxy/2;
bar3d(midx+50,midy-100,midx+60,midy-90,5,1);
```

```
printf("before translation\n");
printf("Enter scaling factors\n");
scanf("%d %d %d", &x,&y,&z);
printf("After scaling\n");
bar3d(midx+(x*50),midy-(y*100),midx+(x*60),midy-(y*90),5*z,1);
}
void rotate()
{
int x,y,z,o,x1,x2,y1,y2;
maxx=getmaxx();
maxy=getmaxy();
midx=maxx/2;
midy=maxy/2;
bar3d(midx+50,midy-100,midx+60,midy-90,5,1);
printf("Enter rotating angle");
scanf("%d",&o);
x1=50*cos(o*3.14/180)-100*sin(o*3.14/180);
y1=50*sin(o*3.14/180)+100*cos(o*3.14/180);
x2=60*cos(o*3.14/180)-90*sin(o*3.14/180);
y2=60*sin(o*3.14/180)+90*cos(o*3.14/180);
printf("After rotation  about x axis");
bar3d(midx+50,midy-x1,midx+60,midy-x2,5,1);
 printf("After rotation about yaxis");
bar3d(midx+x1,midy-100,midx+x2,midy-90,5,1);
}
```

Screenshorts :-

Translation:

Scaling :

Rotaion :


1.Translation
2.Scaling
3.Rotation
4.exit
Enter your choice3
Enter rotating angle50
After rotation about x axisAfter rotation about yaxis

10. KeyFraming graphics animation(C program for bouncing ball)

```
#include <stdio.h>
#include <conio.h>
#include <graphics.h>
#include <dos.h>

int main() {
 int gd = DETECT, gm;
 int i, x, y, flag=0;
 initgraph(&gd, &gm, "C:\\TURBOC3\\BGI");

 /* get mid positions in x and y-axis */
 x = getmaxx()/2;
 y = 30;


 while (!kbhit()) {
  if(y >= getmaxy()-30 || y <= 30)
    flag = !flag;
    /* draws the gray board */
    setcolor(RED);
    setfillstyle(SOLID_FILL, RED);
    circle(x, y, 30);
    floodfill(x, y, RED);

 /* delay for 50 milli seconds */
 delay(50);
```

```
/* clears screen */
cleardevice();
if(flag){
    y = y + 5;
} else {
    y = y - 5;
}
  }

  getch();
  closegraph();
  return 0;
}
```