6. Solve the following

a. Write a program to implement 2D scaling.

b. Write a program to perform 2D translation.

a. Write a program to implement 2D scaling.

```
#include<graphics.h>
#include<stdio.h>
#include<conio.h>
void main()
{
int i;
int gd=DETECT,gm;
int x2,y2,x1,y1,x,y;
initgraph(&gd,&gm,"C://TurboC++/Disk//TurboC3//BGI");
printf("Enter the two endpoints of a line:x1,y1,x2,y2:\n");
scanf("%d\n%d\n%d\n%d",&x1,&y1,&x2,&y2);
line(x1,y1,x2,y2);
printf("Enter the scaling coordinates:x\t y\t");
scanf("%d%d",&x,&y);
x1=(x1*x);
y1=(y1*y);
x2=(x2*x);
```

```
y2=(y2*y);
printf("line after scaling");
line(x1,y1,x2,y2);
getch();
closegraph();
}
```

----------Extra----------

Solution:-

```
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
#include<process.h>
#include<math.h>

int x1, y1, x2, y2, x3, y3, mx, my;

void draw();
void scale();

void main() {
  int gd = DETECT, gm;
```

```
   initgraph(&gd, &gm, " ");
   printf("Enter the 1st point for the triangle:");
   scanf("%d%d", &x1, &y1);
   printf("Enter the 2nd point for the triangle:");
   scanf("%d%d", &x2, &y2);

   printf("Enter the 3rd point for the triangle:");
   scanf("%d%d", &x3, &y3);

   draw();
   scale();
}

void draw() {
   line(x1, y1, x2, y2);
   line(x2, y2, x3, y3);
   line(x3, y3, x1, y1);
}

void scale() {
   int x, y, a1, a2, a3, b1, b2, b3;
   int mx, my;
```

```
printf("Enter the scalling coordinates");
scanf("%d%d", &x, &y);
mx = (x1 + x2 + x3) / 3;
my = (y1 + y2 + y3) / 3;

cleardevice();

a1 = mx + (x1 - mx) * x;
b1 = my + (y1 - my) * y;
a2 = mx + (x2 - mx) * x;

b2 = my + (y2 - my) * y;
a3 = mx + (x3 - mx) * x;
b3 = my + (y3 - my) * y;

line(a1, b1, a2, b2);
line(a2, b2, a3, b3);
line(a3, b3, a1, b1);

draw();
getch();
```

```
}
```

b. Write a program to perform 2D translation.

Solution:-

```
#include<graphics.h>
#include<stdio.h>
#include<conio.h>
void main()
{
int i;
int gd=DETECT,gm;

int x2,y2,x1,y1,x,y;
initgraph(&gd,&gm,"C://TurboC++/Disk//TurboC3//BGI");
printf("Enter the two endpoints of a line:x1,y1,x2,y2:\n");
scanf("%d\n%d\n%d\n%d",&x1,&y1,&x2,&y2);
line(x1,y1,x2,y2);
printf("\n Enter the translation coordinates:x y");
scanf("%d%d",&x,&y);
x1=(x1+x);
y1=(y1+y);
```

```
x2=(x2+x);
y2=(y2+y);
printf("line after Translation");
line(x1,y1,x2,y2);
getch();
closegraph();
}
```

----Extra----

```
/*2D Translation Triangle Example Program In C */
#include<stdio.h>
#include<conio.h>
#include<graphics.h>
#include<process.h>
#include<math.h>
```

```
int x1, y1, x2, y2, x3, y3, mx, my;

void draw();
void tri();

void main() {
   int gd = DETECT, gm;
   int c;
   initgraph(&gd, &gm, "d:\\tc\\bgi ");
   printf("Enter the 1st point for the triangle:");
   scanf("%d%d", &x1, &y1);
   printf("Enter the 2nd point for the triangle:");
   scanf("%d%d", &x2, &y2);
   printf("Enter the 3rd point for the triangle:");
   scanf("%d%d", &x3, &y3);


   cleardevice();
   draw();
   getch();
   tri();
```

```
  getch();
}

void draw() {
  line(x1, y1, x2, y2);
  line(x2, y2, x3, y3);
  line(x3, y3, x1, y1);
}

void tri() {
  int x, y, a1, a2, a3, b1, b2, b3;
  printf("Enter the Transaction coordinates");
  scanf("%d%d", &x, &y);
  cleardevice();
  a1 = x1 + x;
  b1 = y1 + y;
  a2 = x2 + x;
  b2 = y2 + y;
  a3 = x3 + x;
  b3 = y3 + y;
  line(a1, b1, a2, b2);
  line(a2, b2, a3, b3);
```

```
  line(a3, b3, a1, b1);
}
```