PROGRAM 1

Name:- *Kaustubh S Kabra*

Class:-*Second Year Engineering Comp-1*

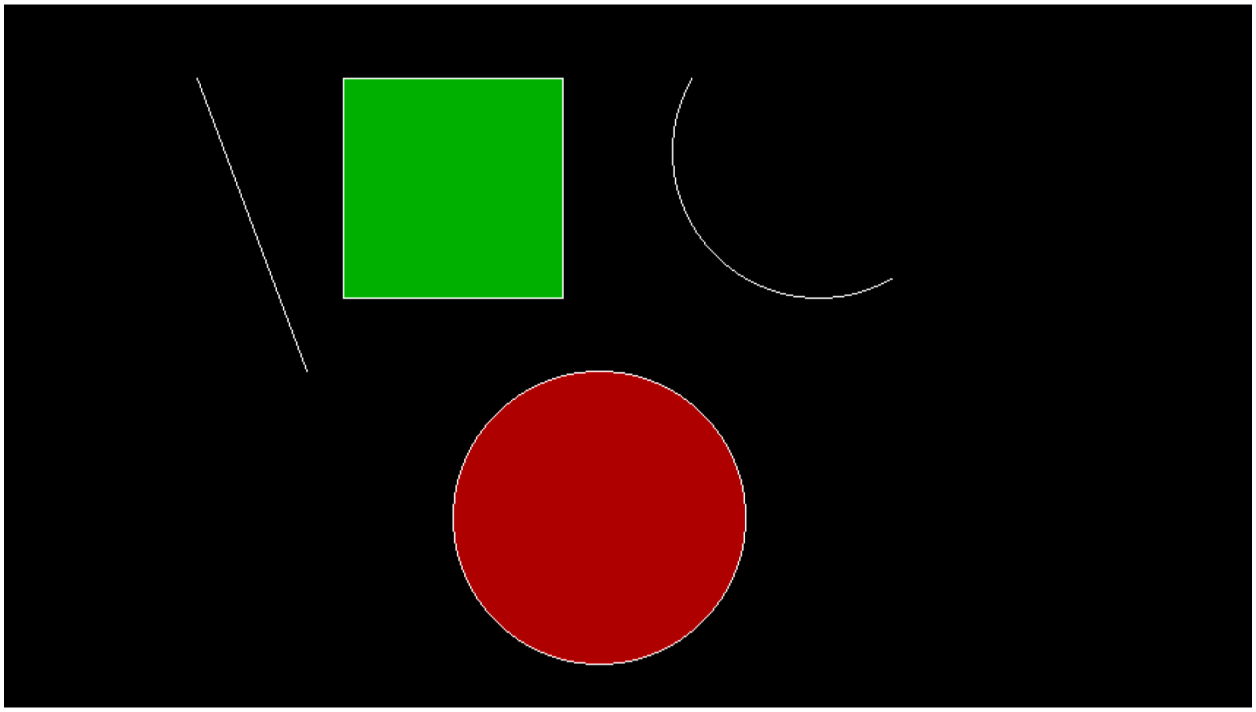
Roll No:- *20*

Write a c++ program for drawing graphics primitive and color it.

```
#include<graphics.h>

#include<conio.h>

void main()

{

   clrscr();

   int gd=DETECT,gm;

   initgraph(&gd,&gm,"C:\\turboc3\\bgi");


   // Line

   line(25,50,100,250);


   //Rectange

   setfillstyle(SOLID_FILL,GREEN);

   rectangle(125,50,275,200);

   floodfill(126,55,WHITE);


   //circle

   setfillstyle(SOLID_FILL,RED);

   circle(300,350,100);

   floodfill(301,355,WHITE);
```

```
    //Arc
    arc(450,100,150,300,100);


    getch();
    closegraph();
}
```

Output:-



PROGRAM 2

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

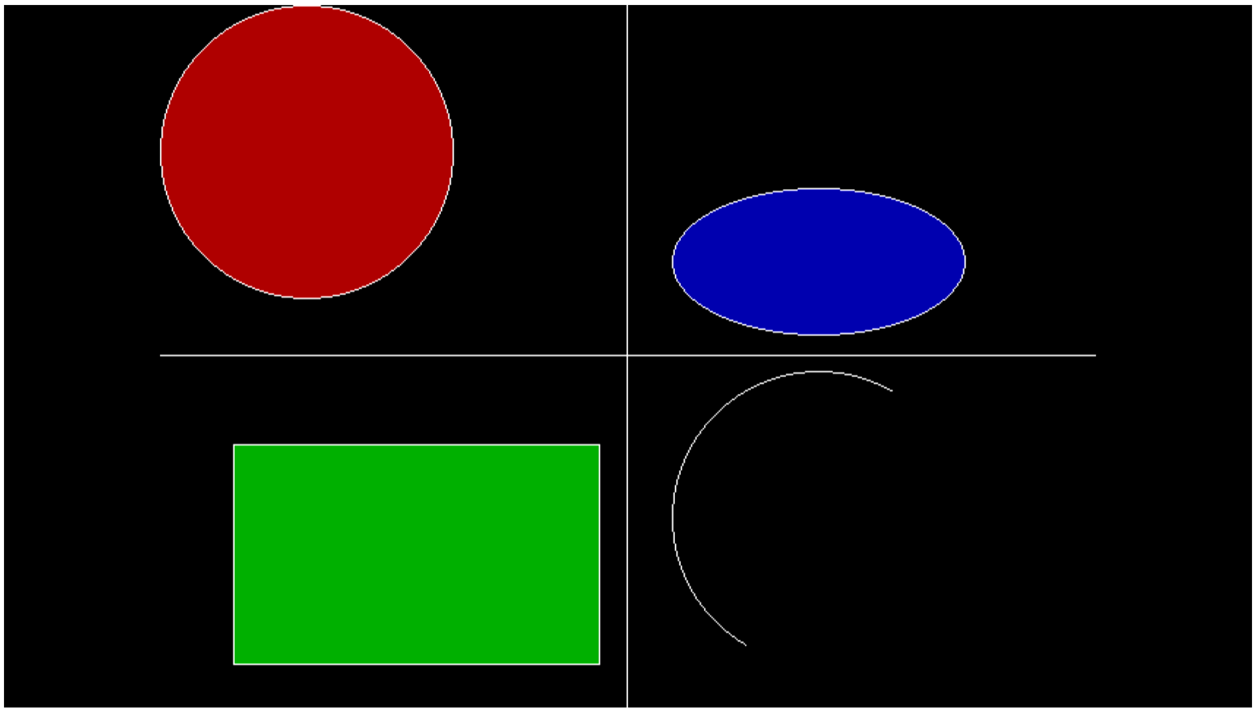
Roll No:- *20*

Write a c++ program to divide the screen into four regions and draw a circle,rectangle,arc and ellipse.

```
#include<graphics.h>

#include<conio.h>

#include<iostream.h>

void main()

{

   clrscr();

   int gd=DETECT,gm;

   initgraph(&gd,&gm,"C:\\turboc3\\bgi");


   line(0,getmaxy()/2,getmaxx(),getmaxy()/2);

   line(getmaxx()/2,0,getmaxx()/2,getmaxy());


   //ellipse in quadrant 1

   setfillstyle(SOLID_FILL,BLUE);

   ellipse(450,175,0,360,100,50);

   floodfill(450,175,WHITE);


   //circle in quadrant 2

   setfillstyle(SOLID_FILL,RED);

   circle(100,100,100);
```

```
    floodfill(100,100,WHITE);


    //arc in quadrant 3
    arc(450,350,60,240,100);


    //rectange in quadrant 4
    setfillstyle(SOLID_FILL,GREEN);
    rectangle(50,300,300,450);
    floodfill(51,305,WHITE);


    getch();
    closegraph();
}
```

Output:-



PROGRAM 3

Name:- *Kaustubh S Kabra*

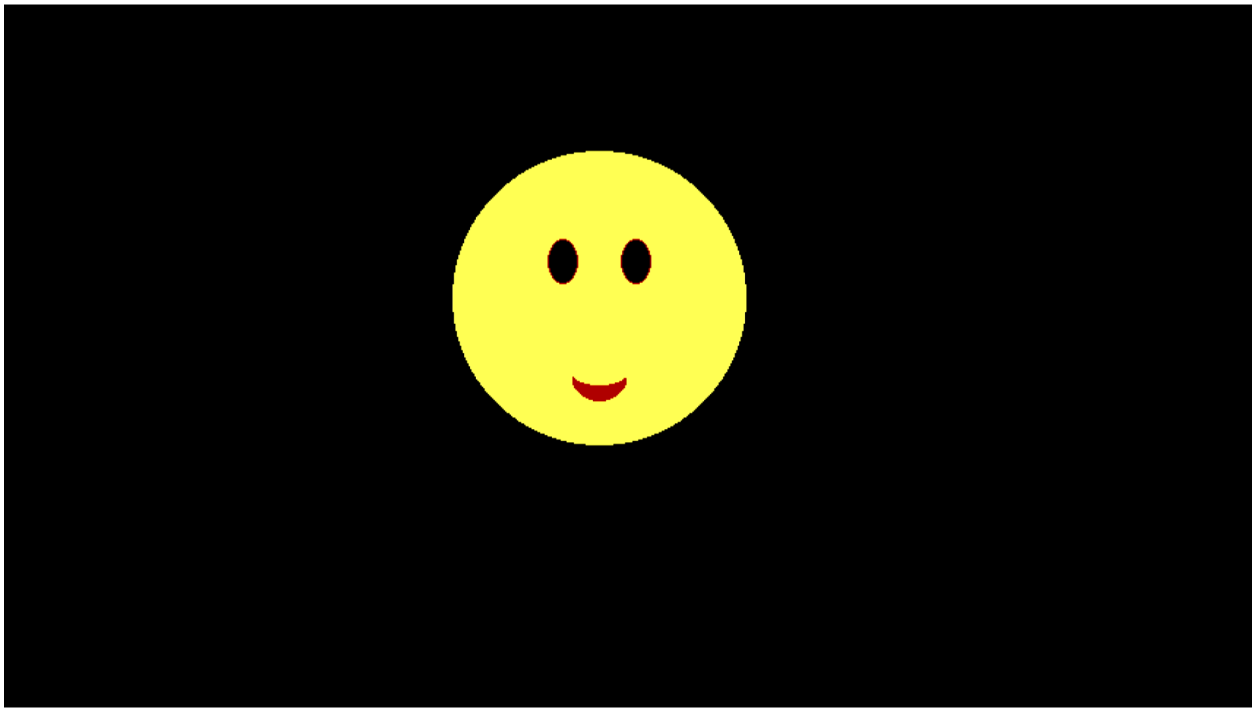
Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program for drawing a simple object.

```
#include <graphics.h>

#include <conio.h>


void main()

{

 int gd=DETECT,gm;

 initgraph(&gd,&gm,"c:\\turboc3\\bgi");

 setcolor(YELLOW);

 setfillstyle(SOLID_FILL, YELLOW);

 circle(300, 200, 100);

 floodfill(300, 200, YELLOW);

 setcolor(RED);

 setfillstyle(SOLID_FILL,BLACK);

 fillellipse(325, 175, 10, 15);

 fillellipse(275, 175, 10, 15);

 ellipse(300, 250, 205, 335, 20, 10);

 ellipse(300, 250, 205, 335, 20, 11);

 ellipse(300, 250, 205, 335, 20, 12);

 ellipse(300, 250, 205, 335, 20, 13);
 ellipse(300, 250, 205, 335, 20, 14);

 ellipse(300, 250, 205, 335, 20, 15);

 ellipse(300, 250, 205, 335, 20, 16);

 ellipse(300, 250, 205, 335, 20, 17);

 ellipse(300, 250, 205, 335, 20, 18);

 ellipse(300, 250, 205, 335, 20, 19);

 ellipse(300, 250, 205, 335, 20, 20);

 getch();

 closegraph();

}
```

OUTPUT:-



PROGRAM 4

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program for drawing a line using DDA and Bresenhams Line Drawing Algorithm

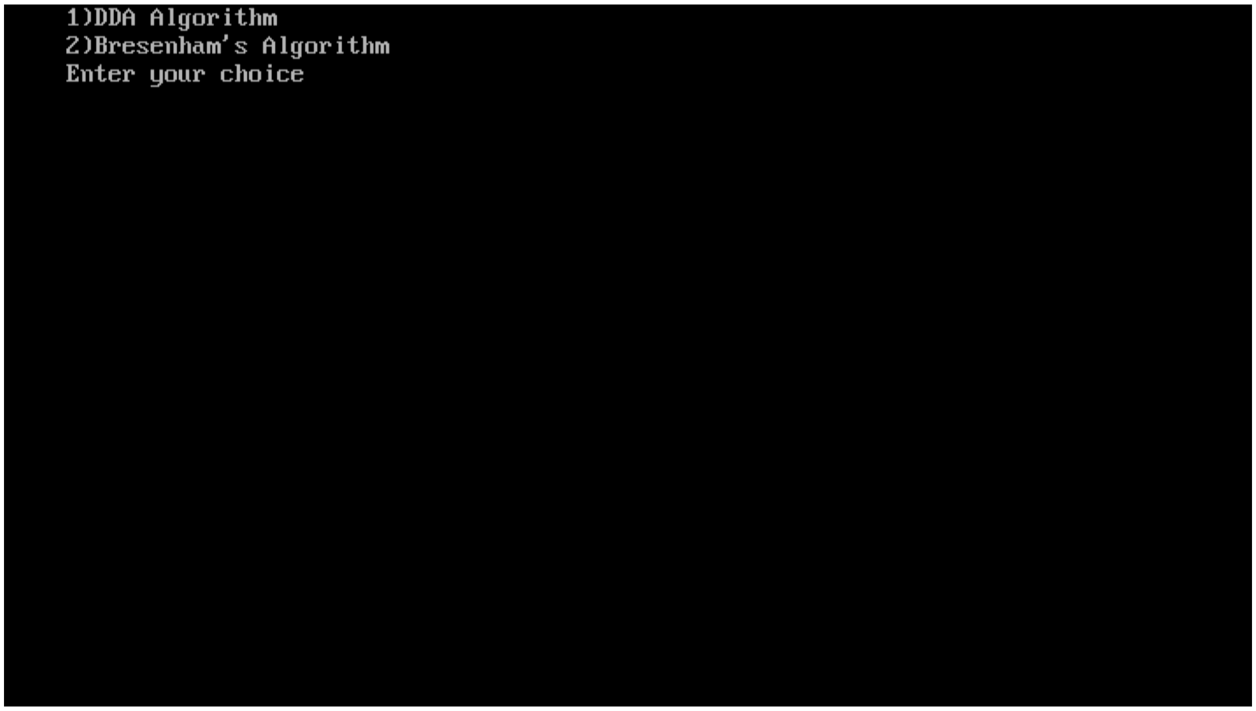
```
#include<graphics.h>

#include<conio.h>

#include<math.h>

#include<iostream.h>

int sign(int x)

{

   if(x>0)

            return 1;

   else if(x<0)

            return -1;

   else

            return 0;

}


void dda(int x1,int y1,int x2,int y2,int col)

{

   float x,y,l,i;

   float dx,dy;

   if(x1==x2 && y1==y2)
```

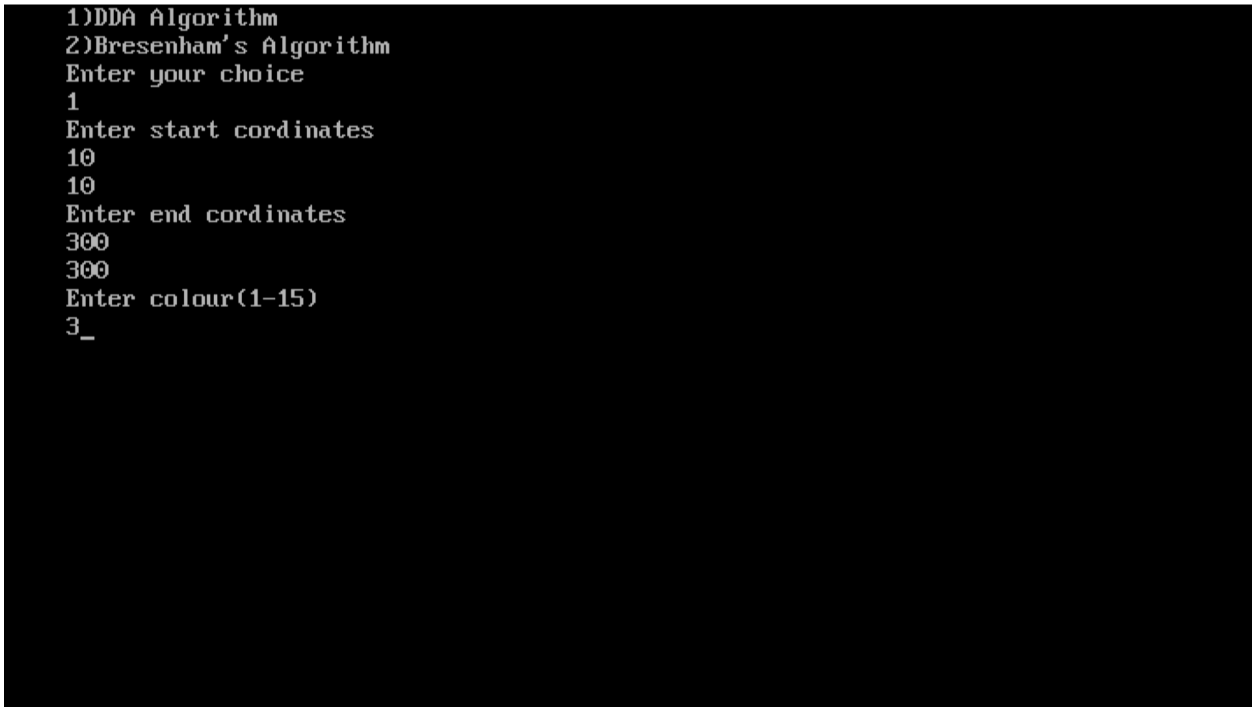
```
    {
        putpixel(x1,x2,col);
    }
    else
    {
        dx=abs(x2-x1);
        dy=abs(y2-y1);
        if(dx>=dy)
          l=dx;
        else
          l=dy;
        dx=(x2-x1)/l;
        dy=(y2-y1)/l;
        x=x1+0.5*sign(dx);
        y=y1+0.5*sign(dy);
        i=1;
        while(i<l)
        {
          putpixel(x,y,col);
          x=x+dx;
          y=y+dy;
          i++;
        }
    }
  }
```

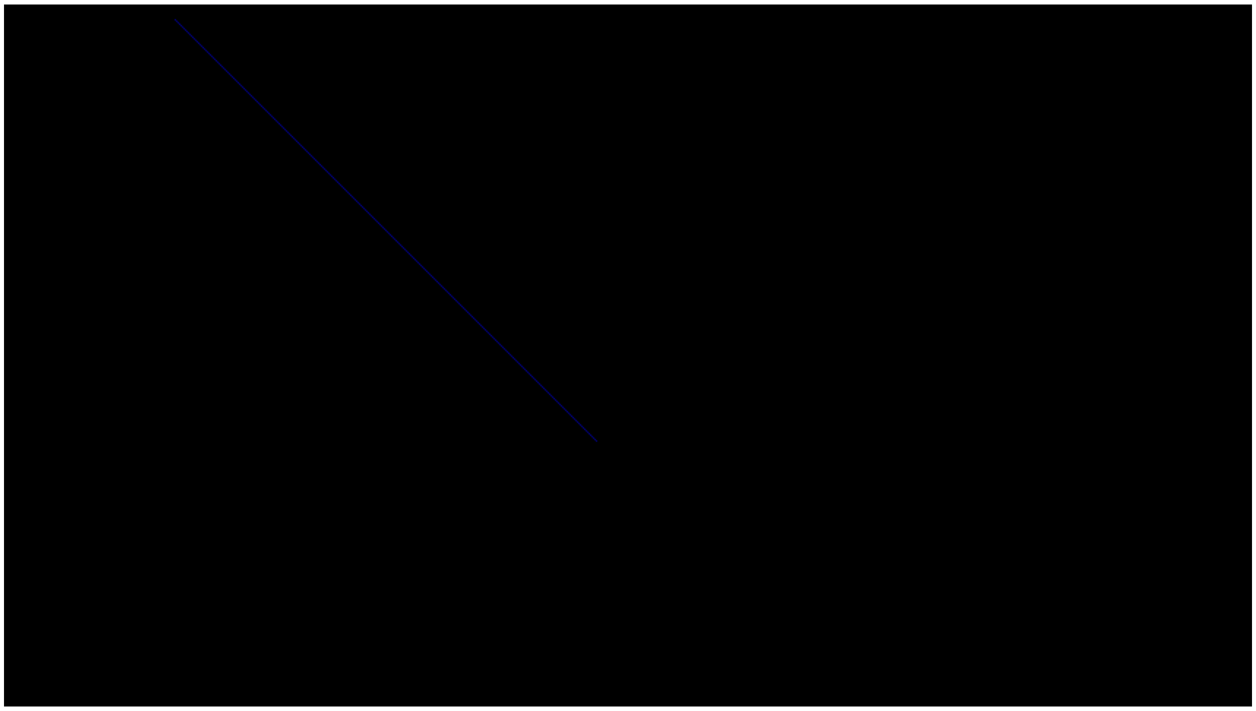
```
void bla(int x1,int y1,int x2,int y2,int col)
{
    int dx,dy,x,y,e,i;
    if(x1==x2 && y1==y2)
              putpixel(x1,y1,col);
    else
    {
               dx=abs(x2-x1);
               dy=abs(y2-y1);
               x=x1;
               y=y1;
               putpixel(x,y,col);
               e=2*dy-dx;
               i=1;
               while(i<=dx)
               {
                   while(e>=0)
                   {
                             y=y+1;
                             e=e-2*dx;
                   }
                   x=x+1;
                   e=e+2*dy;
                   putpixel(x,y,col);
```

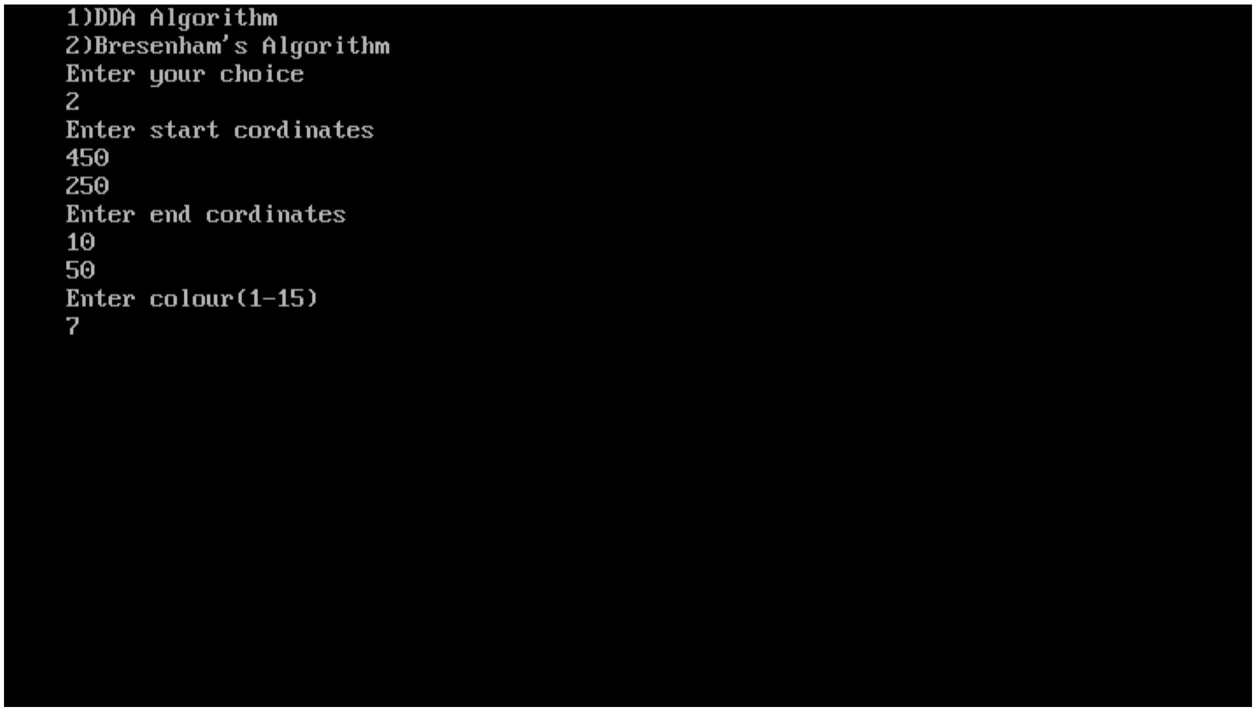
```
                    i=i+1;
                }
    }
}

void main()
{
    clrscr();
    int x1,x2,y1,y2,col,c;
    cout<<"1)DDA Algorithm"<<endl;
    cout<<"2)Bresenham's Algorithm"<<endl;
    cout<<"Enter your choice"<<endl;
    cin>>c;
    switch(c)
    {
            case 1:
            {
                cout<<"Enter start cordinates"<<endl;
                cin>>x1>>y1;
                cout<<"Enter end cordinates"<<endl;
                cin>>x2>>y2;
                cout<<"Enter colour(1-15)"<<endl;
                cin>>col;
                int gd=DETECT,gm;
                initgraph(&gd,&gm,"C:\\turboc3\\bgi");
                dda(x1,y1,x2,y2,col);
                break;
            }
            case 2:
            {
                cout<<"Enter start cordinates"<<endl;
                cin>>x1>>y1;
                cout<<"Enter end cordinates"<<endl;
                cin>>x2>>y2;
                cout<<"Enter colour(1-15)"<<endl;
                cin>>col;
                int gd=DETECT,gm;
                initgraph(&gd,&gm,"C:\\turboc3\\bgi");
                bla(x1,y1,x2,y2,col);
                break;
            }
            default:
            {
                cout<<"Wrong choice";
            }
    }
    getch();
    closegraph();
```

Output:-

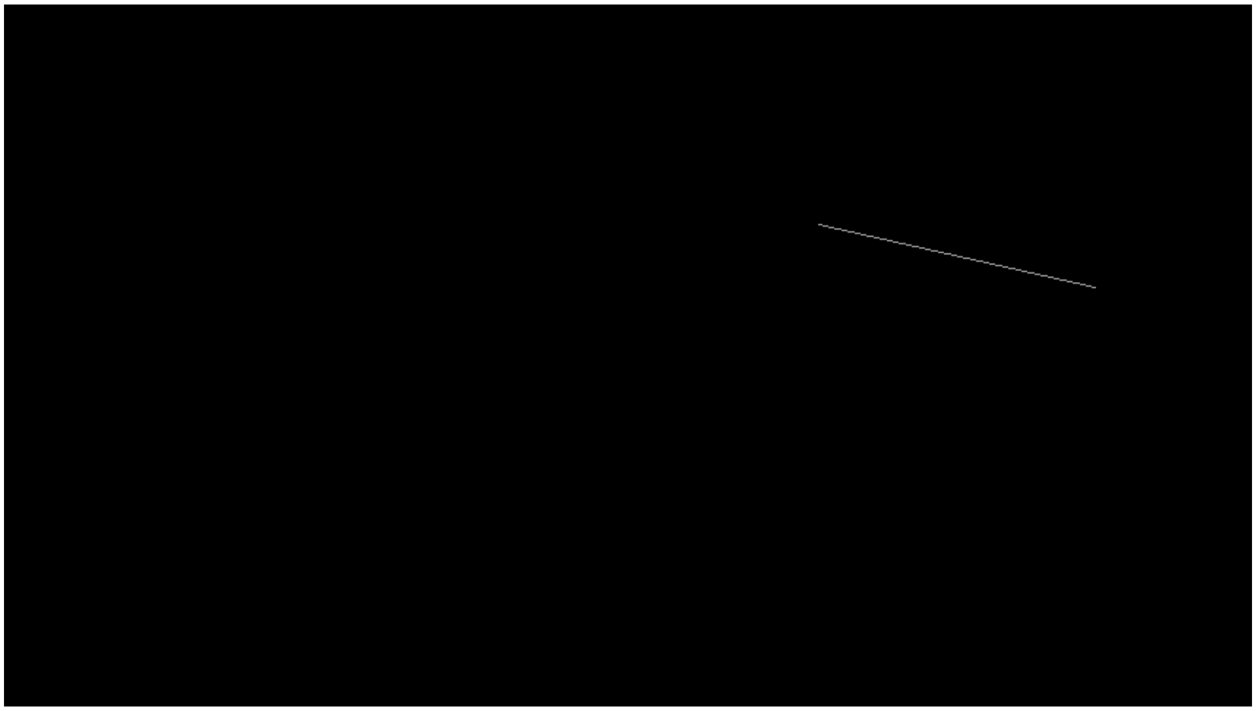

```
1)DDA Algorithm
2)Bresenham's Algorithm
Enter your choice
```

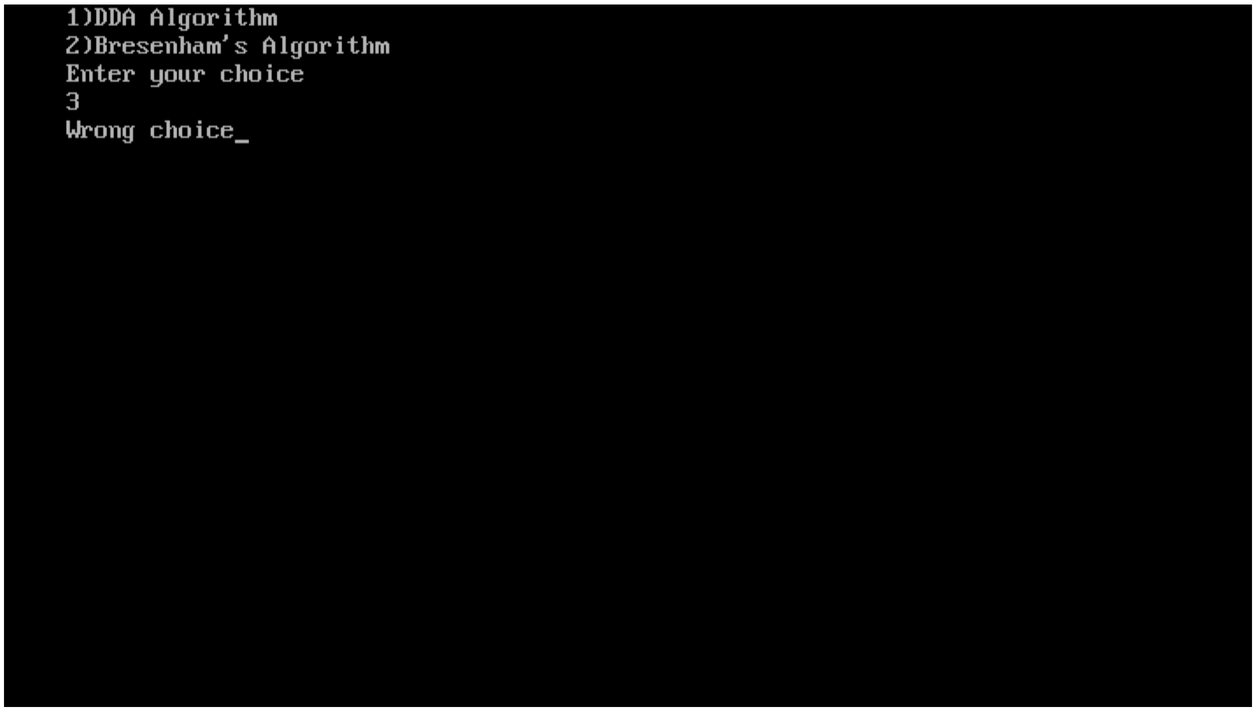

```
1)DDA Algorithm
2)Bresenham's Algorithm
Enter your choice
1
Enter start cordinates
10
10
Enter end cordinates
300
300
Enter colour(1-15)
3_
```





```
1)DDA Algorithm
2)Bresenham's Algorithm
Enter your choice
2
Enter start cordinates
450
250
Enter end cordinates
10
50
Enter colour(1-15)
7
```





```
1)DDA Algorithm
2)Bresenham's Algorithm
Enter your choice
3
Wrong choice_
```

PROGRAM 5(Part-I)

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program to draw pattern 1 using DDA Line and Bresenham Cricle Drwaing Algorithm

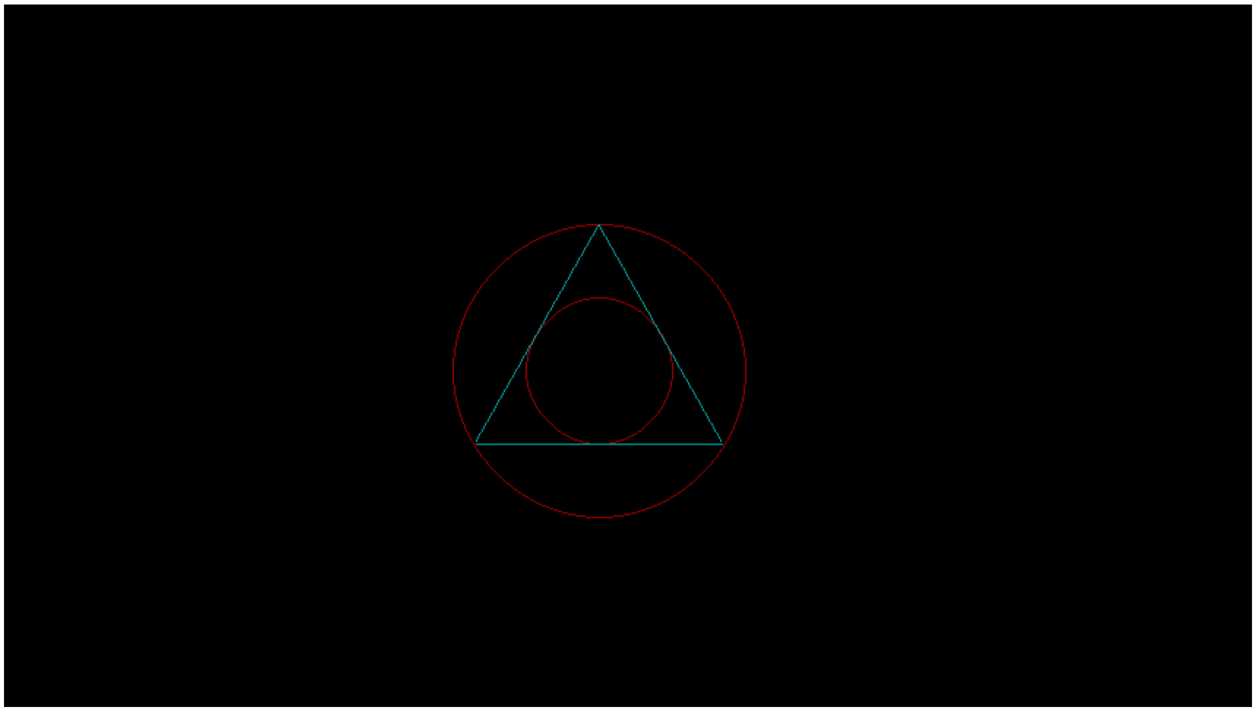
```
#include<graphics.h>

#include<conio.h>

#include<math.h>

#include<iostream.h>

int sign(int x)

{

   if(x>0)

           return 1;

   else if(x<0)

           return -1;

   else

           return 0;

}


void dda(int x1,int y1,int x2,int y2)

{

   float x,y,i,dx,dy,l;

   if(x1==x2 && y1==y2)

   {
```

```
            putpixel(x1,y1,3);
    }
    else
    {
            dx=abs(x2-x1);
            dy=abs(y2-y1);
            if(dx>dy)
               l=dx;
            else
               l=dy;
            dx=(x2-x1)/l;
            dy=(y2-y1)/l;
            x=x1+0.5*sign(dx);
            y=y1+0.5*sign(dy);
            i=1;
            while(i<l)
            {
               putpixel(x,y,3);
               x=x+dx;
               y=y+dy;
               i++;
            }
    }
}
```

```
void show(int x1,int y1,int x,int y)
{
        putpixel(x1+x,y1+y,4);
        putpixel(x1-x,y1+y,4);
        putpixel(x1+x,y1-y,4);
        putpixel(x1-x,y1-y,4);
        putpixel(x1+y,y1+x,4);
        putpixel(x1-y,y1+x,4);
        putpixel(x1+y,y1-x,4);
        putpixel(x1-y,y1-x,4);
}

void b_circle(int x1,int y1,int r)
{
  int d;
  d=3-2*r;
  int x=0,y=r;

  show(x1,y1,x,y);
  while(y>=x)
  {
        x++;
        if(d>0)
        {
          y--;
```

```
                d=d+4*(x-y)+10;
            }
            else
            {
                d=d+4*x+6;
            }
            show(x1,y1,x,y);
    }
}



void main()
{
    clrscr();
    int x1,x2,y1,y2,col;
    int gd=DETECT,gm;
    initgraph(&gd,&gm,"C:\\turboc3\\bgi");

    b_circle(300,250,100);
    b_circle(300,250,50);

    dda(300,150,385,300);
    dda(300,150,215,300);
    dda(385,300,215,300);
    getch();

    closegraph();

}
```

Output:-



PROGRAM 5(Part-II)

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program to draw pattern 2 using DDA Line and Bresenham Cricle Drwaing Algorith.

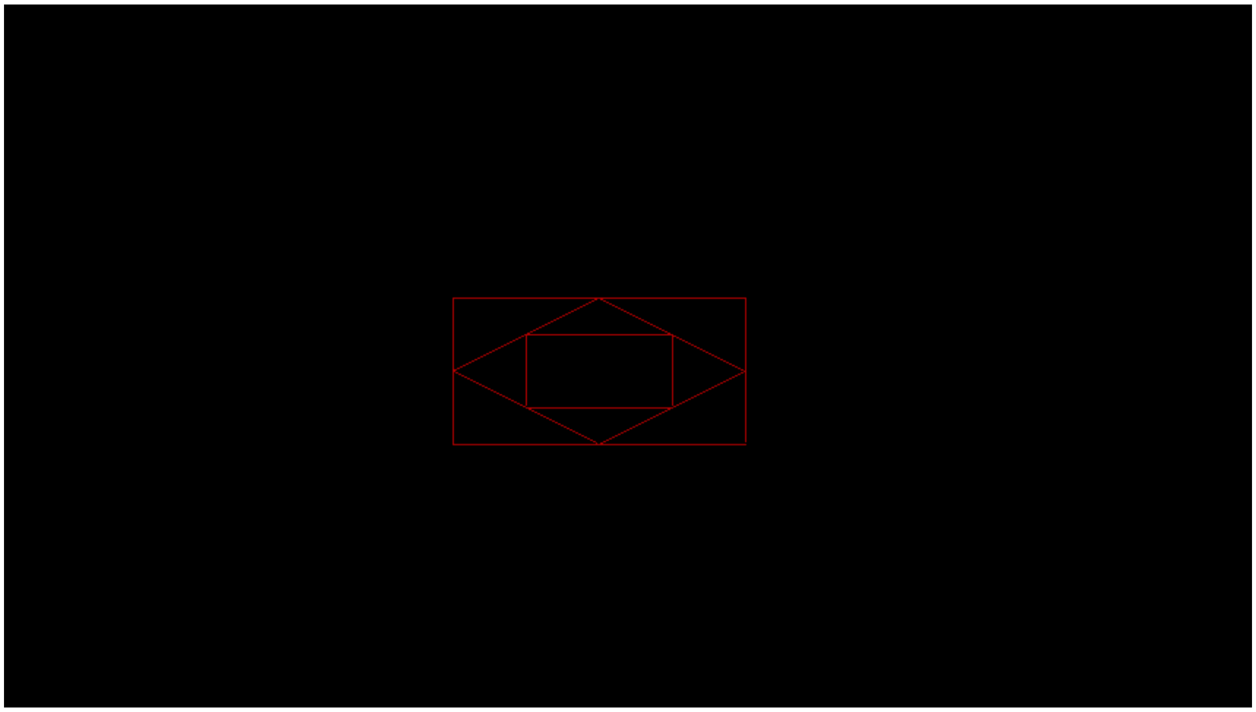
```
#include<graphics.h>

#include<conio.h>

#include<math.h>

#include<iostream.h>

int sign(int x)

{

   if(x>0)

           return 1;

   else if(x<0)

           return -1;

   else

           return 0;

}


void dda(int x1,int y1,int x2,int y2)

{

   float x,y,l,i,dx,dy;

   if(x1==x2 && y1==y2)
```

```
    {
            putpixel(x1,y1,4);
    }
    else
    {
            dx=abs(x2-x1);
            dy=abs(y2-y1);
            if(dx>=dy)
               l=dx;
            else
               l=dy;
            dx=(x2-x1)/l;
            dy=(y2-y1)/l;
            x=x1+0.5*sign(dx);
            y=y1+0.5*sign(dy);
            i=1;
            while(i<l)
            {
               putpixel(x,y,4);
               x=x+dx;
               y=y+dy;
               i++;
            }
    }
}
```

```
void bla(int x1,int y1,int x2,int y2)
{
   float dx,dy,x,y,e,i;
   if(x1==x2 && y1==y2)
            putpixel(x1,y1,4);
   else
   {
            dx=abs(x2-x1);
            dy=abs(y2-y1);
            x=x1;
            y=y1;
            putpixel(x,y,4);
            e=2*dy-dx;
            i=1;
            while(i<=dx)
            {
               while(e>=0)
               {
                      y=y+1;
                      e=e-2*dx;
               }
               x=x+1;
               e=e+2*dy;
               putpixel(x,y,4);
```

```
                i=i+1;
            }
    }
}

void main()
{
    clrscr();
    int gd=DETECT,gm;
    initgraph(&gd,&gm,"C:\\turboc3\\bgi");

    bla(200,300,400,300);
    dda(200,300,200,200);
    bla(200,200,400,200);
    dda(400,200,400,300);

    dda(200,250,300,200);
    dda(200,250,300,300);
    bla(300,200,400,250);
    dda(300,300,400,250);

    bla(250,225,150,225);
    dda(250,225,250,275);
    dda(350,275,250,275);
    dda(350,225,350,275);
    getch();

    closegraph();

}
```

Output:-



PROGRAM 6

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program to draw a concave polygon and fill it with desired color using scan fill algorithm.

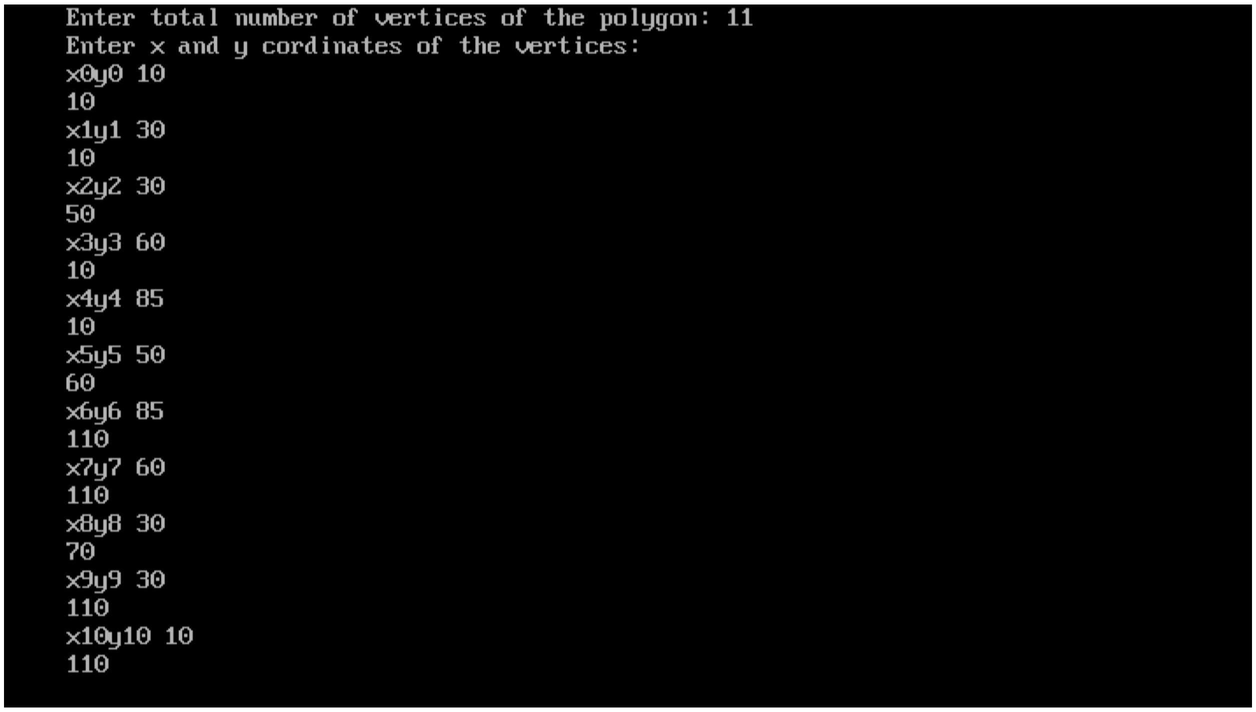
```
#include<graphics.h>

#include<conio.h>

#include<iostream.h>

#include<dos.h>


void main()

{

   clrscr();

   int gd=DETECT,gm,dx,dy,x,y,temp,n,i,j,k;

   int p[20][2],xi[20];

   float slope[20];


   cout<<"Enter total number of vertices of the polygon: ";

   cin>>n;

   cout<<"Enter x and y cordinates of the vertices: "<<endl;

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

   {

          cout<<"x"<<i<<"y"<<i<<" ";

          cin>>p[i][0]>>p[i][1];
```

```
}


p[n][0]=p[0][0];

p[n][1]=p[0][1];


initgraph(&gd,&gm,"C:\\turboc3\\bgi");

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

{

        line(p[i][0],p[i][1],p[i+1][0],p[i+1][1]);

}

getch();


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

{

        dx=p[i+1][0]-p[i][0];

        dy=p[i+1][1]-p[i][1];


        if(dy==0)

        {

           slope[i]=1.0;

        }

        if(dx==0)

        {

           slope[i]=0.0;

        }
```

```
          if((dy!=0) && (dx!=0))
          {
             slope[i]=(float) dx/dy;
          }
}

for(y=480;y>0;y--)
{
          k=0;
          for(i=0;i<n;i++)
          {
             if(((p[i][1]<=y)&&(p[i+1][1]>y))||((p[i][1]>y)&&(p[i+1][1]<=y)))
             {
                       xi[k]=(int)(p[i][0]+slope[i]*(y-p[i][1]));
                       k++;
             }
          }

          for(j=0;j<k-1;j++)
             for(i=0;i<k-1;i++)
             {
                       if(xi[i]>xi[i+1])
                       {
                          temp=xi[i];
                          xi[i]=xi[i+1];
```

```
                        xi[i+1]=temp;
                    }
               }
          setcolor(11);
          for(i=0;i<k;i+=2)
          {
             line(xi[i],y,xi[i+1],y);
             delay(20);
          }
     }
     getch();
     closegraph();
}
```

Output:-



```
Enter total number of vertices of the polygon: 11
Enter x and y cordinates of the vertices:
x0y0 10
10
x1y1 30
10
x2y2 30
50
x3y3 60
10
x4y4 85
10
x5y5 50
60
x6y6 85
110
x7y7 60
110
x8y8 30
70
x9y9 30
110
x10y10 10
110
```

K

K

PROGRAM 7

Name:- *Kaustubh S Kabra*

Class:- *Second Year Engineering Comp-1*

Roll No:- *20*

Write a c++ program to implement Cohen Southerland line clipping algorithm.

```
#include<graphics.h>

#include<iostream.h>

#include<conio.h>

#include<stdlib.h>


static int LEFT=1,RIGHT=2,BOTTOM=4,TOP=8,xmax,ymax,xmin,ymin;

int find_code(int x,int y)

{

   int code=0;

   if(y>ymax)

            code|=TOP;

   if(y<ymin)

            code|=BOTTOM;

   if(x>xmax)

            code|=RIGHT;

   if(x<xmin)

            code|=LEFT;

   return code;

}
```

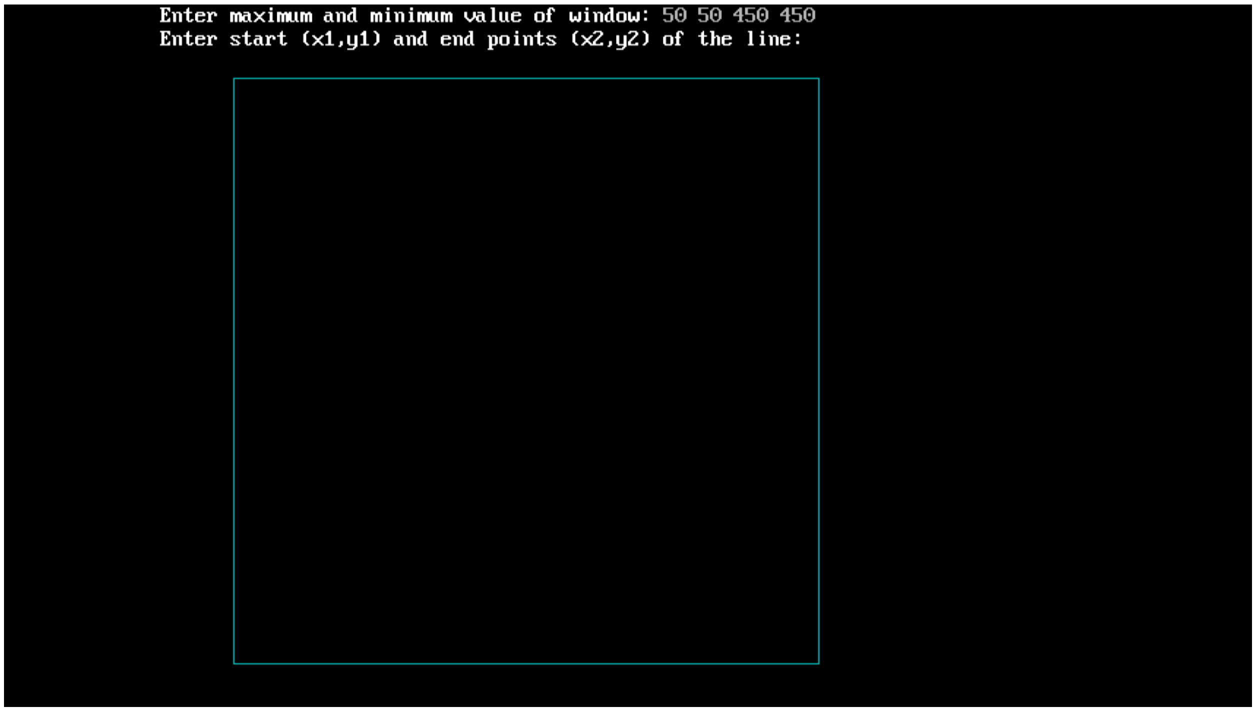
```
void main()

{

    clrscr();

    int x1,y1,x2,y2;

    int gd=DETECT,gm;

    initgraph(&gd,&gm,"C:\\turboc3\\bgi");


    setcolor(CYAN);


    cout<<"Enter maximum and minimum value of window: ";

    cin>>xmin>>ymin>>xmax>>ymax;


    rectangle(xmin,ymin,xmax,ymax);

    cout<<"Enter start (x1,y1) and end points (x2,y2) of the line: ";

    cin>>x1>>y1>>x2>>y2;


    line(x1,y1,x2,y2);

    getch();


    int ocode1=find_code(x1,y1),ocode2=find_code(x2,y2);

    int accept=0;


    while(1)

    {

            float m=(float)(y2-y1)/(x2-x1);

            if(ocode1==0 && ocode2==0)

            {
```

```
    accept=1;

    break;

}

else if((ocode1&ocode2)!=0)

{

    break;

}

else

{

    int x,y;

    int temp;

    if(ocode1==0)

    {

                temp=ocode2;

    }

    else

    {

                temp=ocode1;

    }



    if(temp&TOP)

    {

                x=x1+(ymax-y1)/m;

                y=ymax;

    }

    else if(temp&BOTTOM)

    {
```

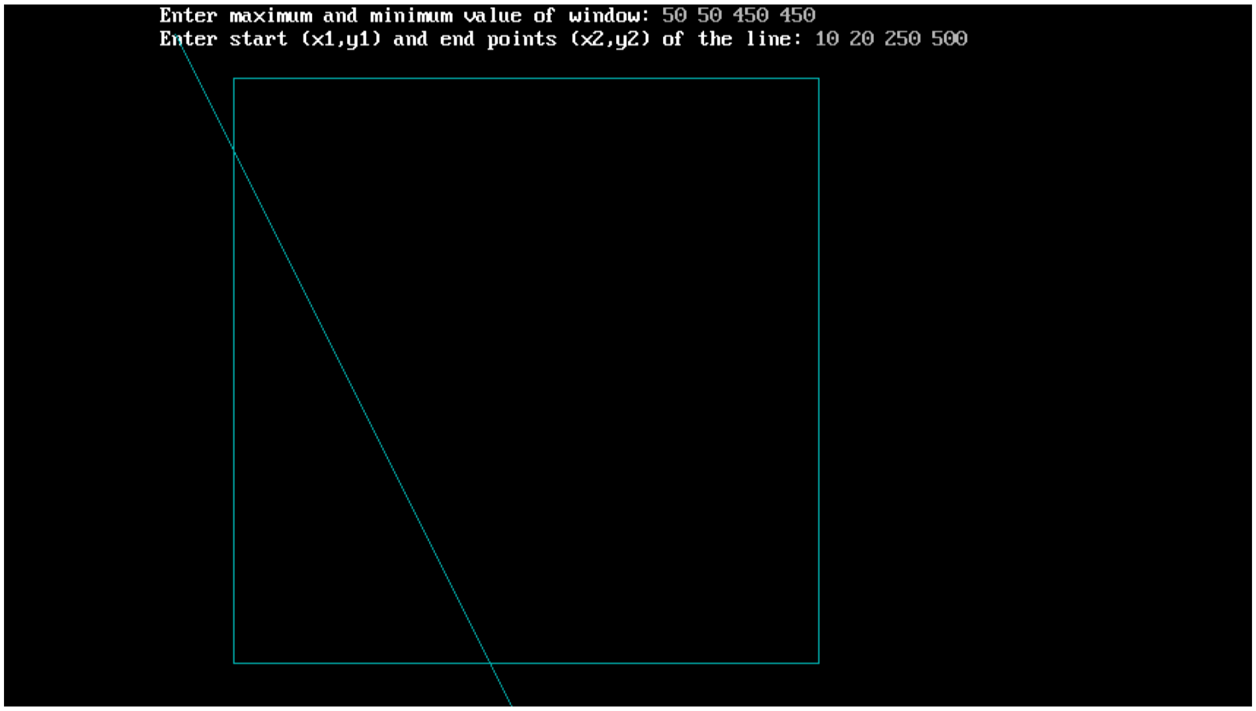
```
                x=x1+(ymin-y1)/m;
                y=ymin;
            }
            else if(temp&LEFT)
            {
                x=xmin;
                y=y1+m*(xmin-x1);
            }
            else if(temp&RIGHT)
            {
                x=xmax;
                y=y1+m*(xmax-x1);
            }
            if(temp==ocode1)
            {
                x1=x;
                y1=y;
                ocode1=find_code(x1,y1);
            }
            else
            {
                x2=x;
                y2=y;
                ocode2=find_code(x2,y2);
            }
        }
    }
```

```
   setcolor(RED);

   cout<<"After clipping";

   if(accept)

   {

            line(x1,y1,x2,y2);

            rectangle(xmin,ymin,xmax,ymax);

   }


   getch();

   closegraph();

}
```

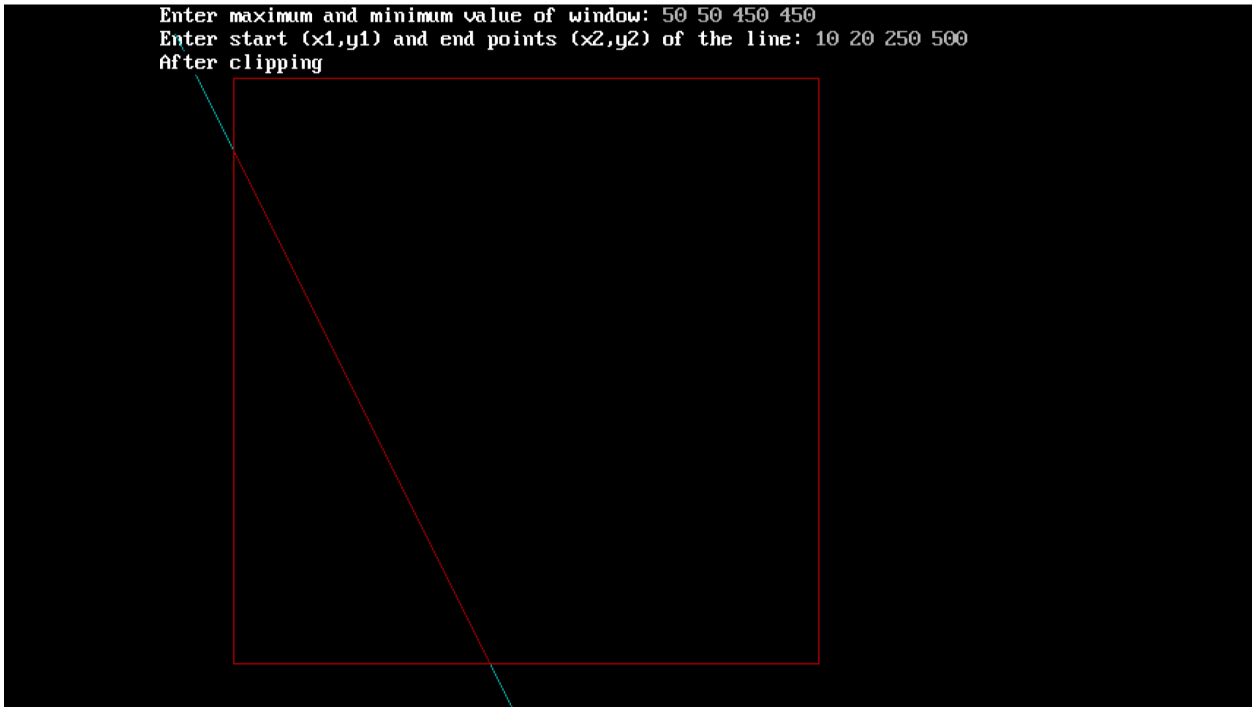
Output:-



```
Enter maximum and minimum value of window: 50 50 450 450
Enter start (x1,y1) and end points (x2,y2) of the line:
```



```
Enter maximum and minimum value of window: 50 50 450 450
Enter start (x1,y1) and end points (x2,y2) of the line: 10 20 250 500
```



```
Enter maximum and minimum value of window: 50 50 450 450
Enter start (x1,y1) and end points (x2,y2) of the line: 10 20 250 500
After clipping
```