Assignment Title:	Write C++ program to draw a concave polygon and fill it with desired color using scan fill algorithm
Assignment No.:	1
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Program Code:

```
#include <conio.h>
#include <iostream>
#include <graphics.h>
#include <stdlib.h>
using namespace std;

class point
{
   public:
   int x,y;
};

class poly
{
   private:
      point p[20];
      int inter[20],x,y;
      int v,xmin,ymin,xmax,ymax;
   public:
      int c;
      void read();
```

```
        void calcs();
        void display();
        void ints(float);
        void sort(int);
};


void poly::read()
{
   int i;
   cout<<"\n\t SCAN_FILL ALGORITHM";
   cout<<"\n Enter the no of vertices of polygon:";
   cin>>v;
   if(v>2)
   {
      for(i=0;i<v; i++)
      {
         cout<<"\nEnter the co-ordinate no.- "<<i+1<<" : ";
         cout<<"\n\tx"<<(i+1)<<"=";
         cin>>p[i].x;
         cout<<"\n\ty"<<(i+1)<<"=";
         cin>>p[i].y;
      }
      p[i].x=p[0].x;
      p[i].y=p[0].y;
      xmin=xmax=p[0].x;
      ymin=ymax=p[0].y;
   }
   else
      cout<<"\n Enter valid no. of vertices.";
}
```

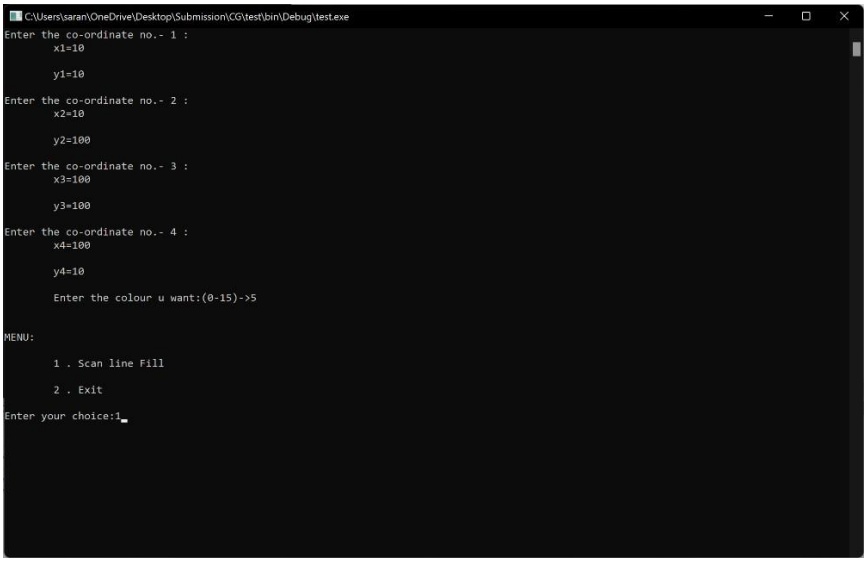
```
void poly::calcs()
{ //MAX,MIN
   for(int i=0;i<v;i++)
   {
      if(xmin>p[i].x)
      xmin=p[i].x;
      if(xmax<p[i].x)
      xmax=p[i].x;
      if(ymin>p[i].y)
      ymin=p[i].y;
      if(ymax<p[i].y)
      ymax=p[i].y;
   }
}

void poly::display()
{
   int ch1;
   char ch='y';
   float s,s2;
   do
   {
      cout<<"\n\nMENU:";
      cout<<"\n\n\t1 . Scan line Fill ";
      cout<<"\n\n\t2 . Exit ";
      cout<<"\n\nEnter your choice:";
      cin>>ch1;
      switch(ch1)
      {
         case 1:
            s=ymin+0.01;
            delay(100);
```

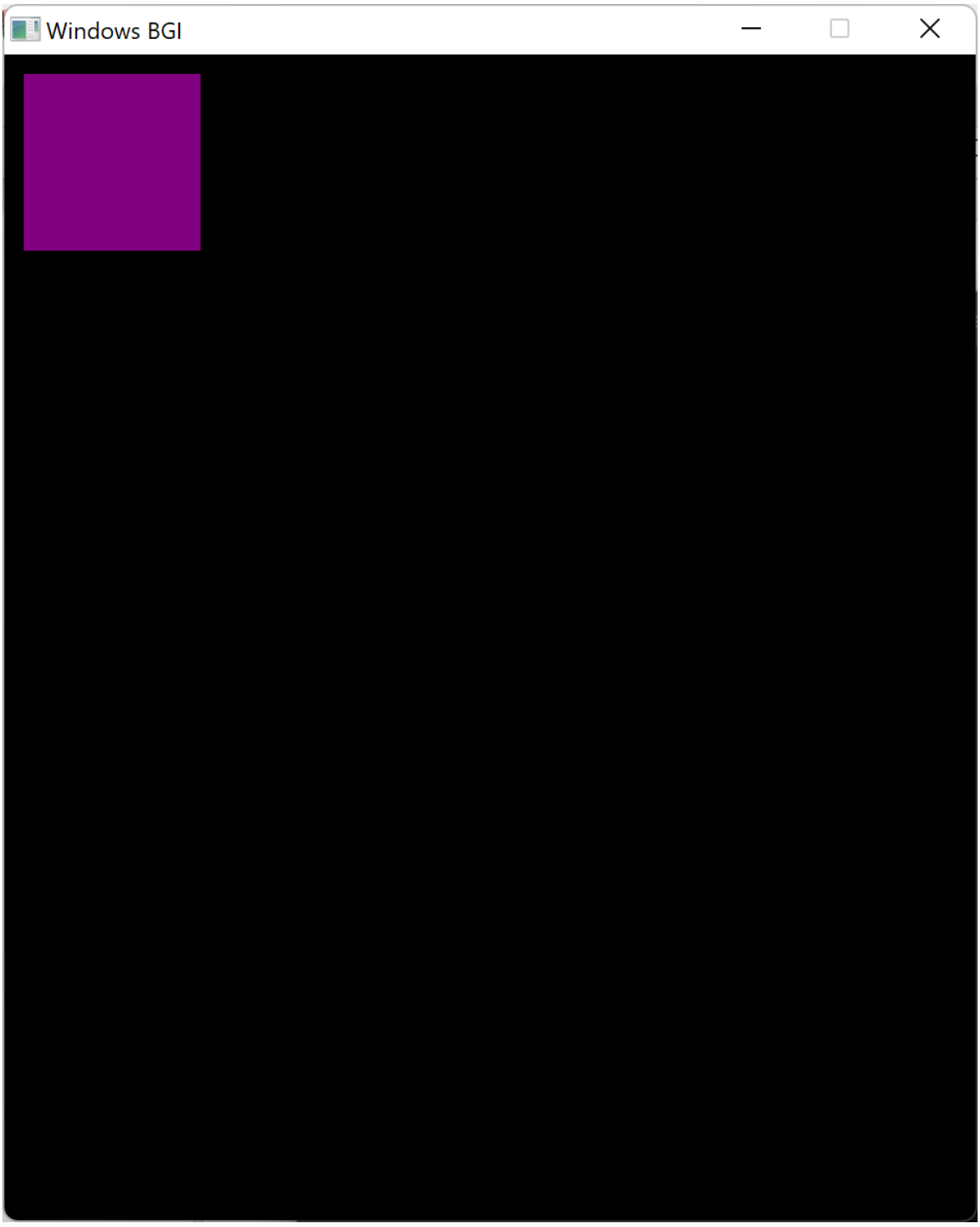
```
            cleardevice();
            while(s<=ymax)
            {
               ints(s);
               sort(s);
               s++;
            }
            break;
         case 2:
            exit(0);
      }

      cout<<"Do you want to continue?: ";
      cin>>ch;
   }while(ch=='y' || ch=='Y');
}

void poly::ints(float z)
{
   int x1,x2,y1,y2,temp;
   c=0;
   for(int i=0;i<v;i++)
   {
      x1=p[i].x;
      y1=p[i].y;
      x2=p[i+1].x;
      y2=p[i+1].y;
      if(y2<y1)
      {
         temp=x1;
         x1=x2;
         x2=temp;
```

```
            temp=y1;
            y1=y2;
            y2=temp;
        }
        if(z<=y2&&z>=y1)
        {
            if((y1-y2)==0)
            x=x1;
            else
            {
                x=((x2-x1)*(z-y1))/(y2-y1);
                x=x+x1;
            }
            if(x<=xmax && x>=xmin)
            inter[c++]=x;
        }
    }
}

void poly::sort(int z)
{
    int temp,j,i;

        for(i=0;i<v;i++)
        {
            line(p[i].x,p[i].y,p[i+1].x,p[i+1].y);
        }
        delay(100);
        for(i=0; i<c;i+=2)
        {
            delay(100);
            line(inter[i],z,inter[i+1],z);
```

```
        }
}

int main()
{
   int cl;
   initwindow(500,600);
   cleardevice();
   poly x;
   x.read();
   x.calcs();
   cleardevice();
   cout<<"\n\tEnter the colour u want:(0-15)->"; //Selecting colour
   cin>>cl;
   setcolor(cl);
   x.display();
   closegraph();
   getch();
   return 0;
}
```

Program Output:




Windows BGI