Jawahar Education Societys Annasaheb Chudaman Patil College of Engineering, Kharghar, Navi Mumbai

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SUBJECT: COMPUTER GRAPHICS

AIM: Implement Scan line Polygon Filling algorithm

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Experiment : 03

Aim :- Implement scan line polygon Algorithm.

Theory :-

"Scan line Polygon Algorithm."

This algorithm lines interior points of a polygon on the scan line and these point are done on or off according to requirement. If Polygon is filled with various colors by coloring various pixels.

- Algorithm

Step1 :- Find out the Ymin and Ymax in given polygon.
Step2 :- Scanline intersect with each of the polygon from Ymin to Ymax. Name each intersection point of the polygon. As p
Step3 :- Sort the interstion point in the increasing order of X coordinate i.e. P_0P_1, P_1P_2, and P_2P_2.
Step4 : Fill all those pair of coordinates that are inside polygon and ignore the alternate pairs.

- Conclusion :- We understand scan line polygon term and its algorithm.

Teachers Signature

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AIM: Implement Scan line Polygon Filling algorithm

Input:

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

main()
{

int n,i,j,k,gd,gm,dy,dx;
int x,y,temp;
int a[20][2],xi[20];
float slope[20];


clrscr();
printf("\n\n\tEnter the no. of edges of polygon : ");
scanf("%d",&n);
printf("\n\n\tEnter the cordinates of polygon :\n\n\n ");

for(i=0;i<n;i++)
{
printf("\tX%d Y%d : ",i,i);
scanf("%d %d",&a[i][0],&a[i][1]);
}

a[n][0]=a[0][0];
a[n][1]=a[0][1];


detectgraph(&gd,&gm);
initgraph(&gd,&gm,"c:\\TUBOC3\\BGI");


/*- draw polygon -*/

for(i=0;i<n;i++)
{
line(a[i][0],a[i][1],a[i+1][0],a[i+1][1]);
}

getch();


for(i=0;i<n;i++)
{
dy=a[i+1][1]-a[i][1];
dx=a[i+1][0]-a[i][0];

if(dy==0) slope[i]=1.0;
if(dx==0) slope[i]=0.0;

if((dy!=0)&&(dx!=0)) /*- calculate inverse slope -*/
{
slope[i]=(float) dx/dy;
}
}

for(y=0;y< 480;y++)
{
k=0;
for(i=0;i<n;i++)
{

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

for(j=0;j<k-1;j++) /*- Arrange x-intersections in order -*/
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(35);
for(i=0;i<k;i+=2)
{
line(xi[i],y,xi[i+1]+1,y);
getch();
}

}
```

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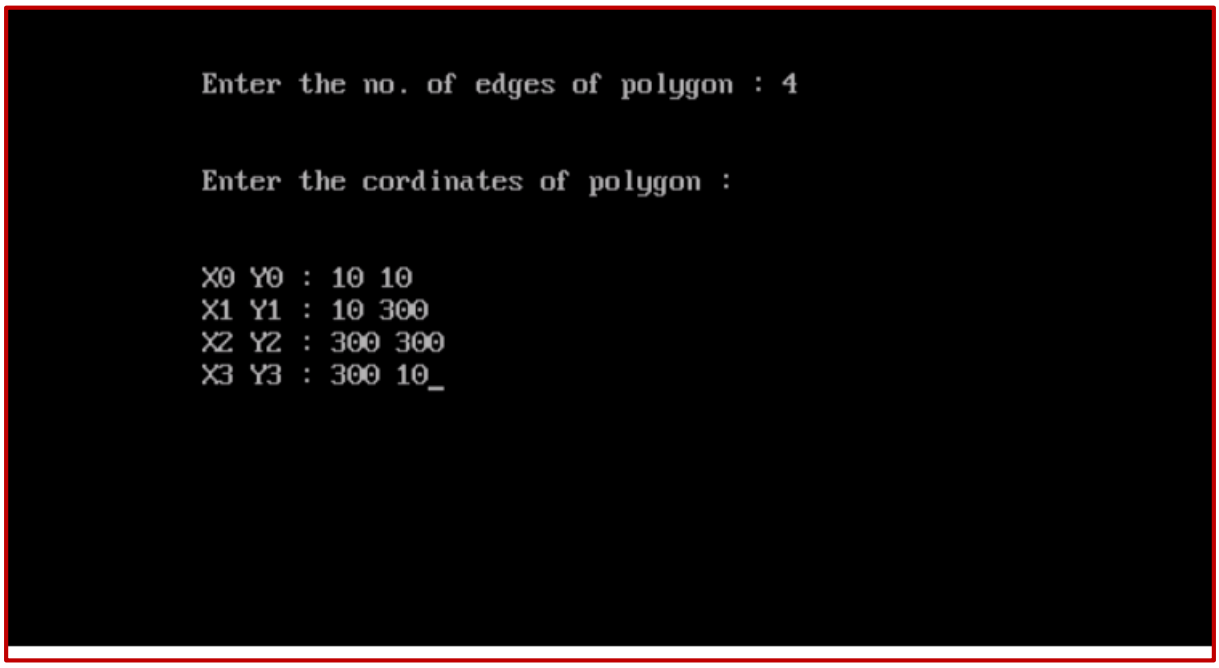
Output:-



Conclusion: - We understanding about scan line polygon term and its algorithm.