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

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SUBJECT: COMPUTER GRAPHICS

AIM: Implement midpoint ellipse algorithm.

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Experiment : 02

Aim :- Implement midpoint elipse Algorithm.

theory

"Midpoint Elipse Algorithm"

This is an incremental method for scan converting an ellipse that is centered at the origin in standard position i.e. with major and minor axis parallel to coordinate system axis. It is very similar to the midpoint circle algorithm. Because of the four-ways symmetry property we need to consider the entire elliptical curve in first quandant.

- Algorithm :-

```
int x=0, y=b   [ starting point]
int fx=0, fy=2a²b   [ initial partical derivatives]
int p=b²-a²+b+a²/4
while (fx<fy);
        if (p<0)
        p=p+fx+b²;
        else;
    {
        y--;
        fy=fy-2a²
        p=p+fx+b²-fy;
    }
}
Setpixel(x,y);
p=b²(x+0.5)²+a²(y-1)²-a²b²
while (y>0)
```

Teachers Signature

AIM: Implement midpoint ellipse algorithm.

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```
{
    y--;
    fy = fy - 2a^2;
    if (p>=0)
    p = p - fy + a^2
     else
  {
  setpixel (x,y);
  p = b^2 (x+0.5)^2 + a^2 (y-1)^2 = a^2 b^2
       x++;
       fx = fx + 2b^2
       p = p + fx - fy + a^2;
   }
   setpixel (x,y);

}
```

- Conclusion :-

Hence we successfully implement midpoint ellipse algorithm.

Teachers Signature

Priyush B. Khobragade

Input:

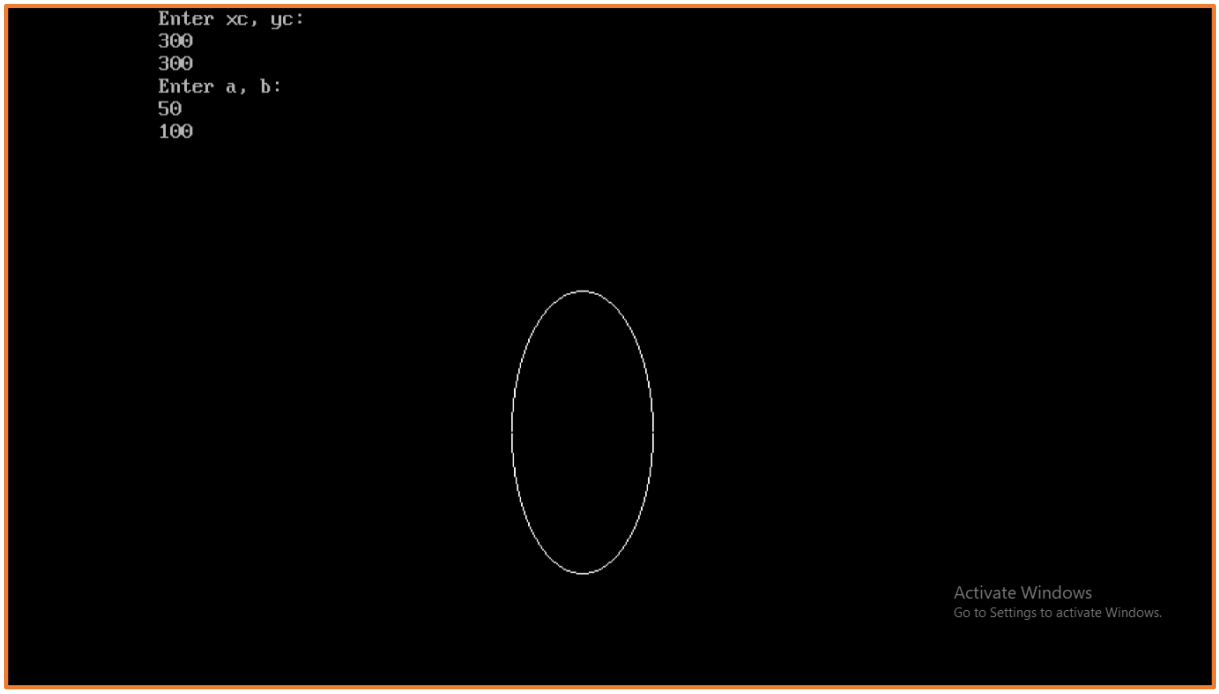
```
/*
Title: Midpoint Ellipse Algorithm
Description: C Program to draw an Ellipse using Midpoint Ellipse
*/

#include<stdio.h>
#include<graphics.h>
void main()
{
int gd=DETECT,gm;
float p,x,y,xc,yc,a,b;
initgraph(&gd,&gm,"C:\\TURBOC3\\BGI");
cleardevice();
printf("Enter xc, yc:\n");
scanf("%f%f",&xc,&yc);
printf("Enter a, b:\n");
scanf("%f%f",&a,&b);
x=0;
y=b;
//Region 1
p=(b*b)-(a*a*b)+(0.25*a*a);
do
{
putpixel(xc+x,yc+y,WHITE);
putpixel(xc+x,yc-y,WHITE);
putpixel(xc-x,yc+y,WHITE);
putpixel(xc-x,yc-y,WHITE);
if(p<0)
 {
 x=x+1;
 p=p+2*b*b*x+b*b;
 }
else
 {
 x=x+1;
 y=y-1;
 p=p+2*b*b*x-2*a*a*y+b*b;
 }
}while(2*b*b*x<2*a*a*y);
//Region 2
p=(b*b*(x+0.5)*(x+0.5))+((y-1)*(y-1)*a*a-a*a*b*b);
do
{
putpixel(xc+x,yc+y,WHITE);
putpixel(xc+x,yc-y,WHITE);
putpixel(xc-x,yc+y,WHITE);
putpixel(xc-x,yc-y,WHITE);
if(p>0)
 {
 y=y-1;
 p=p-2*a*a*y+a*a;
 }
else
 {
 x=x+1;
 y=y-1;
 p=p-2*a*a*y+2*b*b*x+a*a;
 }
}while(y!=0);
getch();
closegraph();
restorecrtmode();

```

AIM: Implement midpoint ellipse algorithm.

Output:-



Conclusion: - Hence we learn about midpoint ellipse drawing algorithm