# CG-Assignment Midpoint Circle and Ellipse Algorithms

封	Aim: Implementing timestrawin midpoint & circle drew algorithm.
	Algorithm:
-	Algorithm: take radius r' and centore coordinates 'scc', 'yc'
	x=0 3 y= V = (5/16) - V
	intial value of decision parameter p= (5/16) - V Csince radius in the program is int-type = (-r)
-	while ( V )
	while (xxy) => p+= 2x+1
	else => p+=2x+1-2y angol y-=1
	X++
	plotpixels at
	(xc+x, yc+y)
	(xc-x, yc+y)
	(x(+x,y(-y))
	(xco-x, yc-y)
	(x(+y) y(+x)
	(xc=y, yc+z)
-	(xc+y, yc-x)
	(xc-y, yc+x)
	(xc+g)-y, yc-x)
	LOOP ENDS
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### **Program:**

Drawing circles using midpoint circle algorithm

#### Code:

```
#include<stdio.h>
#include<graphics.h>
#include<conio.h>
void plotPoints(xc,yc,x,y){
     putpixel(xc+x,yc+y,WHITE);
     putpixel(xc-x,yc+y,WHITE);
     putpixel(xc+x,yc-y,WHITE);
     putpixel(xc-x,yc-y,WHITE);
     putpixel(xc+y,yc+x,WHITE);
     putpixel(xc-y,yc+x,WHITE);
     putpixel(xc+y,yc-x,WHITE);
     putpixel(xc-y,yc-x,WHITE);
}
void mpcircle(int xc, int yc, int r){
     int x,y,p;
     x=0;
     y=r;
     p=1-r;
     plotPoints(xc,yc,x,y);
     while(x<y){
          x++;
          if(p<0){
               p+=2*x+1;
          }else{
               p+=2*(x-y)+1;
          plotPoints(xc,yc,x,y);
     }
}
void main(){
     int gd = DETECT,gm;
     int xc,yc,r;
     initgraph(&gd,&gm, "c:\\turboc3\\bgi");
     printf("Enter the cneter coordiantes(x,y)\n");
     scanf("%d%d",&xc,&yc);
     printf("Enter the radius of the circle\n");
     scanf("%d",&r);
```

```
printf("\nHriday Keswani\nRoll no. 20003088\n");
    mpcircle(xc,yc,r);
    getch();
    closegraph();
}
```

## **Output:**



### **Program:**

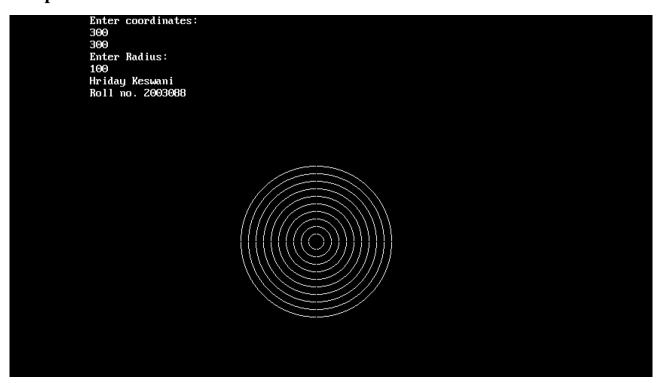
Drawing concentric circles midpoint circle algorithm

#### Code:

```
#include<stdio.h>
#include<graphics.h>
#include<conio.h>
void plotPoints(xc,yc,x,y){
     putpixel(xc+x,yc+y,WHITE);
     putpixel(xc-x,yc+y,WHITE);
     putpixel(xc+x,yc-y,WHITE);
     putpixel(xc-x,yc-y,WHITE);
     putpixel(xc+y,yc+x,WHITE);
     putpixel(xc-y,yc+x,WHITE);
     putpixel(xc+y,yc-x,WHITE);
     putpixel(xc-y,yc-x,WHITE);
}
void mpcircle(int xc, int yc, int r){
     int x,y,p;
     x=0;
     y=r;
     p=1-r;
     plotPoints(xc,yc,x,y);
     while(x<y){
          x++;
          if(p<0){
               p+=2*x+1;
          }else{
               p+=2*(x-y)+1;
          plotPoints(xc,yc,x,y);
     }
     if(r>10){
          r - = 10:
          mpcircle(xc,yc,r);
     }
}
void main(){
     int gd = DETECT,gm;
     int xc,yc,r;
```

```
initgraph(&gd,&gm,"c:\\turboc3\\bgi");
printf("Enter the center coordiantes(x,y)\n");
scanf("%d%d",&xc,&yc);
printf("Enter the radius of the circle\n");
scanf("%d",&r);
printf("\nHriday Keswani\nRoll no. 20003088\n");
mpcircle(xc,yc,r);
getch();
closegraph();
}
```

### **Output:**



## Program:

Drawing ellipse from midpoint ellipse algorithm

## Theory:

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	Aim: To implement midpoint circle algorithm
	Algorithm:
-	Take rx, ry and xc, yc as input
-	$a - 0$ , $q = \gamma q$
_	Contrate initially decision name of the contrate of the
	+ 7 1 1 + 10 2CV - 1
-	27y > 2724) 1/Region 2
	(PRO)
	else = 2 ry x + ry 2
	$p + = 2r_y^2 x + 1 - 2r_x^2 y + r_y^2$
	x++
	LOOP END
-	while (y>0) 11 region 2
	if p <=0
	5 x++
	$p + = 2r_g^2 x - 2r_a^2 y + r_x^2$ else
	$p = 2x^2y + x^2$
	-u
	plotpixels at: - (xc+y), yc+y), (xc-x, yc+y), (xc+x, yc-y), (xe-x, yc-y)
1	LOOP ENDS
1	

### Code:

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

```
void main(){
     int gd = DETECT,gm;
     int xc,yc,x,y;
     long rx,ry;
     float p;
     initgraph(&gd,&gm, "C:\\TURBOC3\\BGI");
     clrscr();
     printf("Enter the center coordinates:\n");
     scanf("%d%d",&xc,&yc);
     printf("Enter Rx and Ry:\n");
     scanf("%ld%ld",&rx,&ry);
     printf("\nHriday Keswani\nRoll no. 20003088\n");
     p = ry*ry-(rx*rx*ry)+(0.25*rx*rx);
     x=0;
     y=ry;
     while (2.0*ry*ry*x \le 2.0*rx*rx*y) {
          if(p<0){
               χ++;
               p = p+2*ry*ry*x+ry*ry;
          }else{
               \chi++;
               p = p+2*ry*ry-2*rx*rx*y-ry*ry;
          }
          putpixel(xc+x,yc+y,WHITE);
          putpixel(xc-x,yc+y,WHITE);
          putpixel(xc+x,yc-y,WHITE);
          putpixel(xc-x,yc-y,WHITE);
     }
     p = ry*ry*(x+0.5)+rx*rx*(y-1)*(y-1)-rx*rx*ry*ry;
     while(y>0){
          if(p<=0){
               \chi++;
               p = p+2*ry*ry*x-2*rx*rx*y+rx*rx;
          }else{
               p=p-2*rx*rx*y+rx*rx;
          }
          putpixel(xc+x,yc+y,WHITE);
          putpixel(xc-x,yc+y,WHITE);
          putpixel(xc+x,yc-y,WHITE);
          putpixel(xc-x,yc-y,WHITE);
     }
```

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

## **Output:**

```
Enter the center coordinates:
300
300
Enter Rx and Ry:
12
10
Hriday Keswani
Roll no. 20003068
```