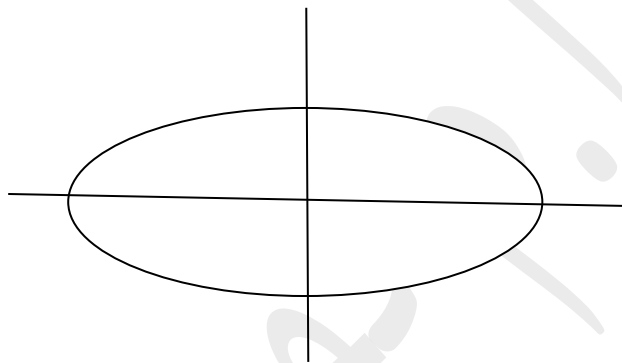


# Computer Graphics

## Ellipse Four- Way Symmetry

We can improve the drawing process of the ellipse by taking advantage of the symmetry in an ellipse.



Consider an ellipse centered at the origin, if the point  $(x, y)$  is on the ellipse, then we can trivially compute three other points on the ellipse, as shown in the figure above. Therefore, we need to compute only one  $90^\circ$  segment to determine the ellipse completely.

```
void Ellipse_4 way (int xc, int yc, int xr, int yr)
```

```
{ float th,dt,x,y;  
  int pi=180;  
  dt=1/(xr+yr)/2;  
  th=0;  
  while ( th<=pi/2 ) {  
      x=xr*cos(th);  
      y=yr*sin(th);
```

```
        putpixel(round(x)+xc, round(y)+yc, 8);  
        putpixel(xc+round(x),yc-round(y),8);  
        putpixel(xc-round(x),yc+round(y),8);  
        putpixel(xc-round(x),yc-round(y),8);  
        th+=dt  
    }  
}
```

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