Computer Graphics And Animations

Semester -4

Rohini D, Madhavi A

Bresenham's Circle drawing Algorithm

The Bresenham's circle drawing algorithm considers the eight way of the symmetry of the circle to generate it.

It plots $1/8^{th}$ part of the circle i.e. from 90° to 45°.

As circle is drawn from 90° to 45°,the x moves in positive direction and y moves in the negative direction.

Algorithm to plot 1/8 of the circle:

1. Read the radius (r) of the circle.
2. Initialize the decision variable. d=3-2r
3. Initialize the starting point x=0 and y=r.
4. do

```
{
 plot(x, y)
 if(d<0)then
    {d=d+4x+6}
 else
     {d=d+4(x-y)+10
      y=y-1
     }
     x=x+1
}while(x<y)
```

5. Stop.

Midpoint circle drawing algorithm:

It also uses the eight-way symmetry of the circle to generate it.

It plots 1/8th part of the circle i.e. from 90° to 45°.

As circle is drawn from 90° to 45°,the x moves in positive direction and y moves in the negative direction.

To draw a 1/8 part of the circle we take unit steps in the positive x direction and make use of decision parameter to determine which of the two possible y positions is closer to the circle.

Midpoint circle drawing algorithm:

1. Read the radius (r) of the circle.
2. Initialize the starting point x=0 and y=r.
3. Calculate the initial value of the decision parameter as p=1.25-r
4. do

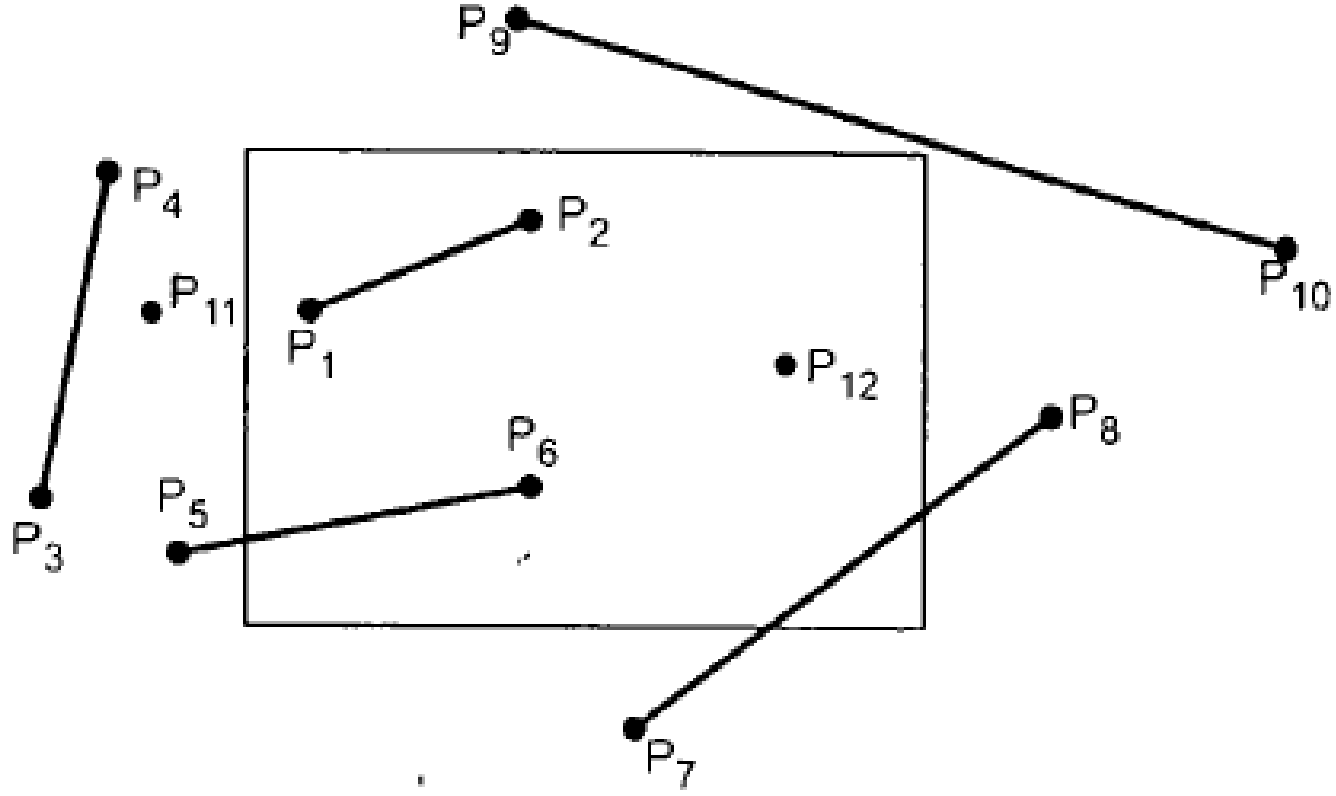
```
{
 plot(x,y)
 if(d<0)then
    {
     x=x+1
    y=y
     d=d+2x+1
  }
```

Midpoint circle drawing algorithm:

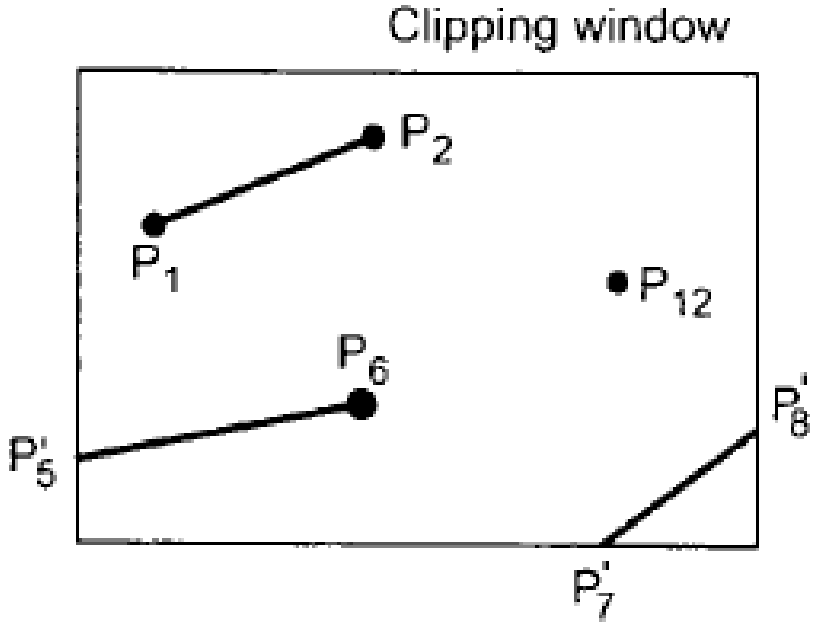
```
else
        {
          x=x+1
         y=y-1
          d=d+2x+2y+1
       }while(x<y)
```

5.Determine the symmetry points.

6. Stop.



(a) Before clipping



(b) After clipping

Clipping

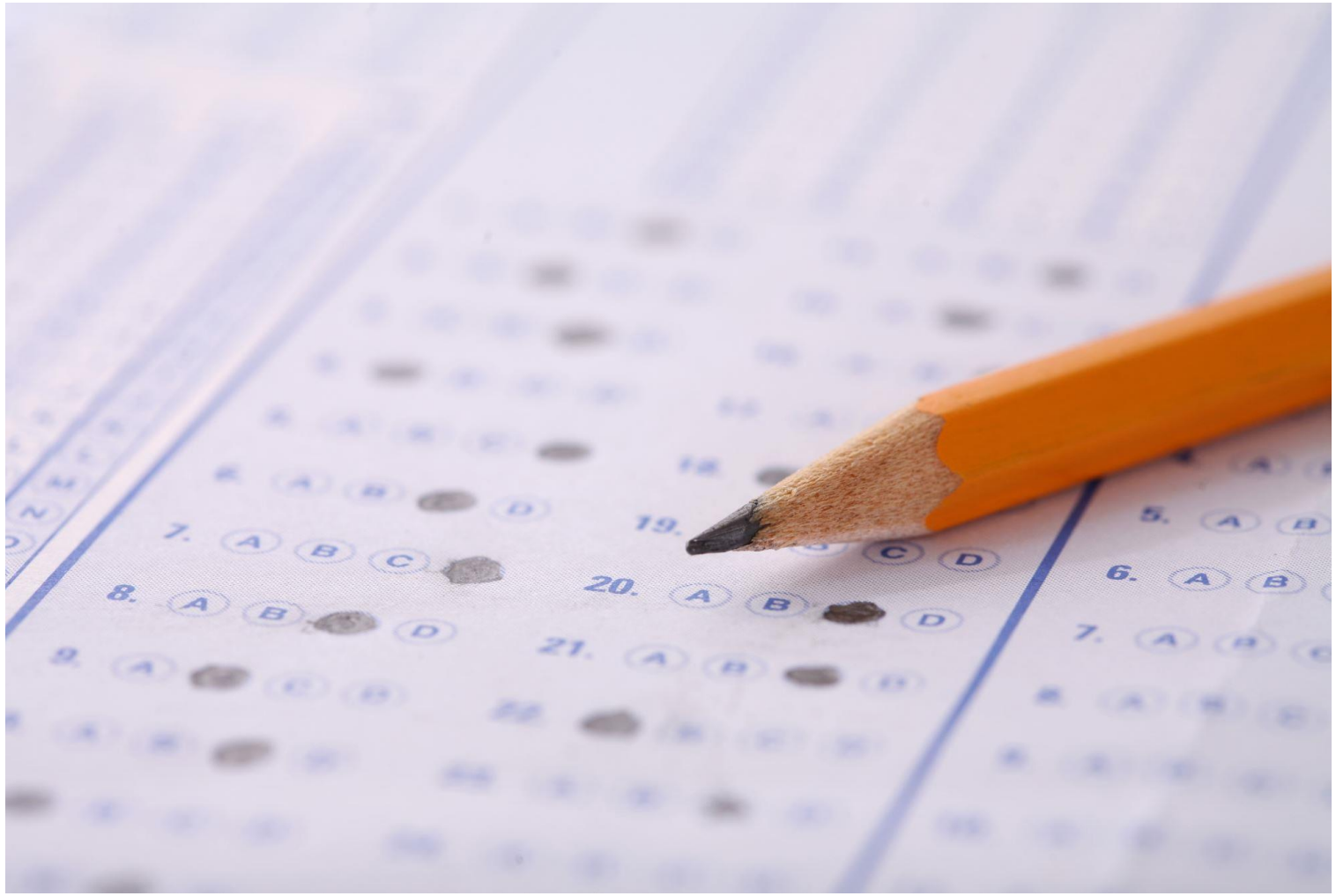
- The process that defines the portion of the picture that are either inside and outside of a specified region is called Clipping.

Point Clipping

- Assume a point P(x,y) does not satisfy the following conditions will be clipped away

$$x_w min \leq x \leq x_w max$$

$$y_w min \leq y \leq y_w max$$



Quiz

Thank You