



## DDA Algorithm:

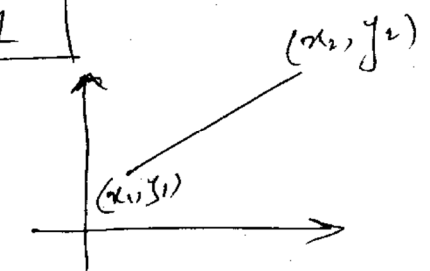
Case 1:  $0 < m < 1$

$$y_{k+1} - y_k = m(x_{k+1} - x_k)$$

Case A:  $\Delta x = 1$   $\therefore x_{k+1} - x_k = 1$

$$y_{k+1} - y_k = m$$

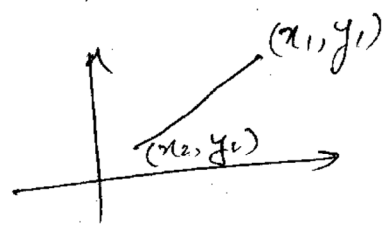
$$\therefore y_{k+1} = y_k + m$$



Case B:  $\Delta x = -1$   
 $\therefore x_{k+1} - x_k = -1$

$$y_{k+1} - y_k = -m$$

$$\therefore y_{k+1} = y_k - m$$

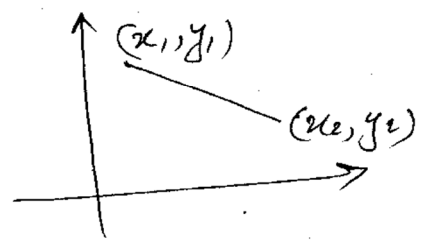


Case 2:  $-1 < m < 0$

Case A:  $\Delta x = +1$   
 $\therefore x_{k+1} - x_k = +1$

$$y_{k+1} - y_k = +m$$

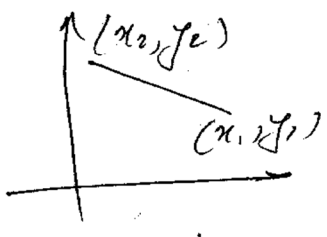
$$\therefore y_{k+1} = y_k + m \quad \text{-ve}$$



Case B:  $\Delta x = -1$   
 $\therefore x_{k+1} - x_k = -1$

$$y_{k+1} - y_k = -m$$

$$\therefore y_{k+1} = y_k - m \quad \text{-ve}$$



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Case 3

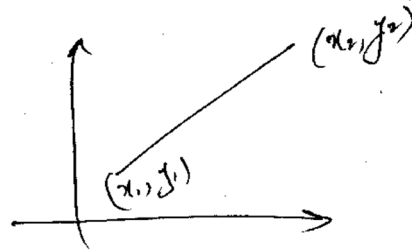
$m > 1$   
 $y_{k+1} - y_k = m(x_{k+1} - x_k)$

Case A

$\Delta y = 1 \therefore y_{k+1} - y_k = 1$

$1 = m(x_{k+1} - x_k)$

$\therefore x_{k+1} = x_k + \frac{1}{m}$



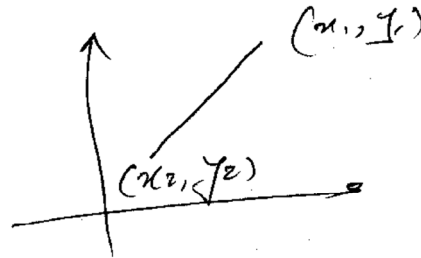
Case B

$\Delta y = -1$

$y_{k+1} - y_k = -1$

$-1 = m(x_{k+1} - x_k)$

$\therefore x_{k+1} = x_k - \frac{1}{m}$



Case A

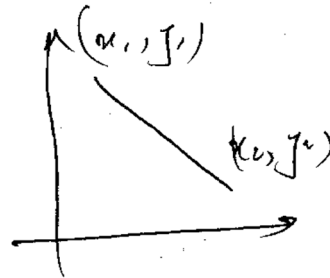
$m < -1$

$\Delta y = -1$

$\therefore y_{k+1} - y_k = -1$

$-1 = m(x_{k+1} - x_k)$

$\therefore x_{k+1} = x_k - \frac{1}{m} \leftarrow -ve$

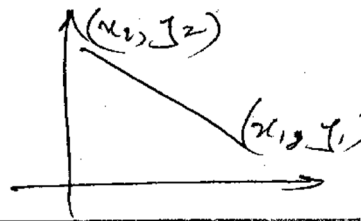


Case B

$\Delta y = 1 \therefore y_{k+1} - y_k = 1$

$1 = m(x_{k+1} - x_k)$

$\therefore x_{k+1} = x_k + \frac{1}{m} \leftarrow -ve$





## Algorithm:

- 1) Accept starting & ending points  $(x_1, y_1)$  &  $(x_2, y_2)$
- 2) Plot  $(x_1, y_1)$
- 3)  $dx \leftarrow x_2 - x_1$ ;  
 $dy \leftarrow y_2 - y_1$
- 4) if  $\text{absolute}(dx) \geq \text{absolute}(dy)$   
4.1)  $\text{length} \leftarrow \text{absolute}(dx)$
- 5) else 5.1)  $\text{length} \leftarrow \text{absolute}(dy)$
- 6)  $dx \leftarrow dx / \text{length}$
- 7)  $dy \leftarrow dy / \text{length}$
- 8) loop  $\text{length}$  times  
8.1)  $x \leftarrow x + dx$   
8.2)  $y \leftarrow y + dy$   
8.3) Plot  $(\text{round}(x), \text{round}(y))$

**/\* DDA Line Drawing Algorithm \*/**

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

void ddaLine(int x1,int y1,int x2,int y2)
{
    float x=x1,y=y1,dx,dy;
    int length,i;

    putpixel(x1,y1,WHITE);

    if(abs(x2-x1)>=abs(y2-y1))
        length=abs(x2-x1);
    else
        length=abs(y2-y1);
    dx=(float)(x2-x1)/length;
    dy=(float)(y2-y1)/length;
    for(i=1;i=length;i++)
    {
        x=x+dx;
        y=y+dy;
        putpixel((int)(x+0.5),(int)(y+0.5),WHITE);
    }
}

void main( )
{
    int x1,y1,x2,y2;
    int gdriver = VGA, gmode=VGAHI;
    initgraph(&gdriver, &gmode, "\\tc\\bgi");

    printf("Enter the starting co-ordinates: ");
    scanf("%d %d",&x1,&y1);
    printf("Enter the ending co-ordinates: ");
    scanf("%d %d",&x2,&y2);

    ddaLine(x1,y1,x2,y2);
    getch();
    closegraph();
}
```

