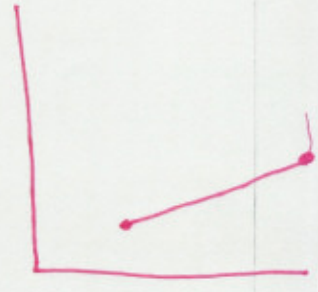
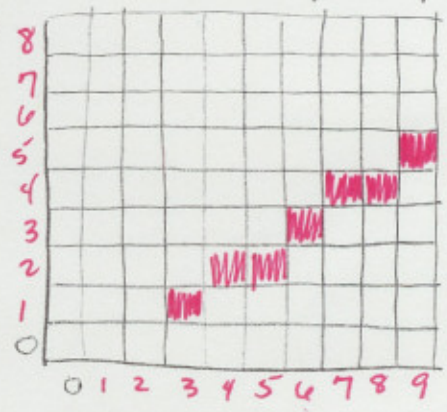


#1 CMPS/160 Name Key

2) Consider a line from (3,1) to (9,5)  
 10pts a) Use DDA method to plot pixels on screen

Show work

X	y	pxely
3	1	1
4	1 $\frac{2}{3}$	2
5	2 $\frac{1}{3}$	2
6	3	3
7	3 $\frac{2}{3}$	4
8	4 $\frac{1}{3}$	4
9	5	5



$$m = \frac{4}{6} = \frac{2}{3} \quad m < 1$$

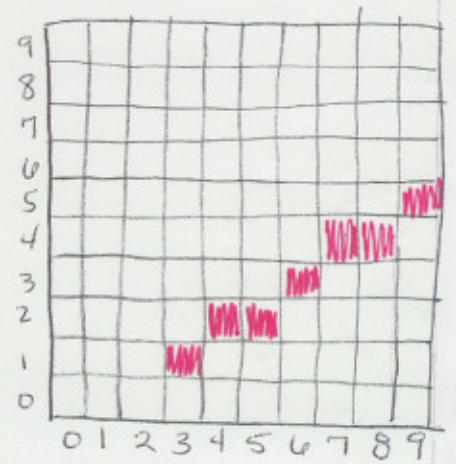
$$y_x = y_k + m$$

20pts b) Use Bresenham's line algorithm to determine pixels. Plot on Screen

Show all work ~~DDA~~  $\Delta X = 6$   $2\Delta X = 12$   
 $\Delta Y = 4$   $2\Delta Y = 8$   
 $m < 1$   $P_0 = 2\Delta Y - \Delta X$

K	P <sub>k</sub>	X <sub>k+1</sub> <sup>3</sup>	Y <sub>k+1</sub> <sup>1</sup>
0	2	4	2
1	-2	5	2
2	6	6	3
3	2	7	4
4	-2	8	4
5	6	9	5

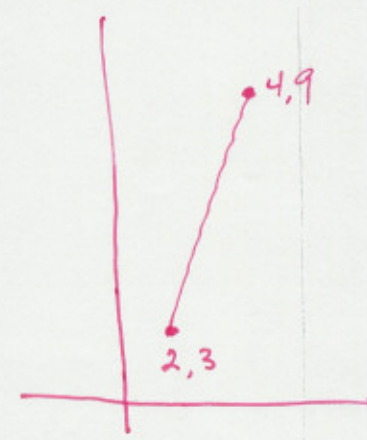
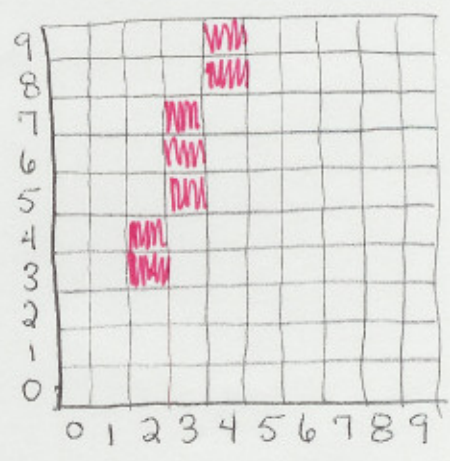
if  $P_k < 0$ , plot  $x_{k+1}, y_k$   
 $P_{k+1} = P_k + 2\Delta y$   
 else plot  $x_{k+1}, y_{k+1}$   
 $P_{k+1} = P_k + 2\Delta y - 2\Delta x$



1) Consider a line from (2,3) to (4,9)

10 pts a) Use DDA method to plot pixel points. Show all work!

Pixel X	X	Y
2	2	3
2	2 1/3	4
3	2 2/3	5
3	3	6
3	3 1/3	7
4	3 2/3	8
4	4	9

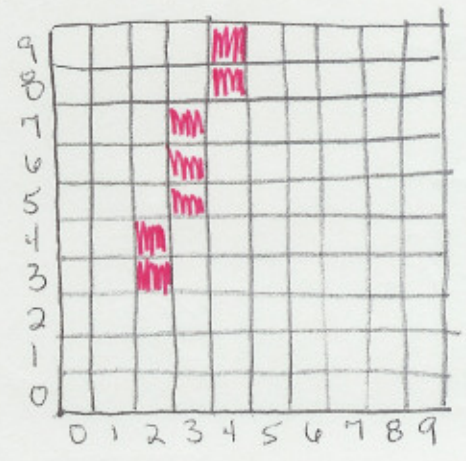


Raster Screen  
fill in pixel areas of line

$b/2 = 3 \quad m > 1 \quad x_{k+1} = x_k + \frac{1}{m}$

20 pts b) use the Bresenham algorithm to determine pixel points. Show all work. Plot on "Screen"

K	P <sub>k</sub>	X <sub>k+1</sub>	Y <sub>k+1</sub>
0	-2	2	4
1	2	3	5
2	-6	3	6
3	-2	3	7
4	2	4	8
5	-6	4	9



$\Delta X = 2 \quad 2\Delta X = 4$   
 $\Delta Y = 6 \quad 2\Delta Y = 12$   
 $PO = 2\Delta X - \Delta Y = 4 - 6 = -2$   
 if  $P_k < 0$  plot  $x_k, y_{k+1} \quad P_{k+1} = P_k + 2\Delta X$   
 else plot  $x_{k+1}, y_k \quad P_{k+1} = P_k + 2\Delta X - 2\Delta Y$

20pts 3) Use the midpoint circle algorithm to plot pixels of a circle centered on (7,7) with a radius of 7.

K	$P_k$	$x_{k+1}$	$y_{k+1}$
0	-6	1	7
1	-3	2	7
2	2	3	6
3	-3	4	6
4	6	5	5

$2+6+1-12$

Only compute as many values as needed before applying symmetry. Show work.

- Plot
- 7, 14
  - 8, 14
  - 9, 14
  - 10, 13
  - 11, 13
  - 12, 12

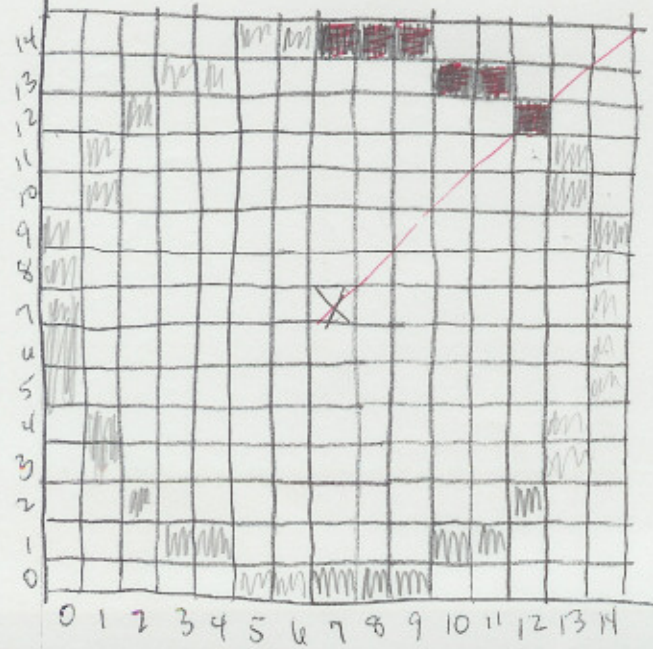
Notate computed pixels versus Symmetric pixels

Move center to origin for computation



$$P_0 = \frac{5}{4} - r \approx 1 - 7 = -6$$

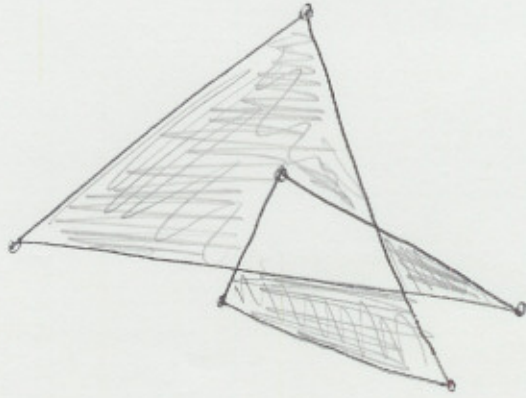
if  $P_k < 0$  plot  $x_{k+1}, y_k$   
 $P_{k+1} = P_k + 2x_{k+1} + 1$   
 else  
 Plot  $x_{k+1}, y_{k+1}$   
 $P_{k+1} = P_k + 2x_{k+1} + 1 - 2y_{k+1}$



HW#1 CMP 160 Name \_\_\_\_\_

4 Given the following ~~polygon~~ <sup>polyline</sup>, shade only the interior regions. Show all work

10pts a) use the odd-even rule



10pts b) use the non-zero winding rule

