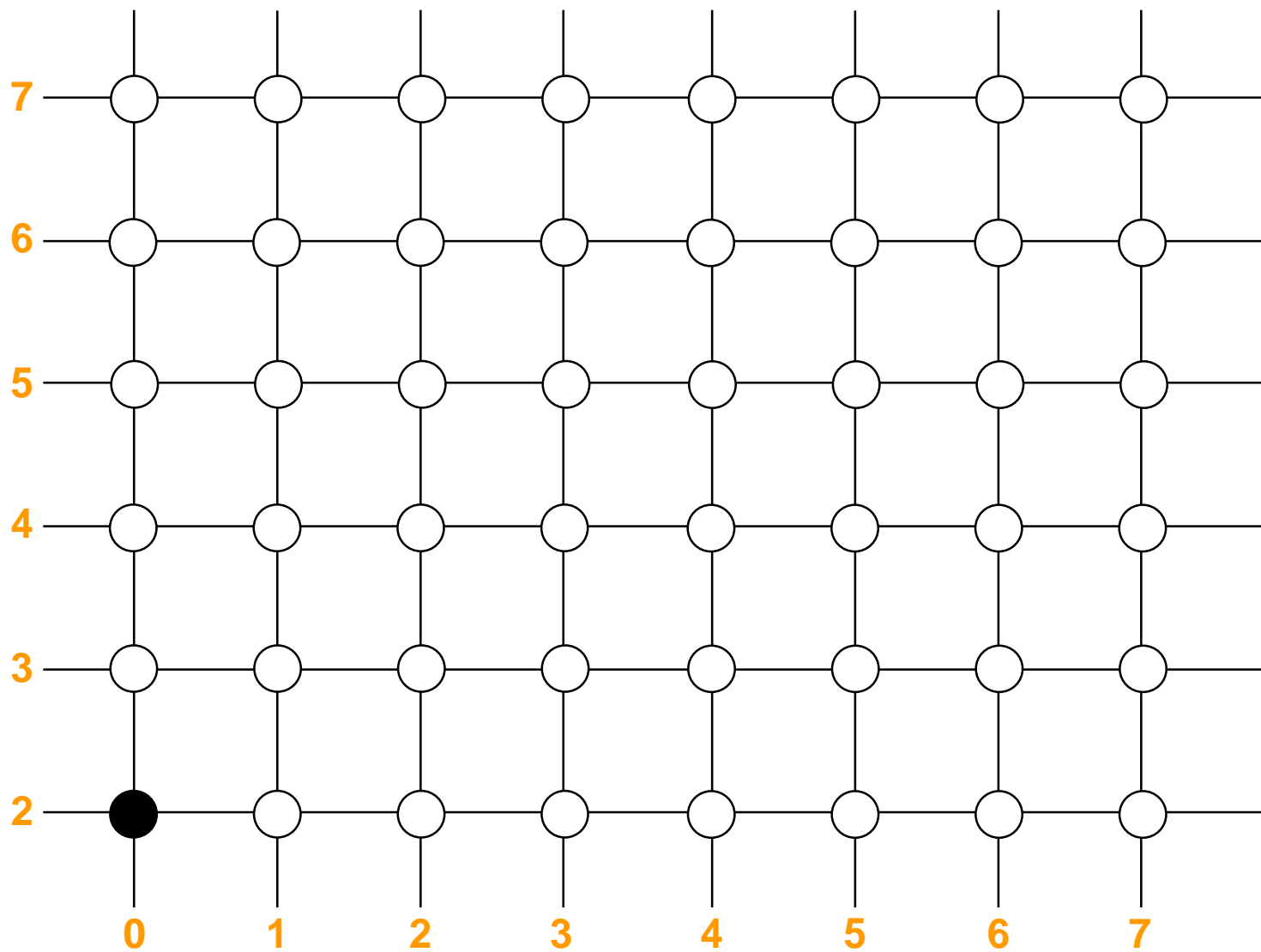


Computer Graphics: Line Drawing Algorithms

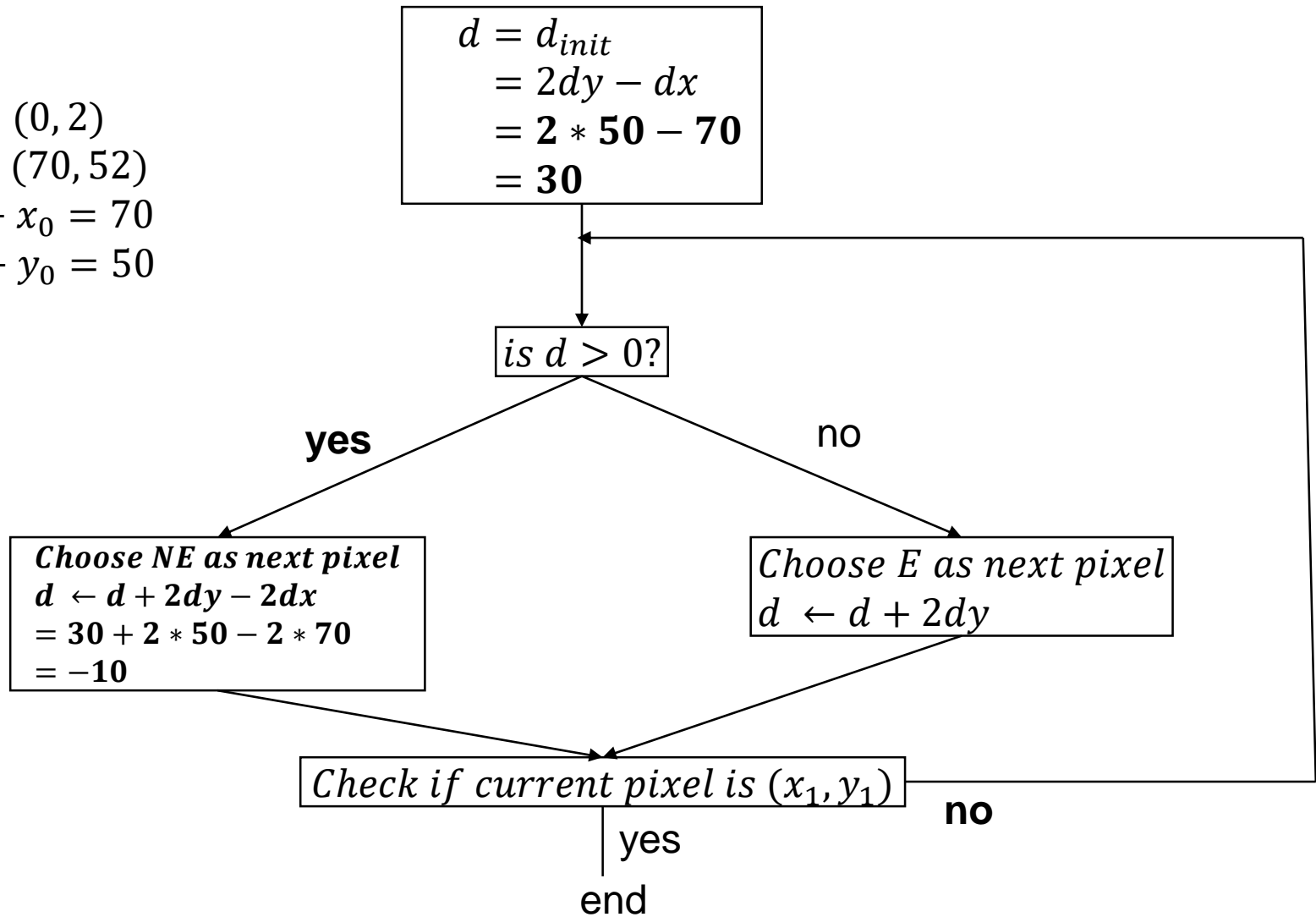
Scan Conversion Algorithms
(Midpoint Line)

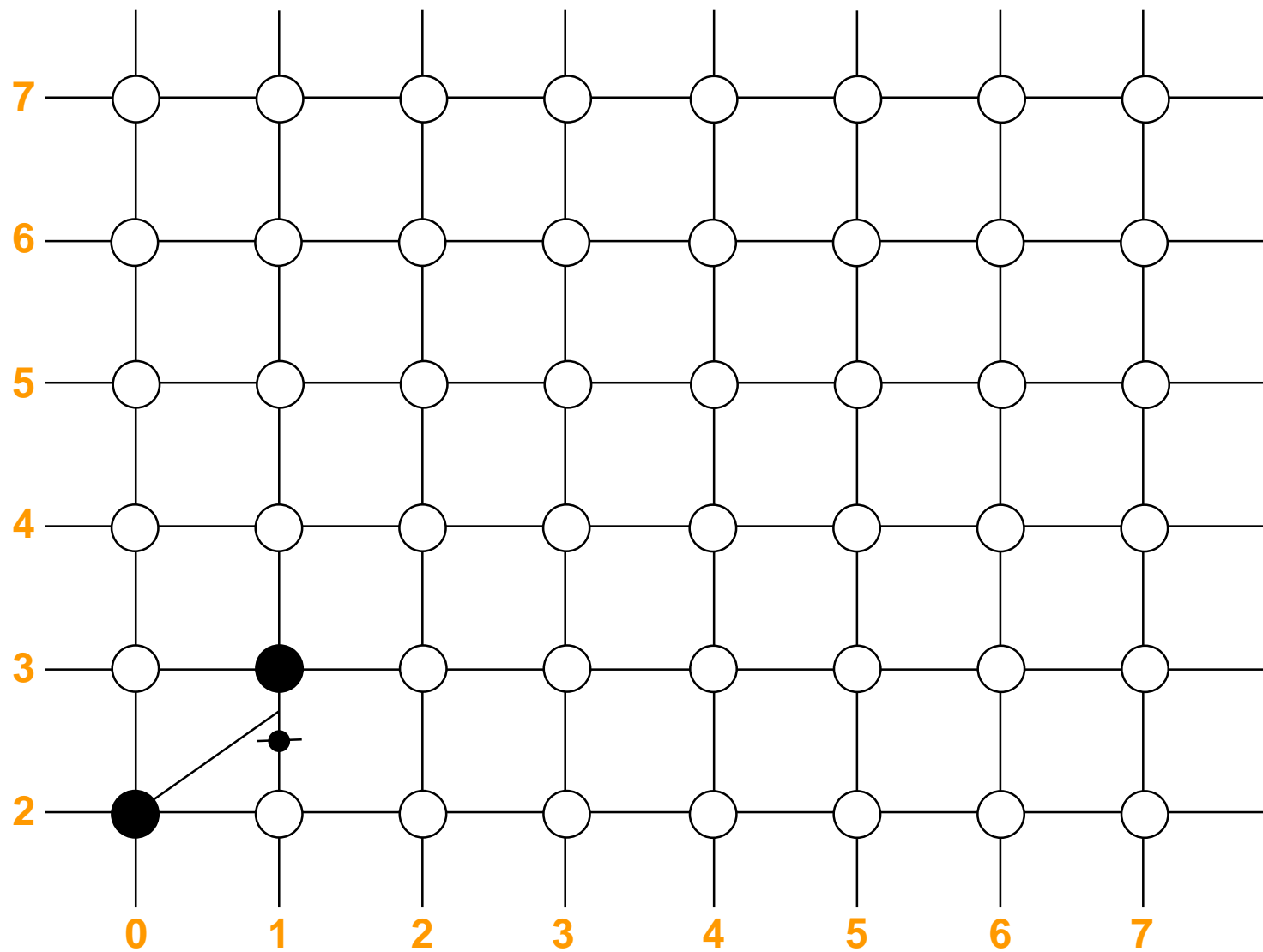
Find out the first 7 pixels of the line segment starting from (0, 2) to (70, 52) using midpoint line algorithm



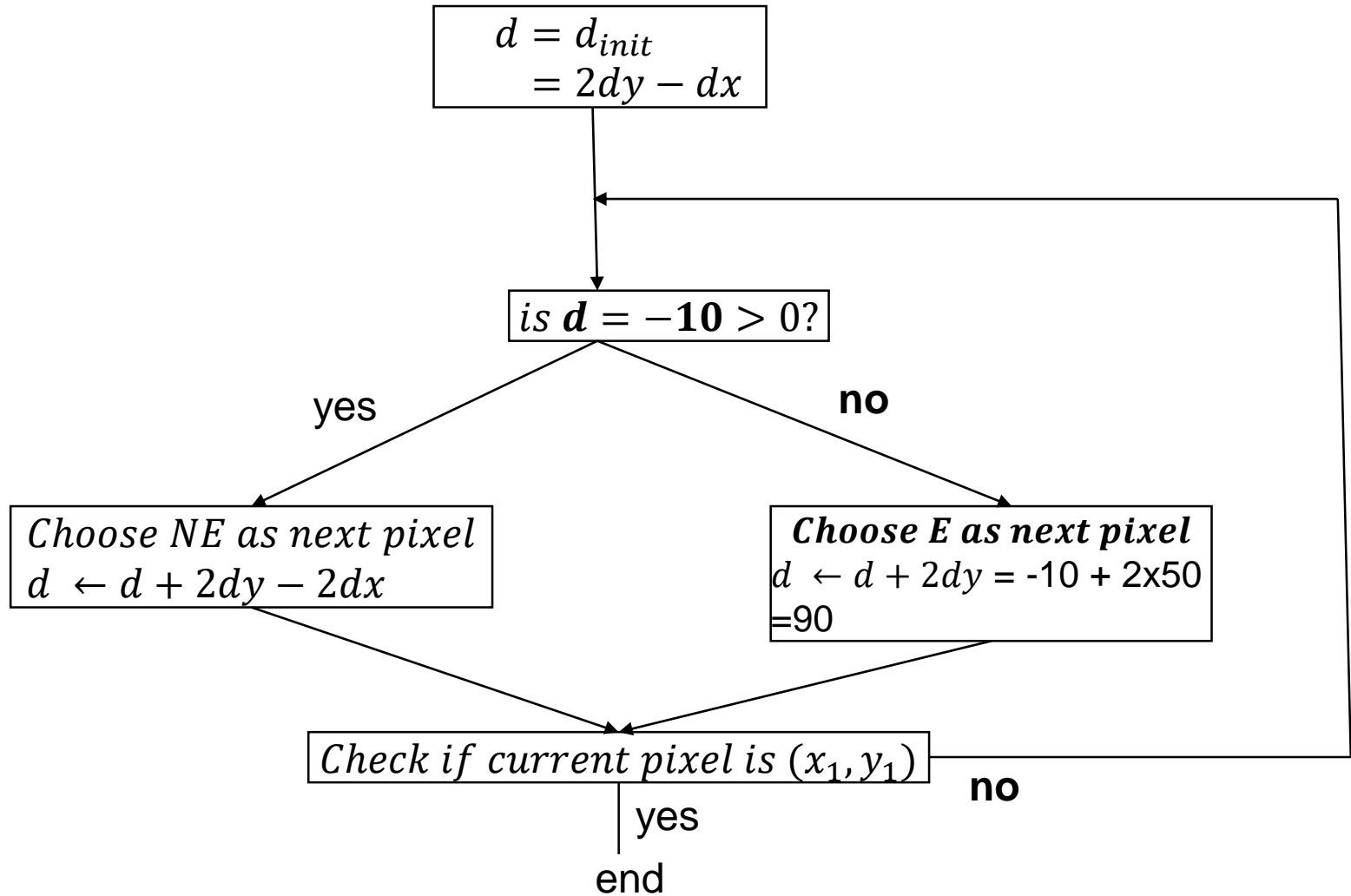
[illegible]

$(x_0, y_0) = (0, 2)$
 $(x_1, y_1) = (70, 52)$
 $dx = x_1 - x_0 = 70$
 $dy = y_1 - y_0 = 50$

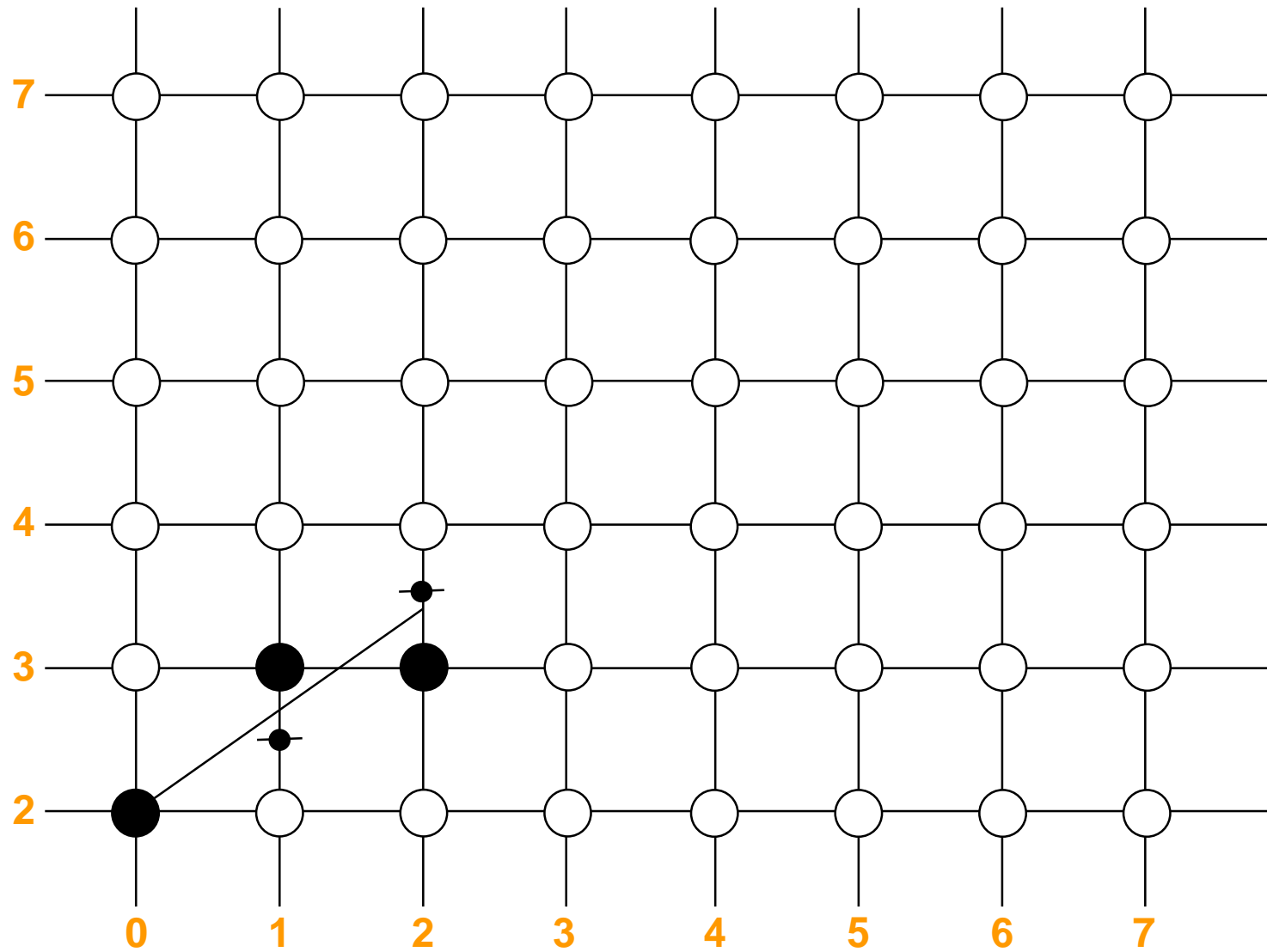




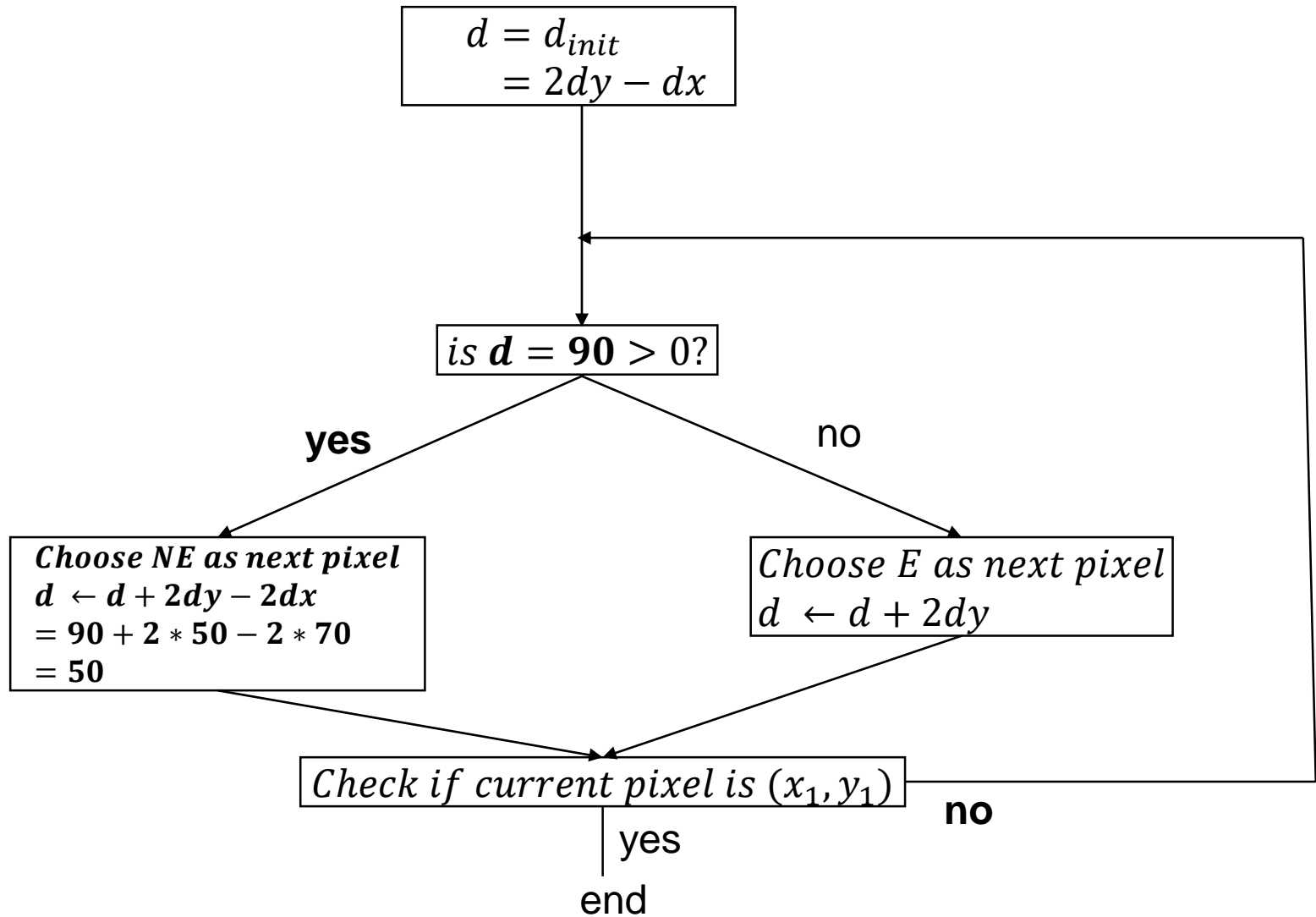
$dy = 50$
 $dx = 70$



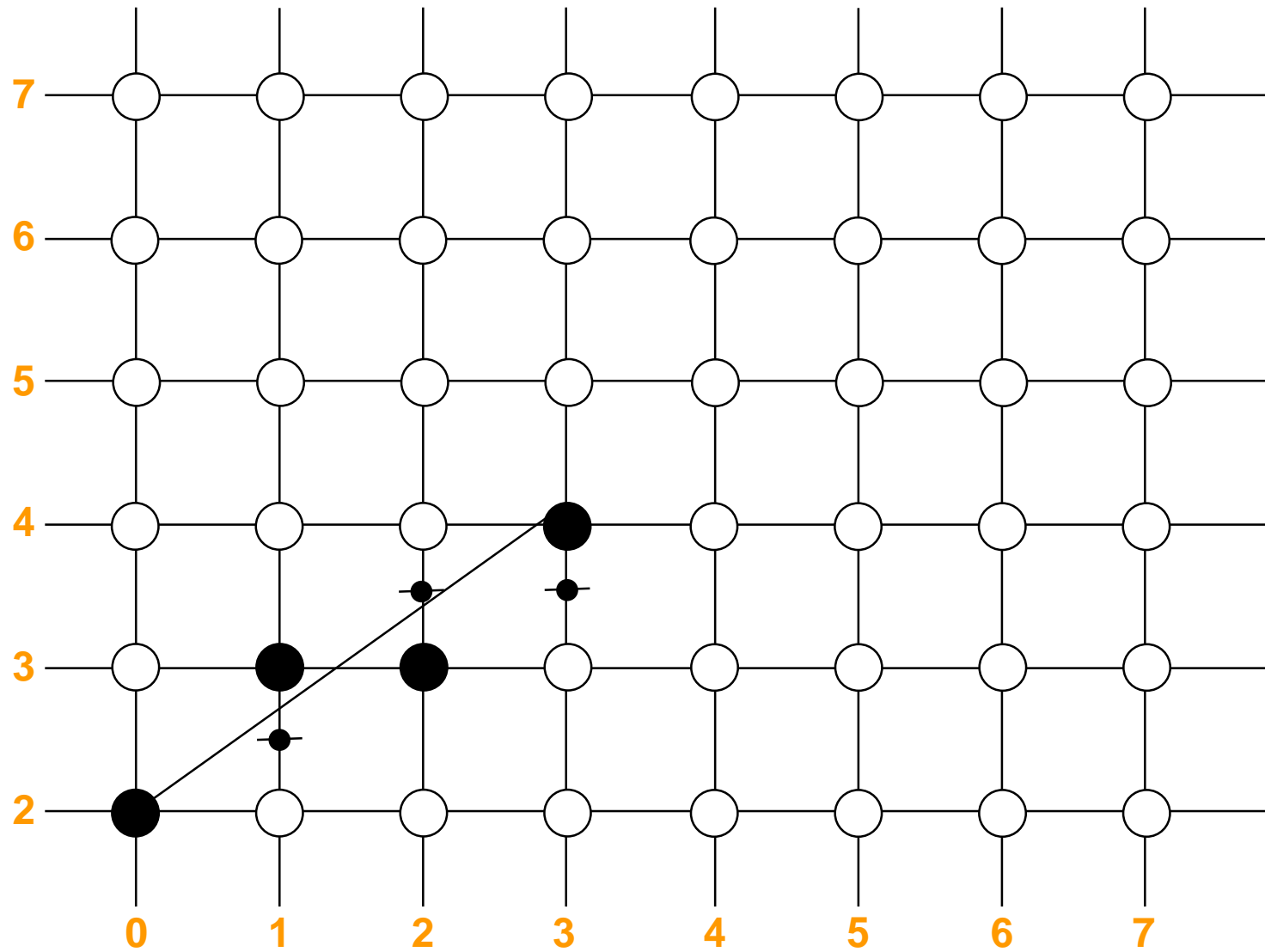
x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30+2 \times 50-2 \times 70 = -10$	(0, 2)
1	3	-10	E	$-10+2 \times 50 = 90$	(1, 3)
2	3				



x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30+2 \times 50-2 \times 70 = -10$	(0, 2)
1	3	-10	E	$-10+2 \times 50 = 90$	(1, 3)
2	3				

$dy = 50$
 $dx = 70$ 

x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30+2 \times 50-2 \times 70 = -10$	(0, 2)
1	3	-10	E	$-10+2 \times 50 = 90$	(1, 3)
2	3	90	NE	$90+2 \times 50-2 \times 70 = 50$	(2, 3)
3	4				



$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30+2 \times 50-2 \times 70 = -10$	(0, 2)
1	3	-10	E	$-10+2 \times 50 = 90$	(1, 3)
2	3	90	NE	$90+2 \times 50-2 \times 70 = 50$	(2, 3)
3	4				

$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

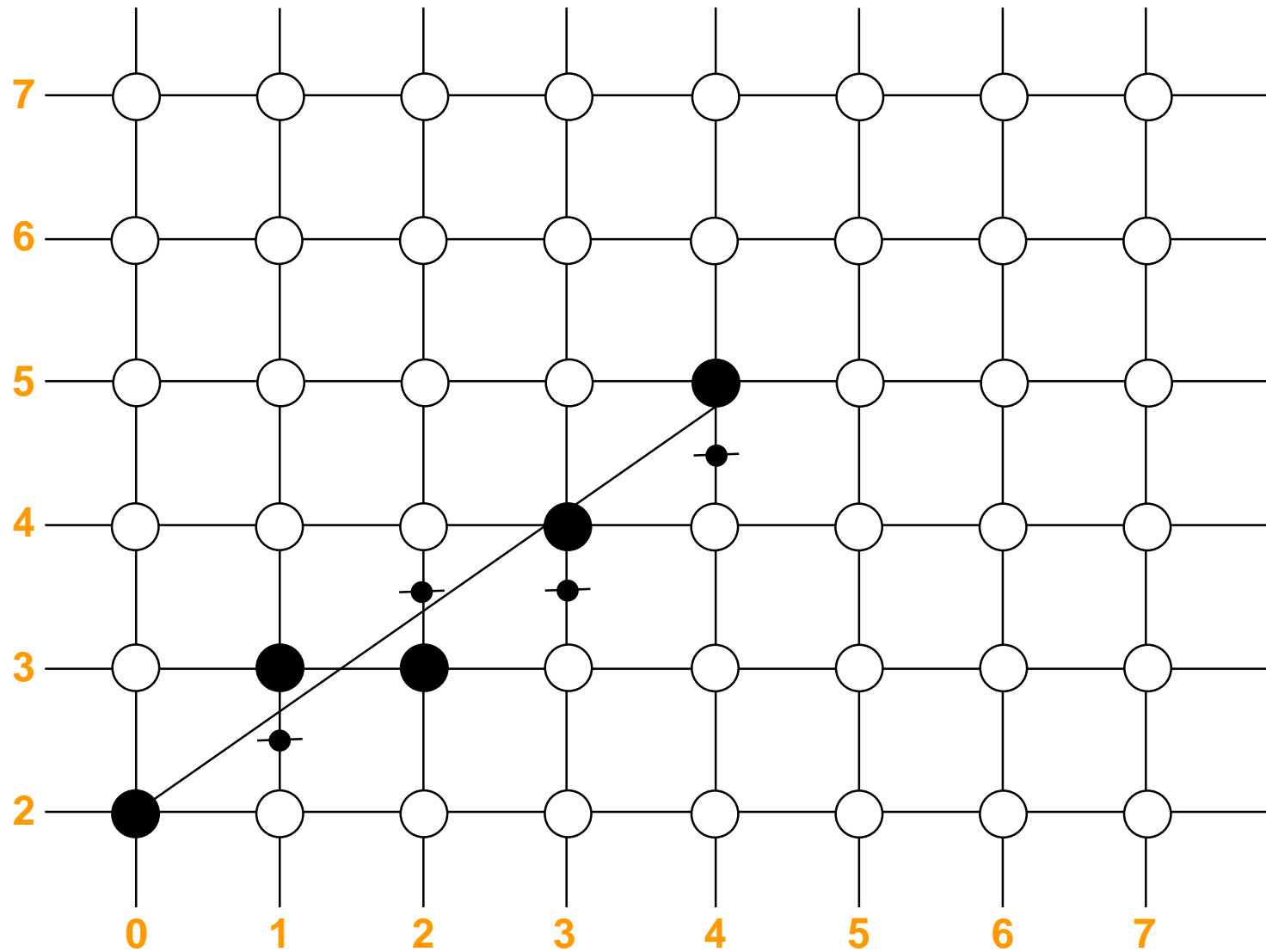
$$\Delta d_E = 2dy = 2.50 = 100$$

x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4				

$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

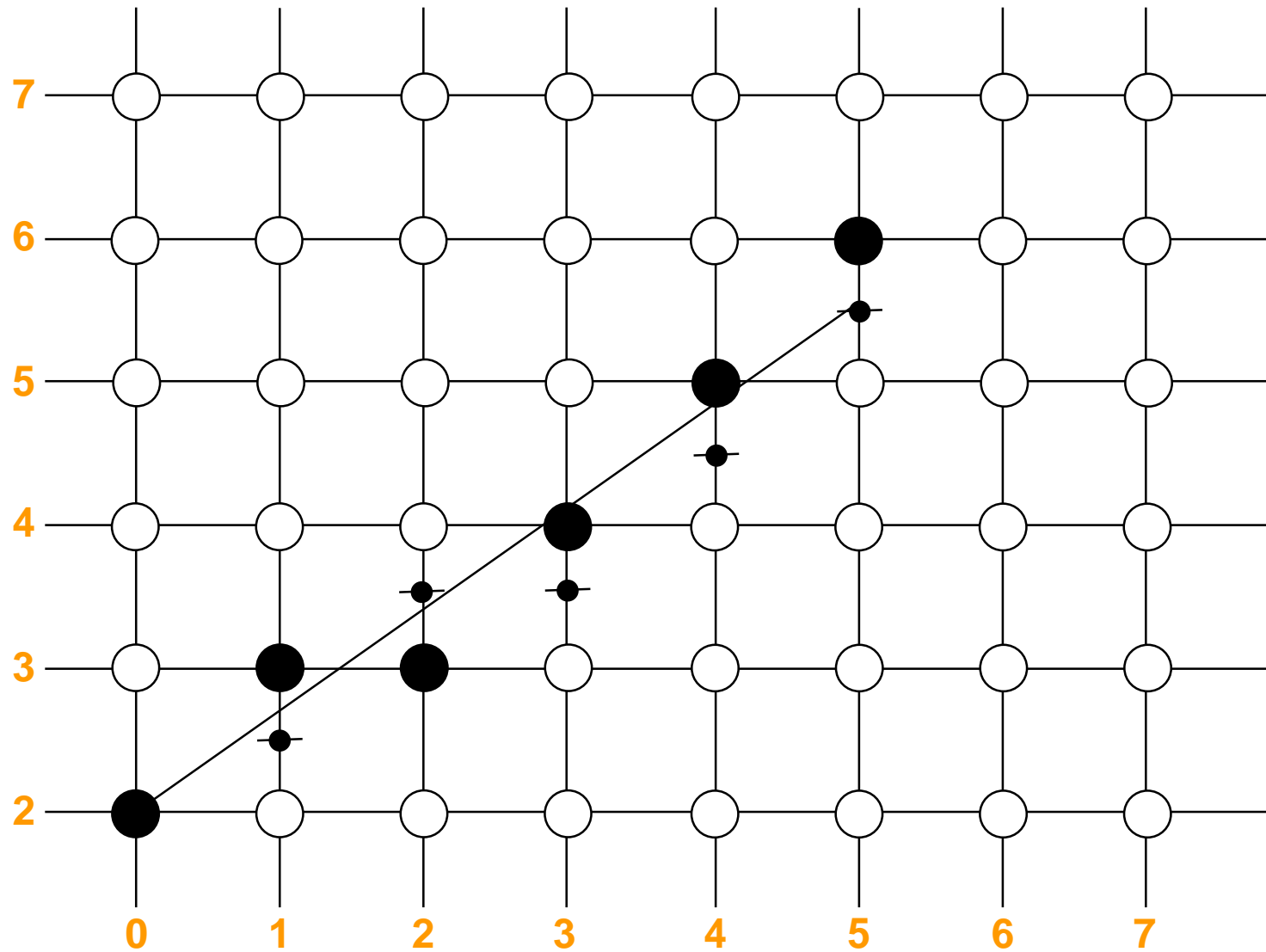
x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4	50	NE	$50 + \Delta d_{NE} = 10$	(3, 4)
4	5				



$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

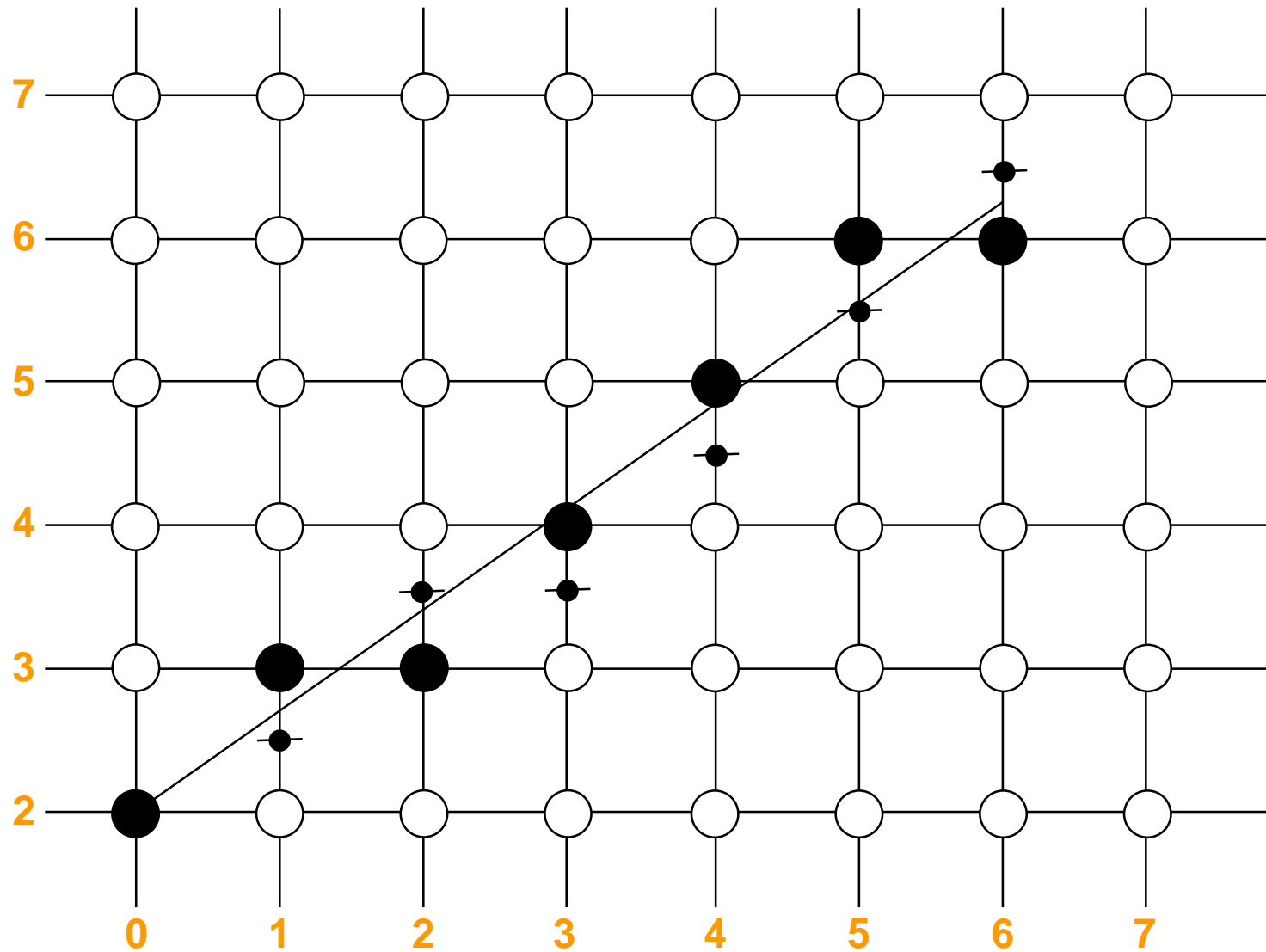
x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4	50	NE	$50 + \Delta d_{NE} = 10$	(3, 4)
4	5	10	NE	$10 + \Delta d_{NE} = -30$	(4, 5)
5	6				



$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

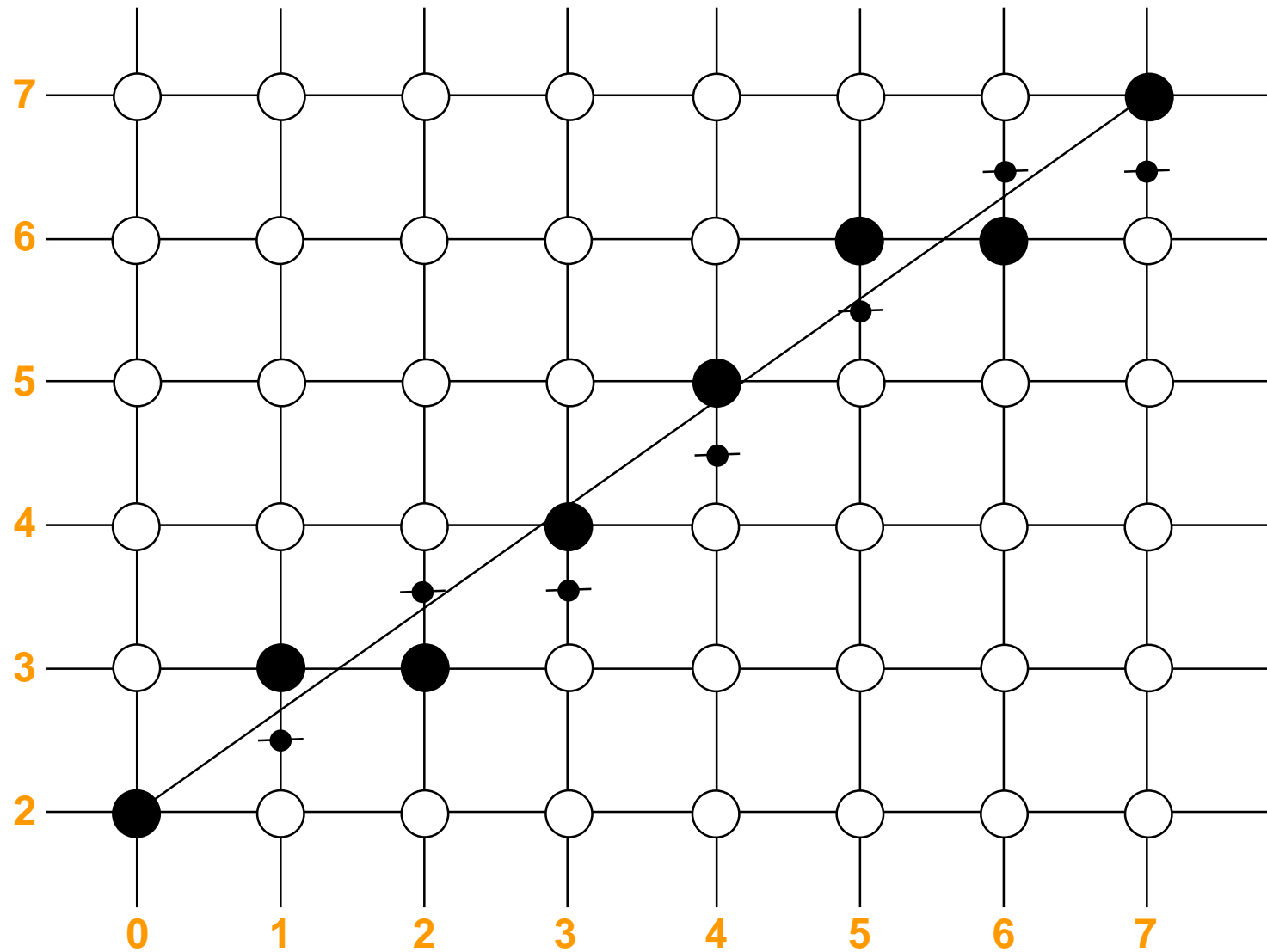
x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4	50	NE	$50 + \Delta d_{NE} = 10$	(3, 4)
4	5	10	NE	$10 + \Delta d_{NE} = -30$	(4, 5)
5	6	-30	E	$-30 + \Delta d_E = 70$	(5, 6)
6	6				



$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4	50	NE	$50 + \Delta d_{NE} = 10$	(3, 4)
4	5	10	NE	$10 + \Delta d_{NE} = -30$	(4, 5)
5	6	-30	E	$-30 + \Delta d_E = 70$	(5, 6)
6	6	70	NE	$70 + \Delta d_{NE} = 30$	(6, 6)
7	7				



$$d_{init} = 2dy - dx = 2.50 - 70 = 30$$

$$\Delta d_{NE} = 2dy - 2dx = 2.50 - 2.70 = -40$$

$$\Delta d_E = 2dy = 2.50 = 100$$

x	y	d	NE(+1,+1)/ E(+1,0)	d updating	Pixel
0	2	30	NE	$30 + \Delta d_{NE} = -10$	(0, 2)
1	3	-10	E	$-10 + \Delta d_E = 90$	(1, 3)
2	3	90	NE	$90 + \Delta d_{NE} = 50$	(2, 3)
3	4	50	NE	$50 + \Delta d_{NE} = 10$	(3, 4)
4	5	10	NE	$10 + \Delta d_{NE} = -30$	(4, 5)
5	6	-30	E	$-30 + \Delta d_E = 70$	(5, 6)
6	6	70	NE	$70 + \Delta d_{NE} = 30$	(6, 6)
7	7				