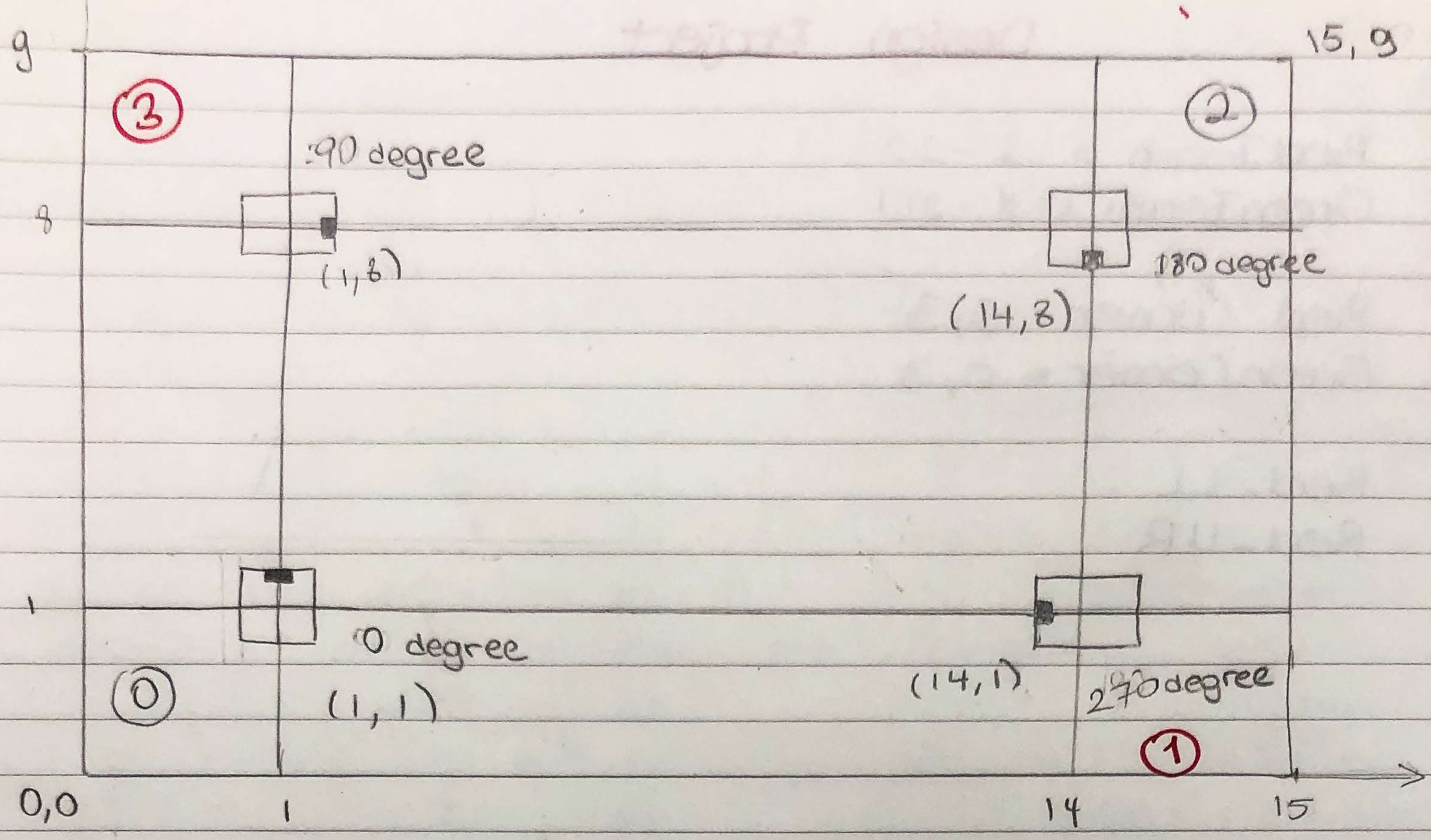
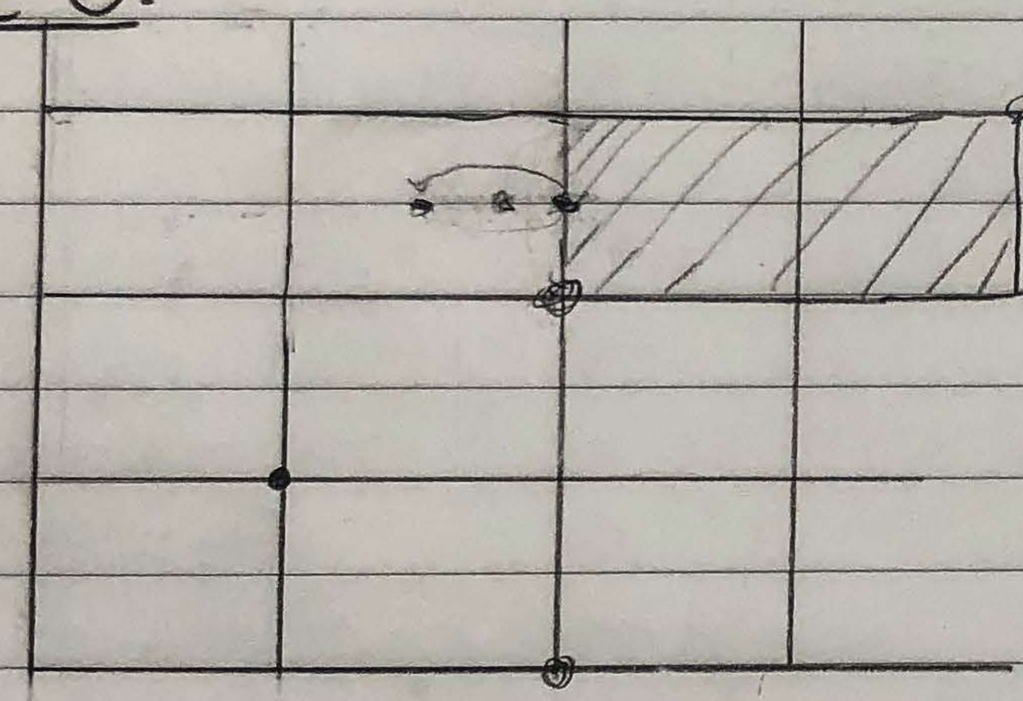
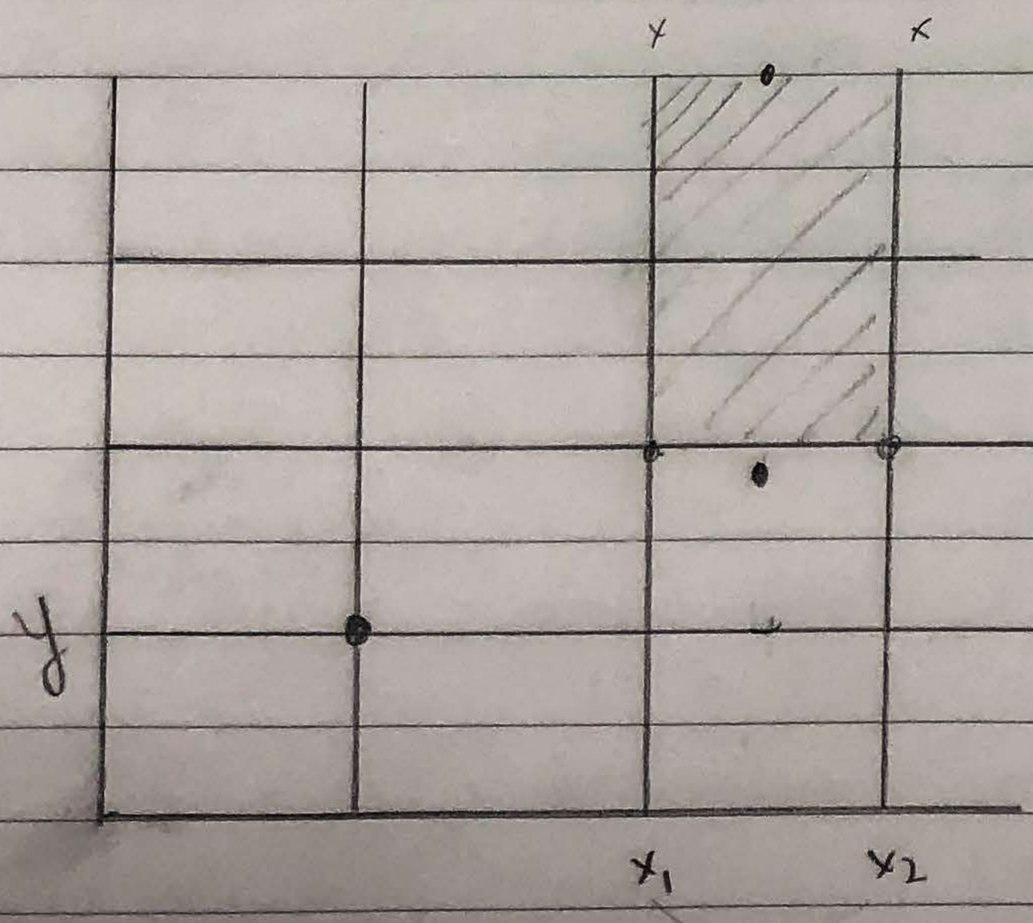


case 0:



if (Horizontal)
avX = LL_X
avY = $\frac{LLy + URy}{2}$ ← math abs

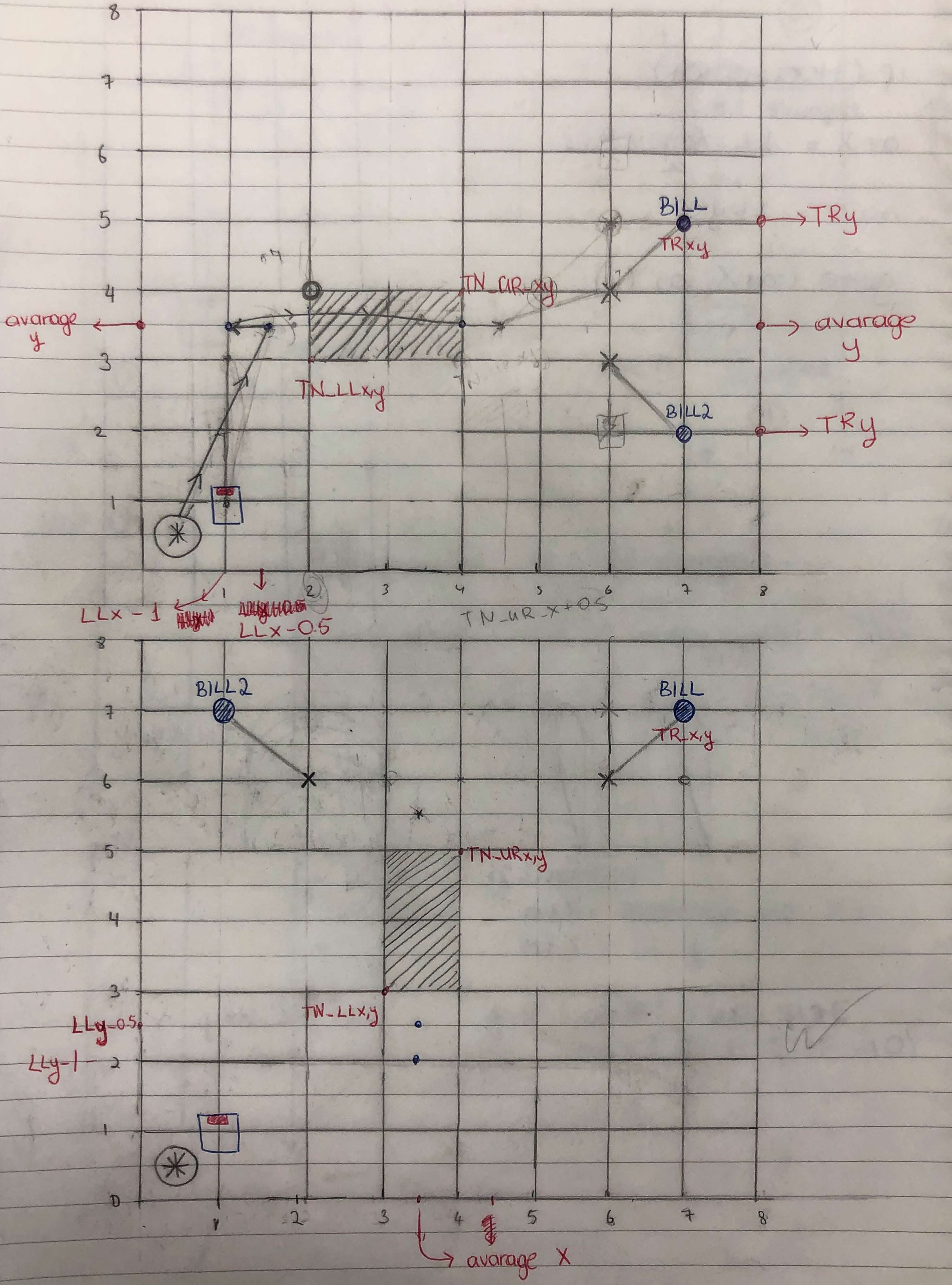
goto (avX * TILE_SIZE -10
avY * TILE_SIZE)



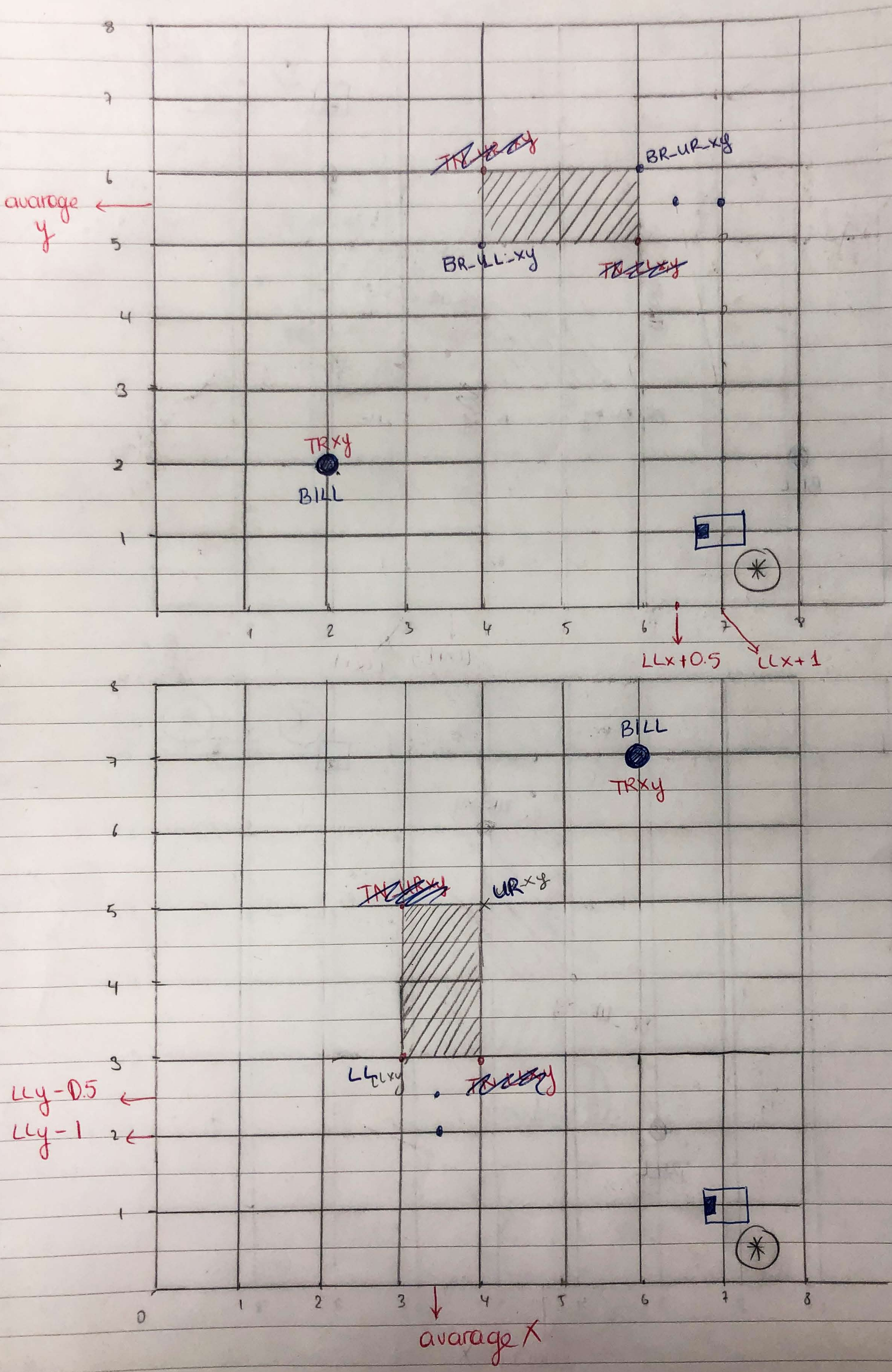
if (vertical)
avX = avarage of Xs
avY = LL_y - 10

goto (avX * TILE_SIZE,
avY * TILE_SIZE -10)

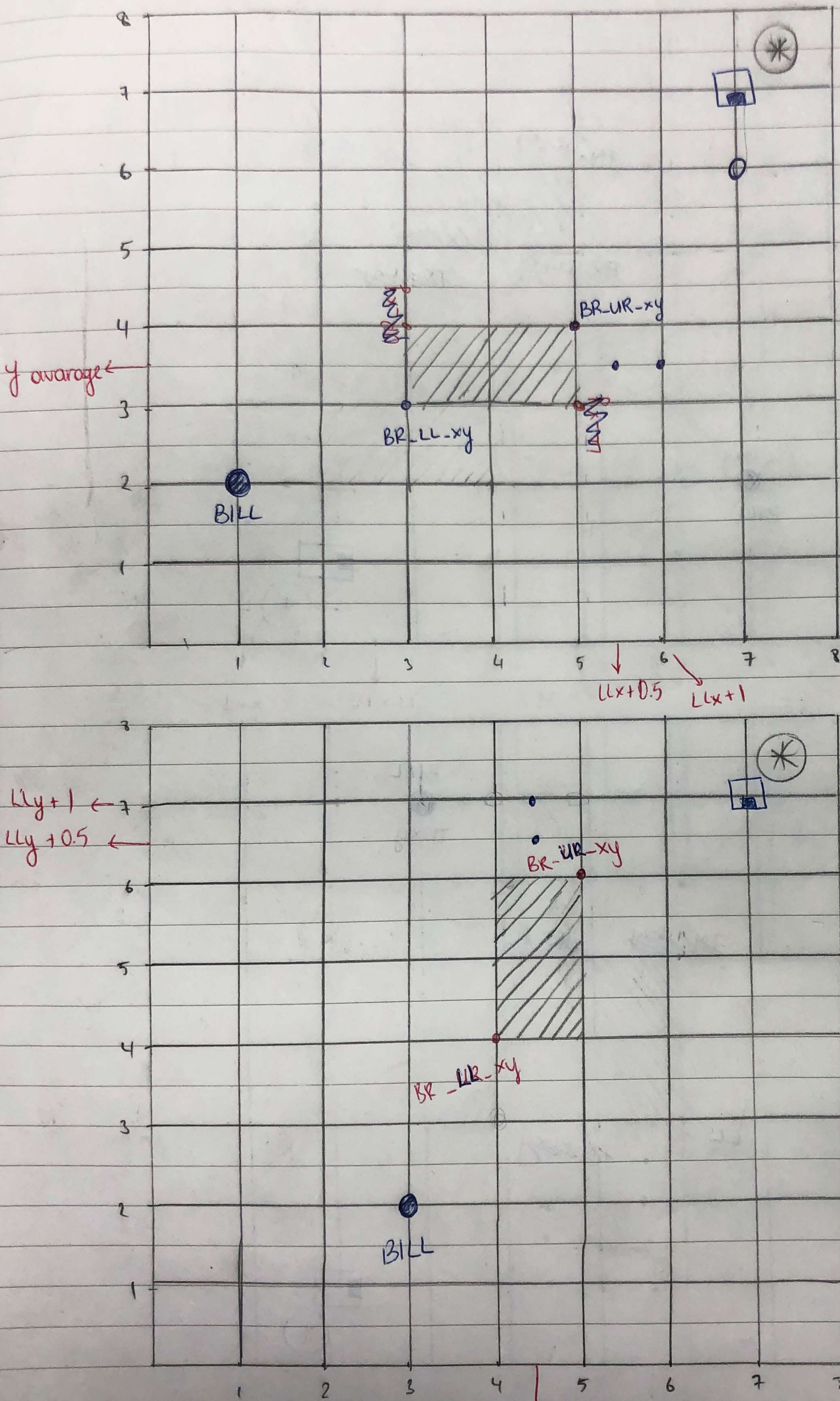
case 0


BILL
TRxy
TRy
TN_UR_xy
average y
average y
TN_LLxy
BILL2
TRy
LLx - 1
LLx - 0.5
TN_UR_x+0.5
BILL2
BILL
TR_x,y
TN_URx,y
TN_LLx,y
LLy-0.5
LLy-1
average X

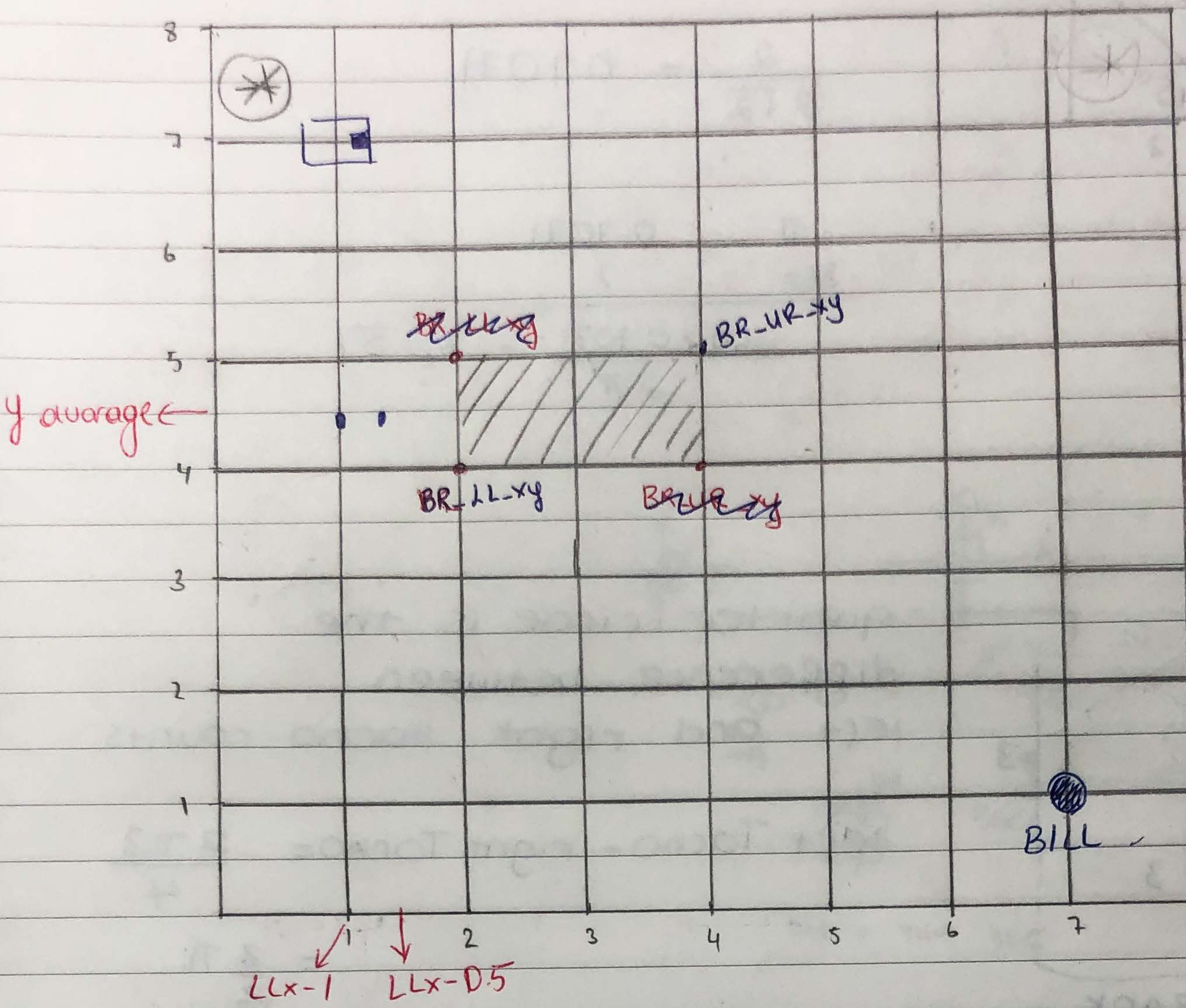
Case 1

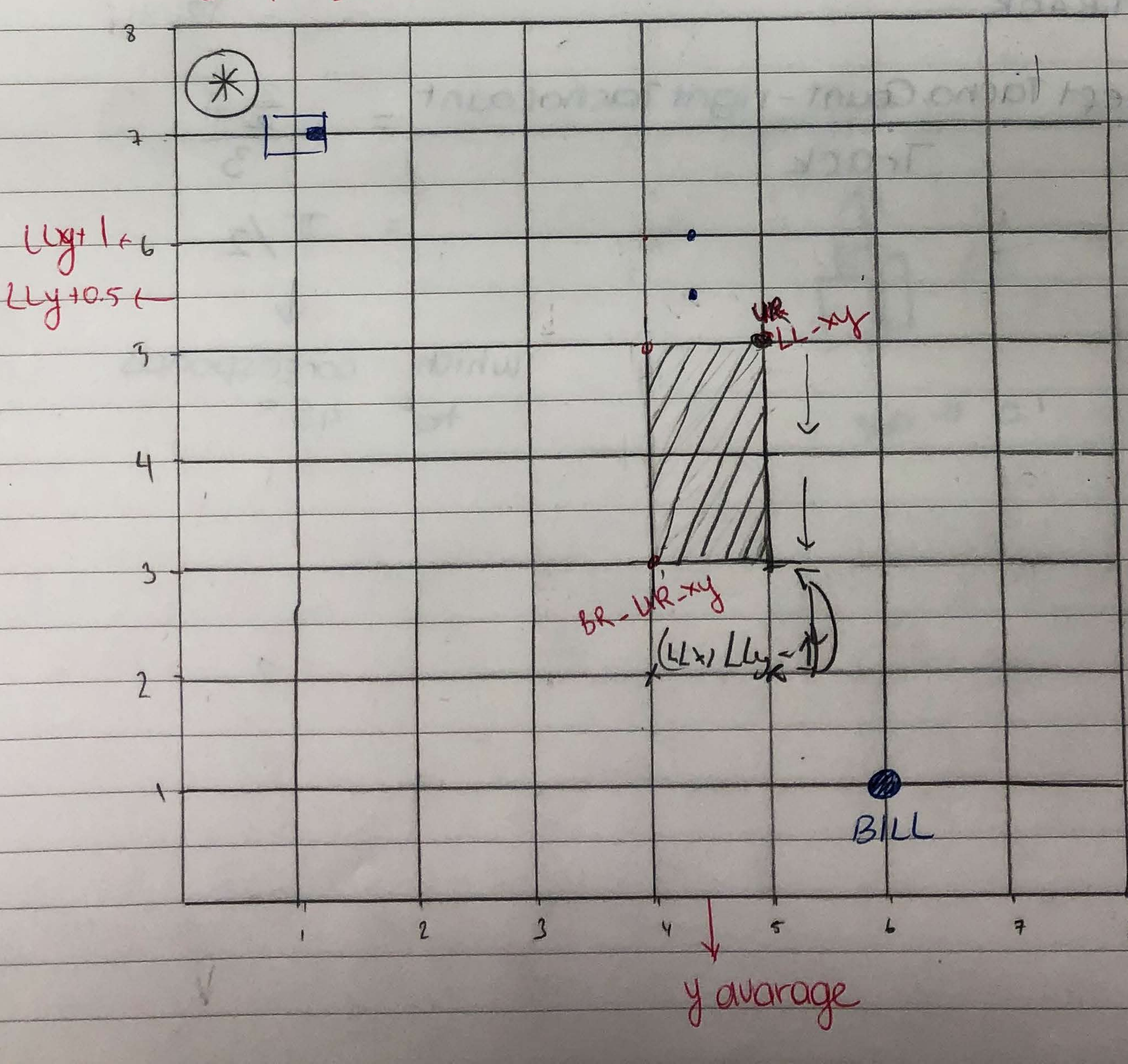

TRXY
BILL
BR_UR_xy
BR_LL_xy
average y
LLx+0.5
LLx+1
BILL
TRXY
UR_xy
LLy-0.5
LLy-1
average X

case 2:

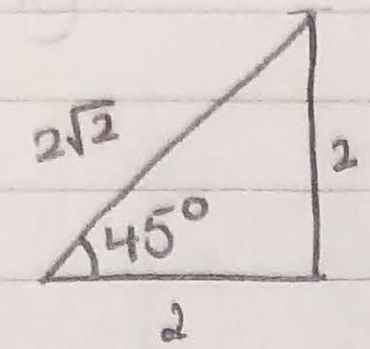

BR_UR-xy
BR_LL-xy
y average
BILL
LLx+0.5
LLx+1
LLy+1
LLy+0.5
BR_UR-xy
BR_LL-xy
BILL
average X

case 3:


8
7
6
5
4
3
2
1
y average
BR_UR_xy
BR_LL_xy
BILL
1
2
3
4
5
6
7
8
LLx-1
LLx-0.5


8
7
6
5
4
3
2
1
LLy+1
LLy+0.5
UR LL-xy
BR_UR-xy
(LLx) LLy-1
BILL
1
2
3
4
5
6
7
8
y average

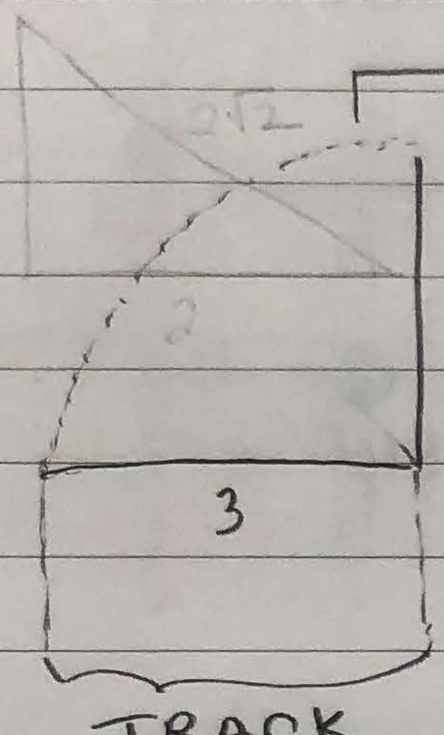
(*)



$$\frac{2}{2\sqrt{2}} = 0.7071$$

2π	0.7071
360	?

$$\frac{360 \times 0.7071}{2\pi} = 40.51$$



→ quarter circle is the difference between left and right tacho counts

left Tacho - right Tacho = $\frac{3\pi 3}{4}$

$= \frac{3}{2}\pi$

$= 1.884$

$$\text{delta T} = \frac{\text{left Tacho Count} - \text{right Tacho Count}}{\text{Track}} = \frac{\frac{3}{2}\pi}{3}$$

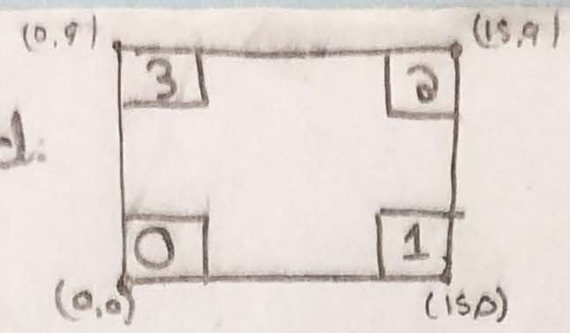
$= \pi/2$

↓

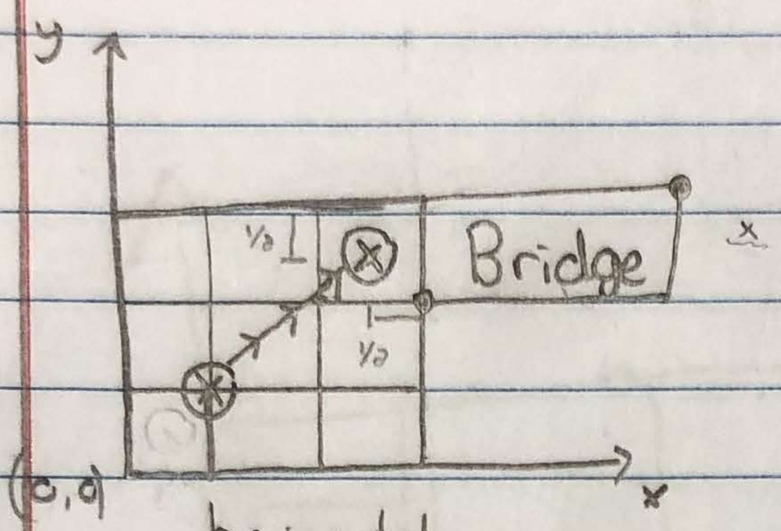
which corresponds to 45°

travelToBridge()

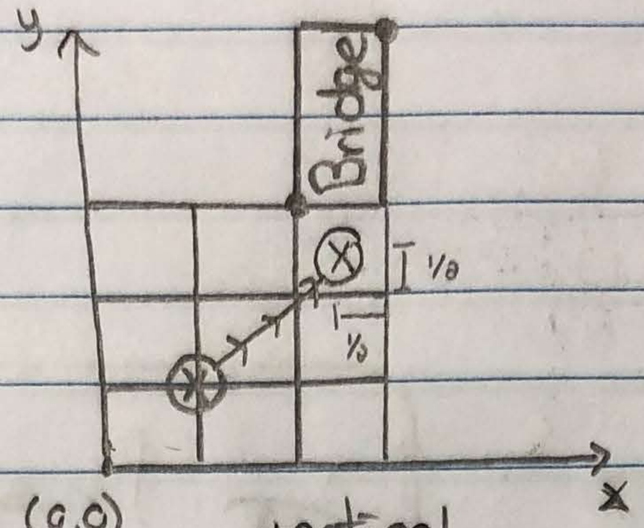
Grid:



Case: Corner 0:

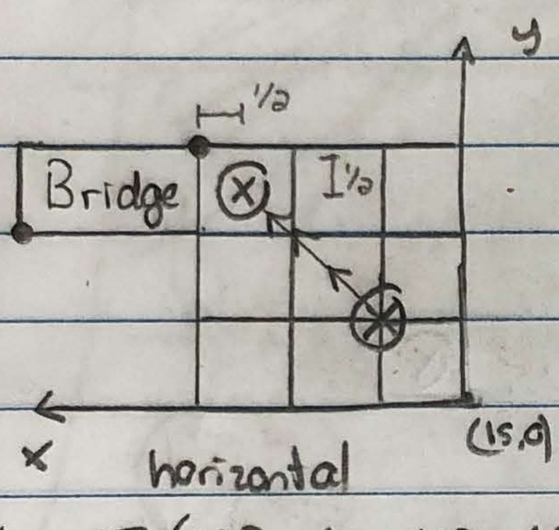


travelTo(LLx-1/2, LLy+1/2)

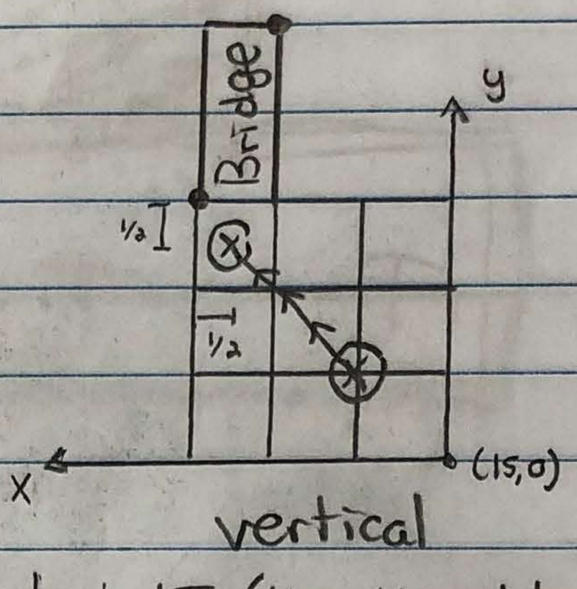


travelTo(LLx+1/2, LLy-1/2)

Case: Corner 1:

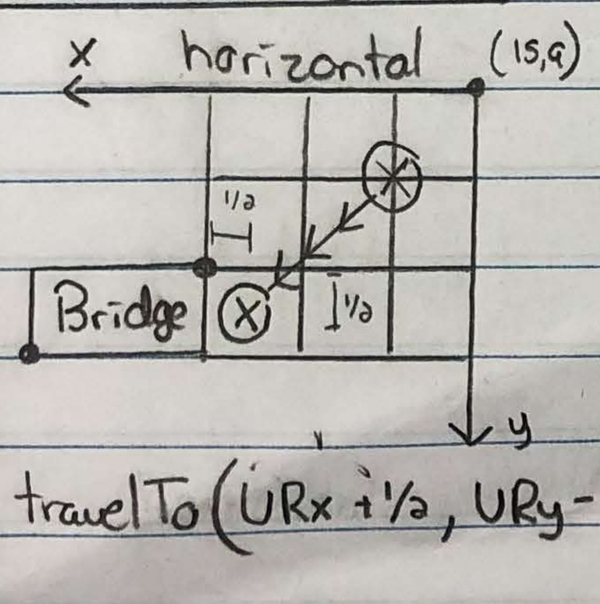


travelTo(URx+1/2, URy-1/2)

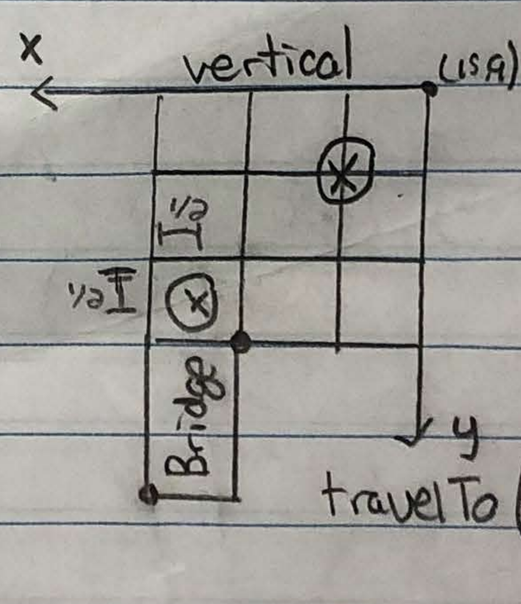


travelTo(LLx+1/2, LLy-1/2)

Case: Corner 2:

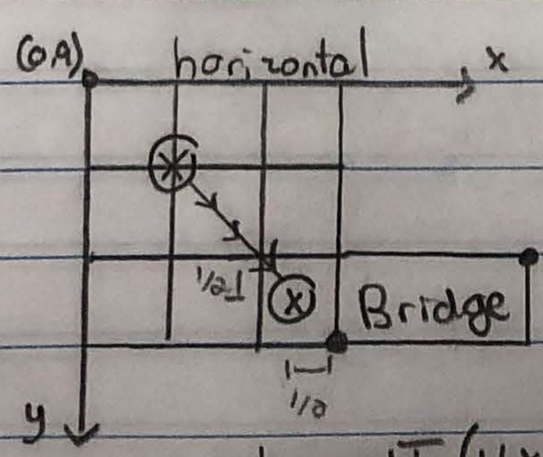


travelTo(URx+1/2, URy-1/2)

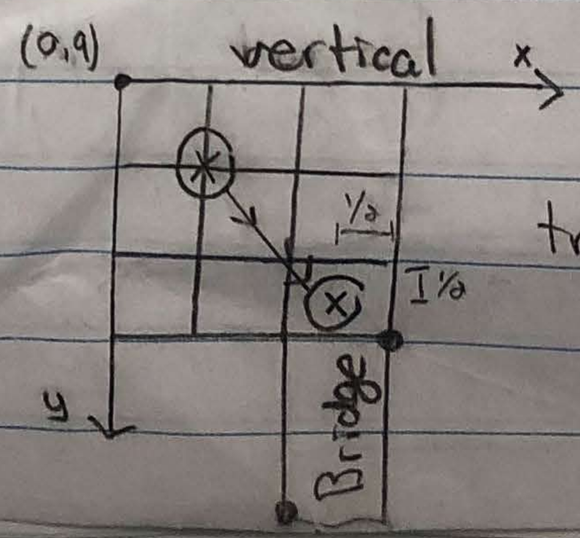


travelTo(URx-1/2, URy+1/2)

Case: Corner 3:



travelTo(LLx-1/2, LLy+1/2)



travelTo(URx-1/2, URy+1/2)

Lab 5 ring detection

Blue ring

	R	G	B
1	0.021764	0.070196	0.086274
2	0,028647	0,083725	0,092745
3	0,026666	0,082764	0.092764
4	0,028627	0,084705	0,092725
5	0,027647	0,082745	0,090980
6			
7			
8			
9			
10			
Mean:	0,026670	0,080827	0,091098

Green ring

	R	G	B
1	0,072941	0,120392	0,017843
2	0,070980	0,134117	0.021784
3	0,071960	0,135098	0,020784
4	0,070980	0,133137	0,019864
5	0,079803	0.137078	0.021784
6			
7			
8			
9			
10			
Mean:	0,073333	0,131964	0,020412

Yellow ring

	R	G	B
1	0.218843	0,123294	0,026666
2	0,229607	0,131968	0,032549
3	0,220215	0,114509	0,034705
4	0,223725	0,117254	0,026666
5	0,229607	0,139909	0,029607
6			
7			
8			
9			
10			
Mean	0,220399	0,125787	0,030039

Orange ring

	R	G	B
1	0,159803	0,038450	0,013745
2	0,169607	0,041176	0,013745
3	0,147156	0,038411	0,013764
4	0,153941	0,045098	0,014764
5	0,149019	0,043156	0,014725
6			
7			
8			
9			
10			
Mean	0,154905	0,041258	0,014145

* scale everything to integer ! => * 10^6

color classified as:

$$d_i = \sqrt{(S_R - M_R)^2 + (S_G - M_G)^2 + (S_B - M_B)^2}$$

(sample, mean)

S_x = measured sample
M_x = target ring mean RGB

=> To proceed: calculate d four times
1- Check if blue
2- Check if green
3- Check if yellow
4- Check if orange

Color calculus:

$$\left.\begin{aligned} d_{blue} &= \sqrt{(S_R - 26670)^2 + (S_G - 80827)^2 + (S_B - 91098)^2} \\ d_{green} &= \sqrt{(S_R - 73333)^2 + (S_G - 131964)^2 + (S_B - 20412)^2} \\ d_{yellow} &= \sqrt{(S_R - 220399)^2 + (S_G - 125787)^2 + (S_B - 30039)^2} \\ d_{orange} &= \sqrt{(S_R - 154905)^2 + (S_G - 41258)^2 + (S_B - 14145)^2} \end{aligned}\right\} = 0$$

* Range of acceptable values ? *
→ standard deviation (excel or by hand)
very long to compute

example: blue ring trial 2

$$d_{blue} = \sqrt{(1977)^2 + (2898)^2 + (1647)^2}$$

$$d_{blue} = 3875$$

range : [0, 10 000] ?

Scaled to light:

Blue ring: $\hat{R}_{mi} = \frac{26670}{124672,13} = 0,2139$

$\hat{G}_{mi} = \frac{80897}{124672,13} = 0,6483$

$\hat{B}_{mi} = \frac{91098}{124672,13} = 0,7307$ %

Green ring: $\hat{R}_{mi} = \frac{73\ 333}{192\ 344,6} = 0,4814$

$\hat{G}_{mi} = \frac{131\ 964}{152\ 344,6} = 0,8662$

$\hat{B}_{mi} = \frac{20\ 412}{152\ 344,6} = 0,1340$

Yellow ring: $\hat{R}_{mi} = \frac{220399}{255539,49} = 0,8624$

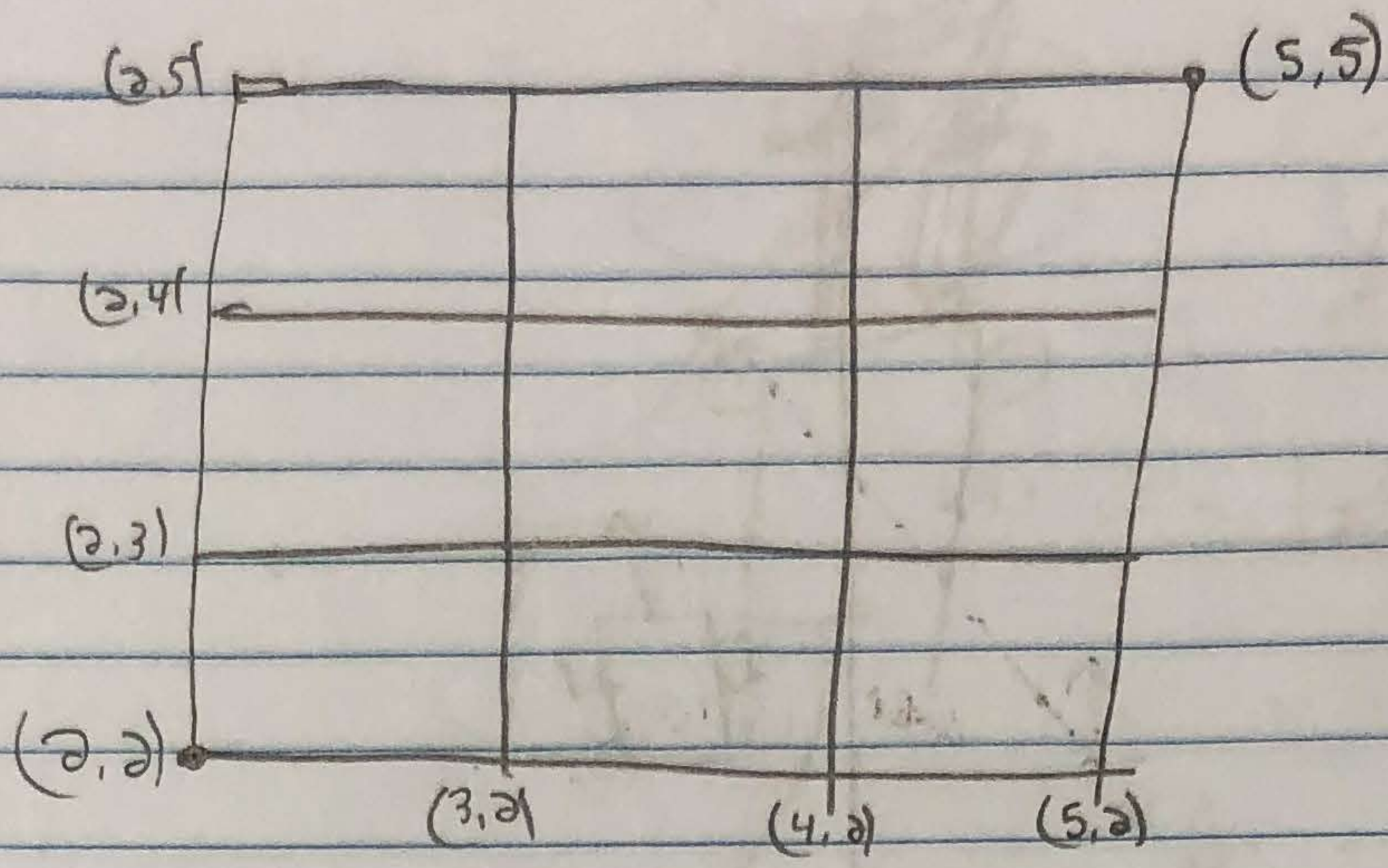
$\hat{G}_{mi} = \frac{125787}{255\ 539,49} = 0,4922$

$\hat{B}_{mi} = \frac{30\ 039}{255\ 539,49} = 0,1176$

Orange ring: $\hat{R}_{mi} = \frac{154905}{160\ 938,15} = 0,9626$

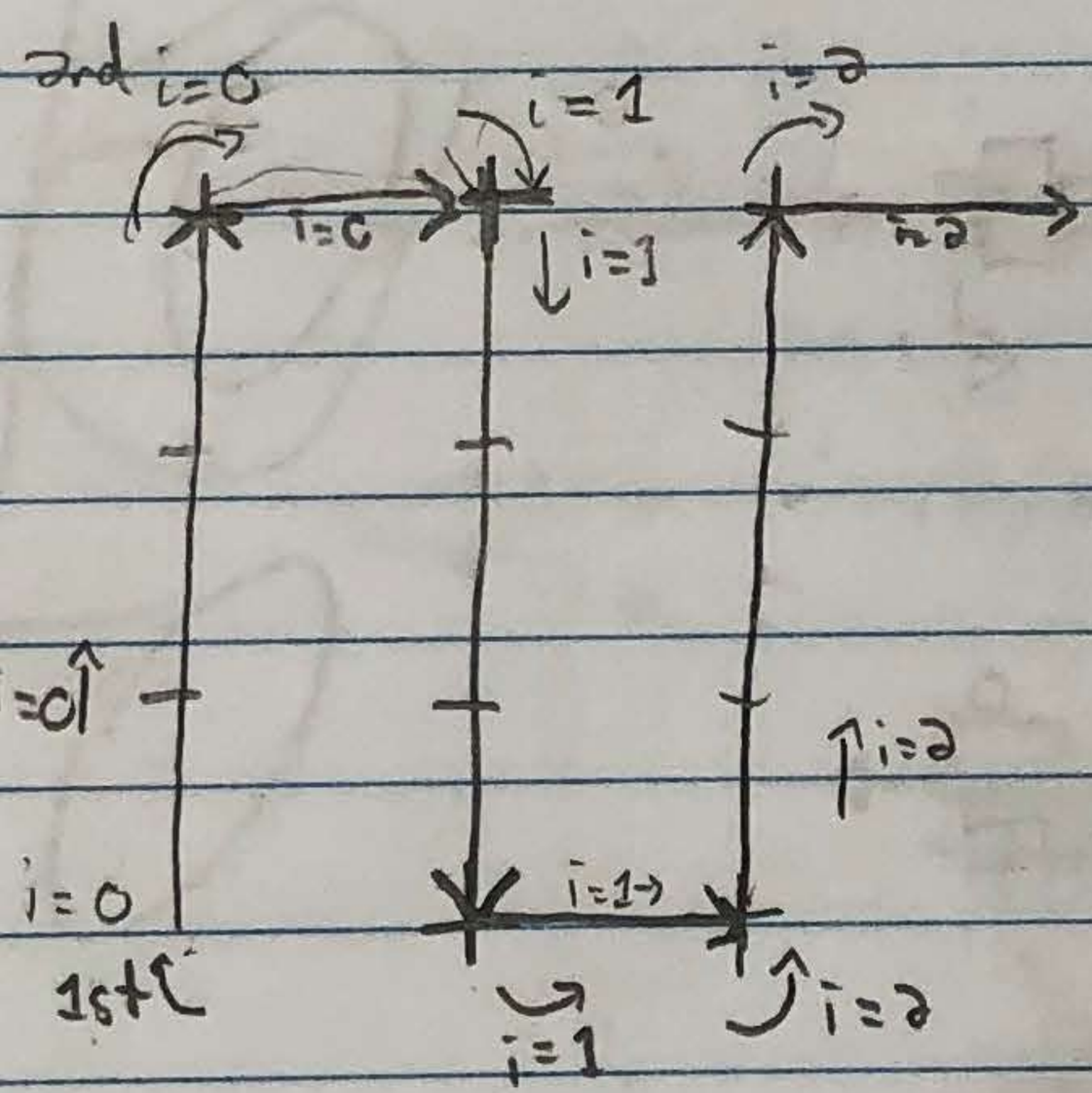
$\hat{G}_{mi} = \frac{41\ 258}{160\ 938,15} = 0,2564$

$\hat{B}_{mi} = \frac{14145}{160\ 938,15} = 0,0879$

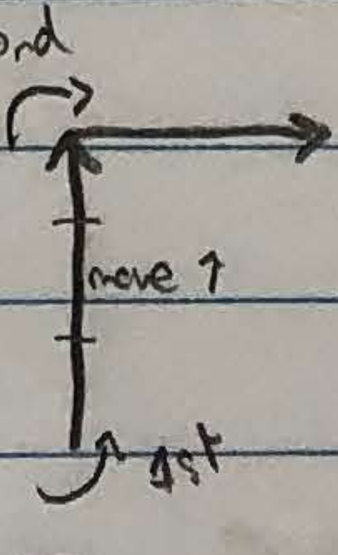


xCounter = 3 i = 1

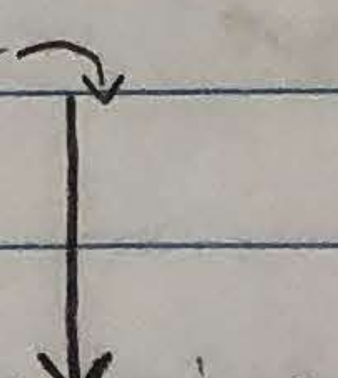
yCounter = 3 y = 1



if (i % 2 == 0) ⇒

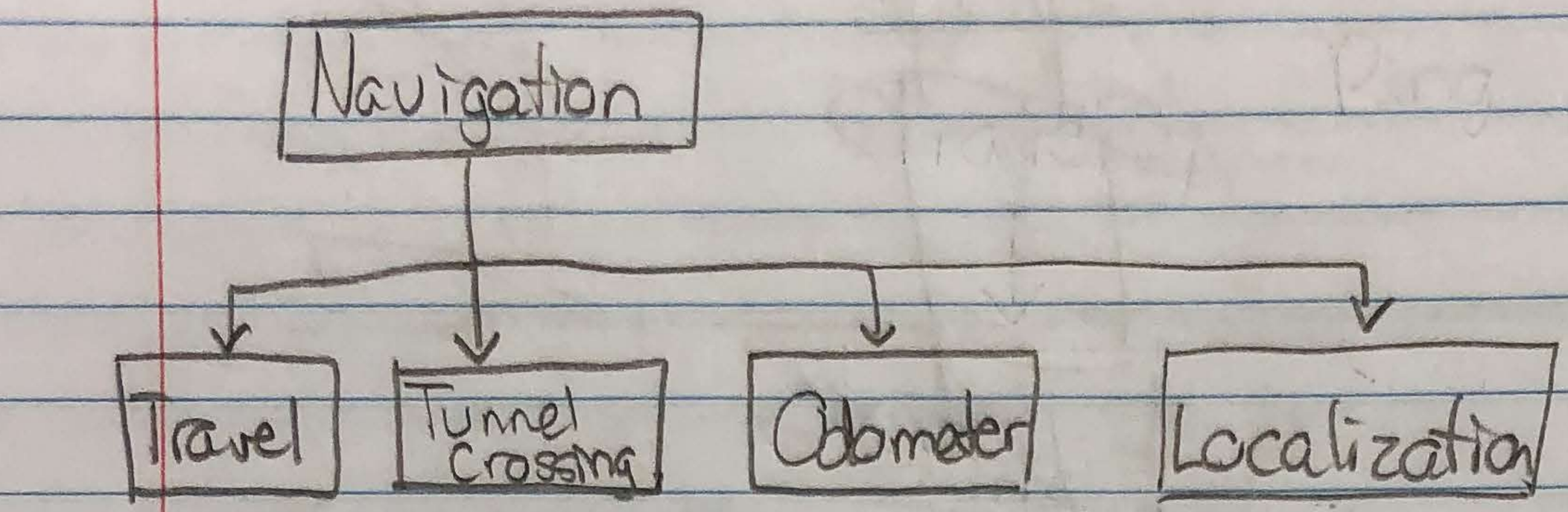


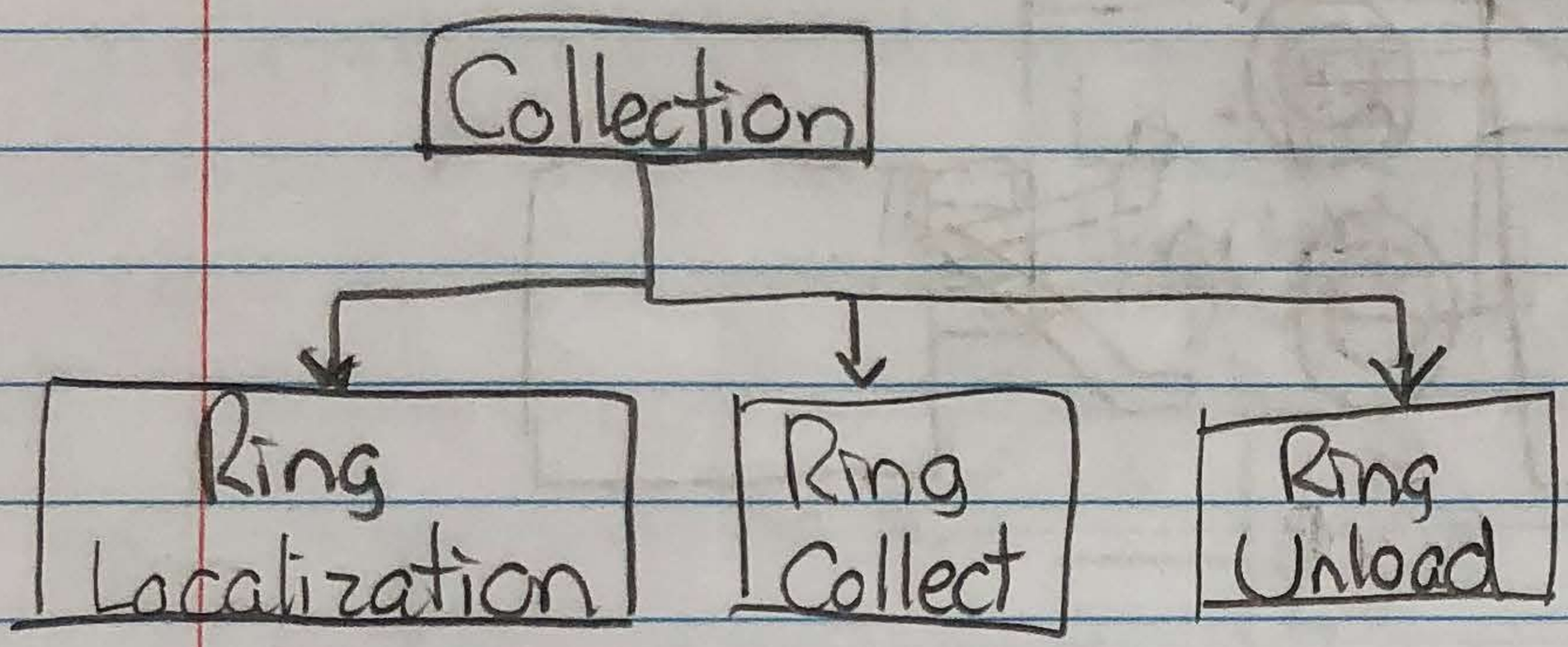
if (i % 2 != 0) ⇒



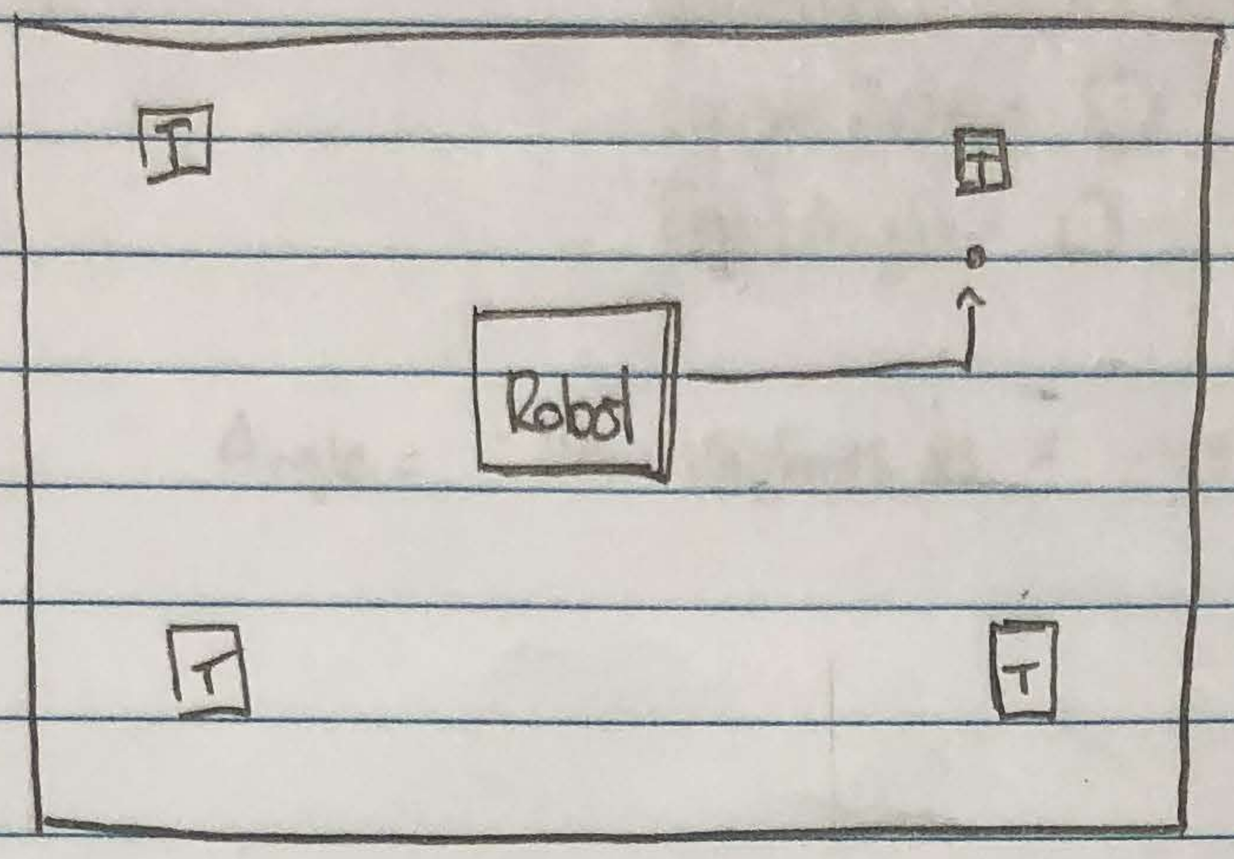
corrected!

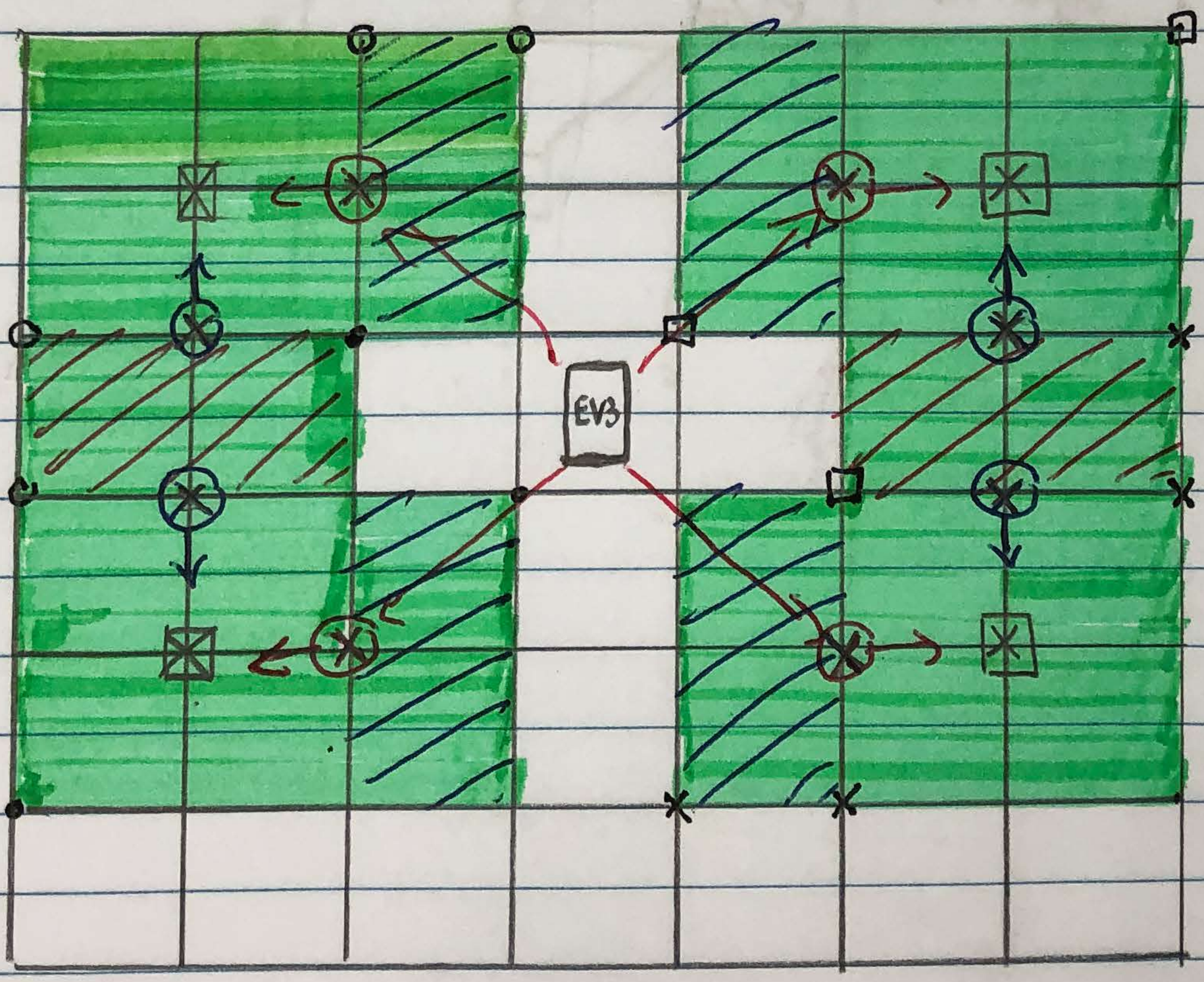
Basic functions - Block diagram



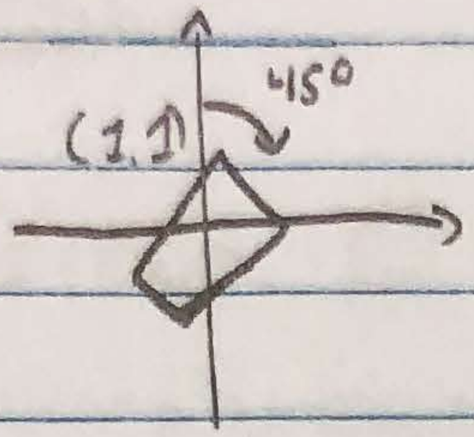


travelToRingSet();





travelTo(2,1)



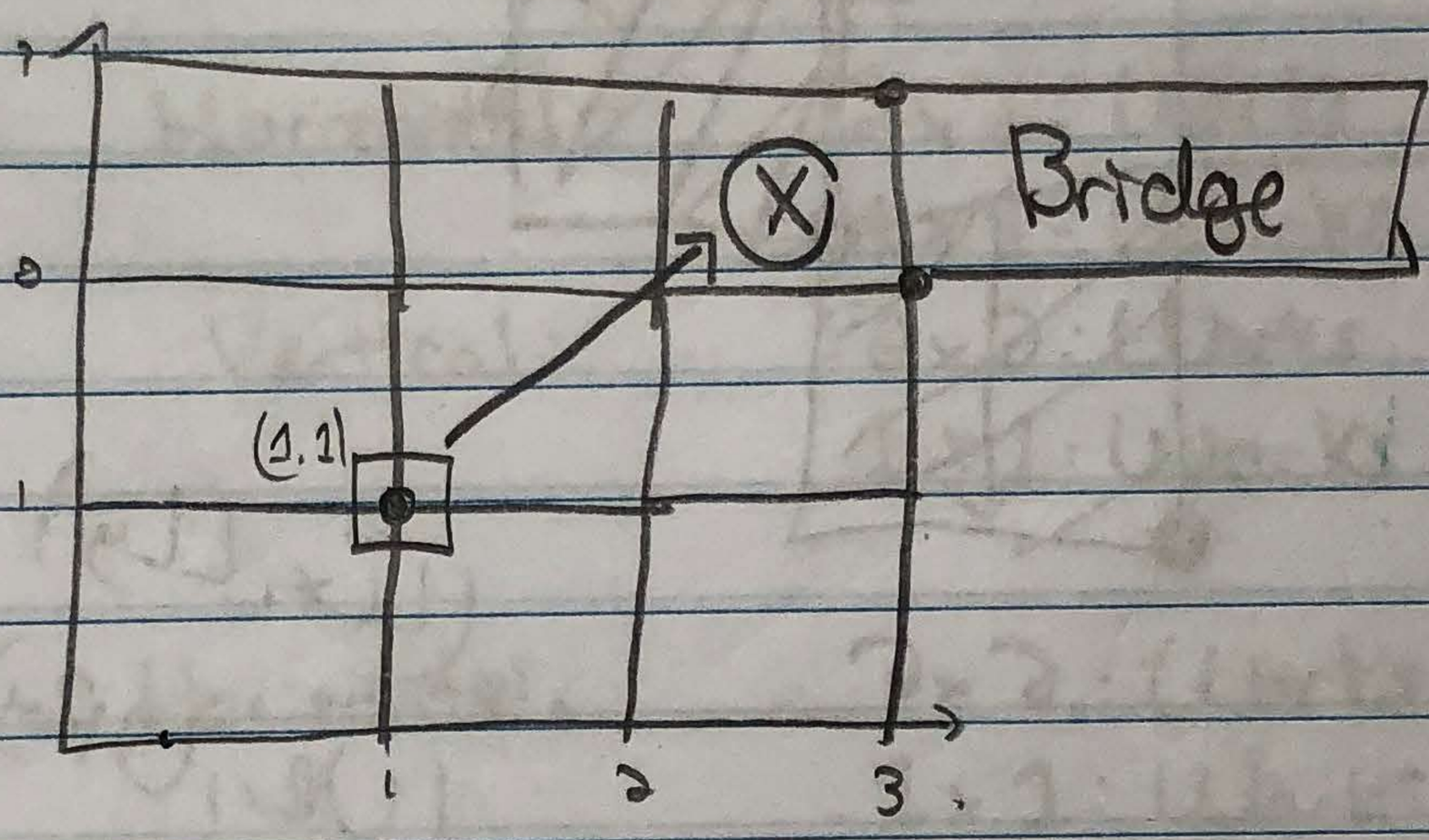
xdistance = 60,96 - 30,48 = 30,48

ydistance = 30,48 - 30,48 = 0

angleBeta = 0

finalAngle = 0 - π/4 = -π/4

Angle = -π/4 · 180/Math.PI = -45°



Test

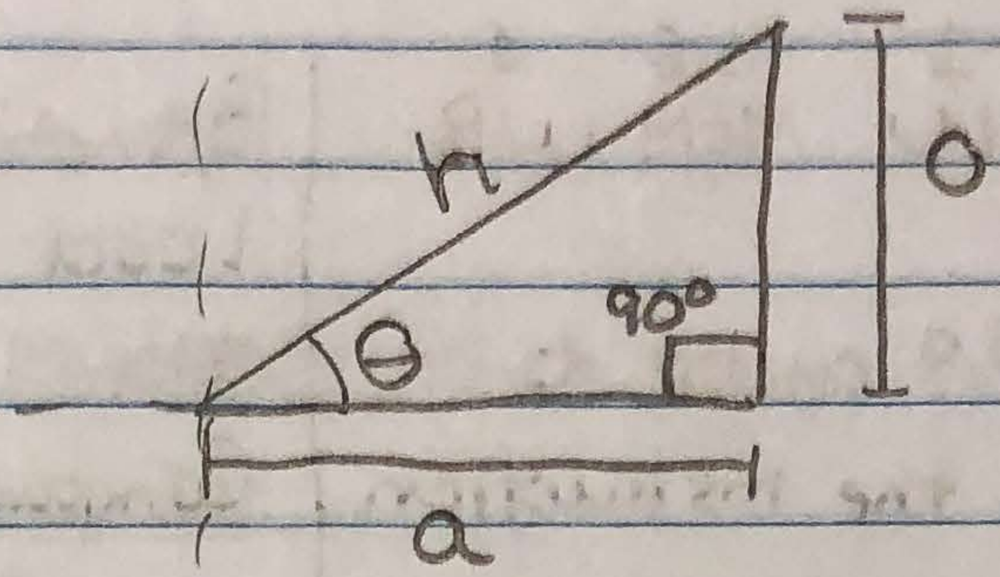
Corner 0: Horizontal: 2x2: Works
1x1: Works
Vertical: 2x2: Works
1x1: Works

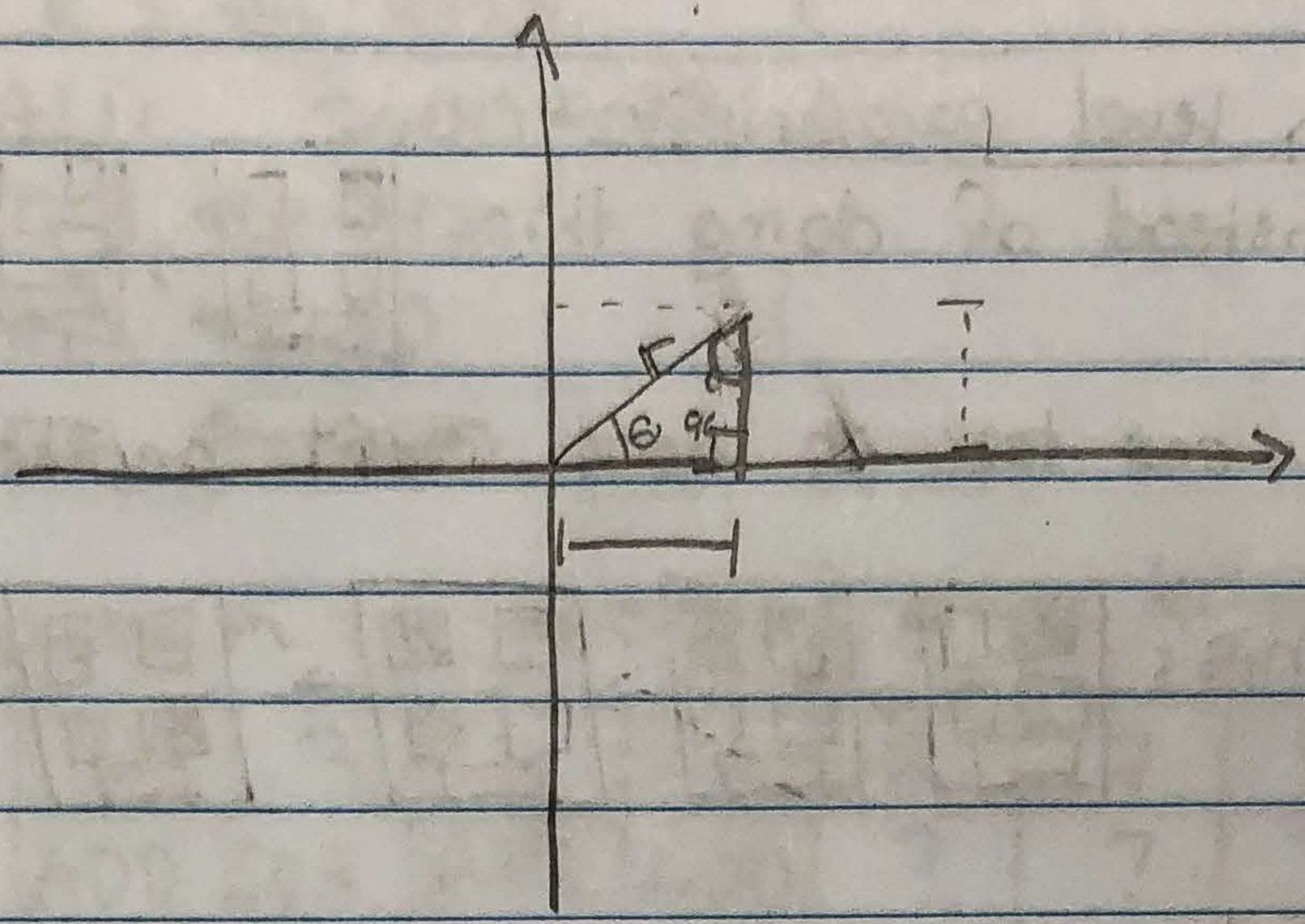
Corner 1: Horizontal: 2x2: Works
1x1: Works
Vertical 2x2: Works
1x1: Works

Corner 2: Horizontal: 2x2: Works
1x1: Works
Vertical: 2x2: Works
1x1: Works

Corner 3: Horizontal: 2x2: Works
1x1: Works
Vertical: 2x2: Works
1x1: Works

YEET!





we have "r" = ~~distDiff~~

$$deltaT = \frac{\pm h}{TRACK}$$

$$\sin(\theta) = \frac{o}{h}$$

$$\theta = \sin^{-1}\left(\frac{o}{h}\right)$$

odo.update(0,0, thetaInit)

(0,9)

(15,9)

(4,7)

(13,7)

(2,6)

(12,5)

(3,3)

(13,3)

(1,2)

(11,2)

(0,0)

(15,0)