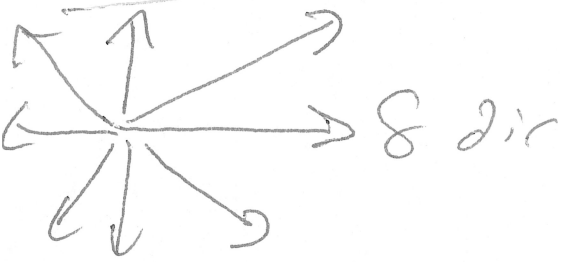


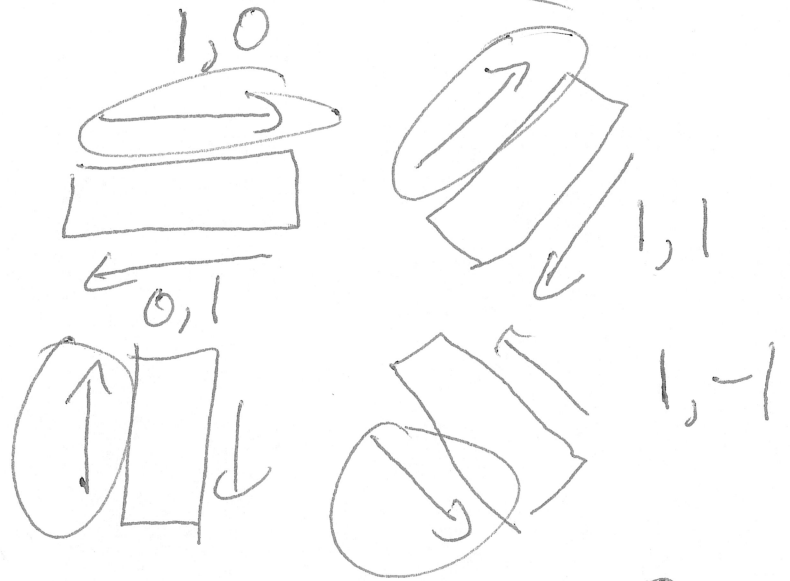
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Checking for a win (Connect 4)



any win can be checked in 2 dir

4 possible unique dir
0 1 2 3



$$DC = \{0, 1, 1, 1\}$$

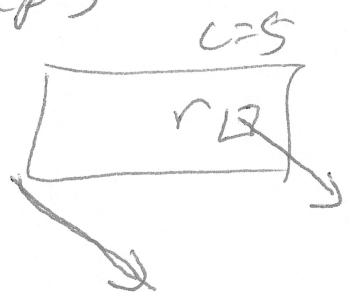
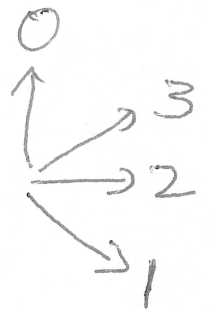
$$DR = \{1, -1, 0, 1\}$$

In i ^{direction} steps from

col c , row r , moving d steps
I will be at

$$\begin{aligned} \text{newrow} &= r + DR[i] * d \\ \text{newcol} &= c + DC[i] * d \end{aligned}$$

0,5							
0,3							
0,2							
0,1	1,1	2,1	3,1	4,1	5,1	6,1	
0,0	1,0	2,0	3,0	4,0	5,0	6,0	



r	c	d	i	$r + DR[i] * d$	$c + DC[i] * d$
2	5	0	1	$2 + (-1) * 0 = 2$	$5 + 1 * 0 = 5$
2	5	1	1	$2 + (-1) * 1 = 1$	$5 + 1 * 1 = 6$
2	5	2	1	$2 + (-1) * 2 = 0$	$5 + 1 * 2 = 7$
2	5	3	1	$2 + (-1) * 3 = -1$	$5 + 1 * 3 = 8$
				Out of bounds	Out of bounds

To check for a winner starting
at col c, row r



Loop all directions

① for i in range(len(DR)):

winner = getWinner(c, r, i)

↳ returns the winner starting
at column c, row r,
direction i

In function col row
 ↓ ↓
getWinner(c, r, i) =

if board[c][r] == "white":
 return "white"

match = board[c][r]

for d in range(1, 4):

newc = c + DR[i]*d

newr = r + DR[i]*d

if not inbounds(newc, newr):

 return "white"

if board[newc][newr] != match

 return "white"

return
match