Day 01

$(A+B+C) < (B+C+D)$

$\rightarrow A < D$

```
for i in range(len(lines)-3):
    inc += [lines[i] < lines[i+3]]
print inc
```

---

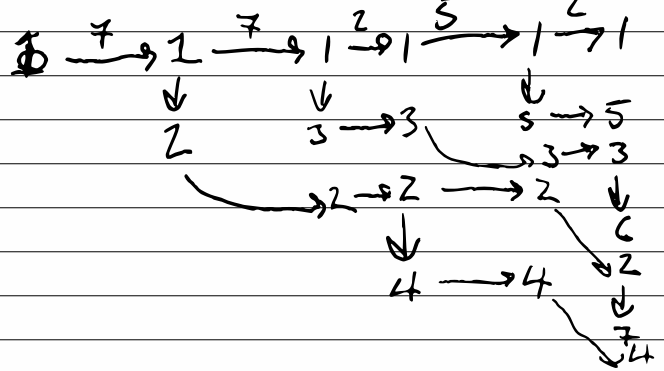
day 03

sum down each column
if value > lines/2 => 1 else 0
epsilon = ~(gamma)

Day 06

$x_{n+7} = x_n + 1$

$x_{n+16} = x_n + 2$



direct children = $\left(\frac{T-2}{7}\right)$

child 1 children = $\left(\frac{T-11}{7}\right)$

child 2 children = $\left(\frac{T-18}{7}\right)$

child 1 child 1 children = $\left(\frac{T-20}{7}\right)$

Day 07

Find x s.t. $f = \sum_i |x - x_i|$ is minimized

not how absolute works

min of $f = |Nx - \sum_i x_i|$ for $0 \le x \le \max(x_i)$

where $N = \text{size}(x_i)$

constant

min of $f = |Nx - X|$

Day 08

len(2) = 1 len(4) = 4 len(3) = 7, len(7) = 8

aa c — get chars from '4' not in '1'

bdd c — one of remaining 2 in all else except '6'

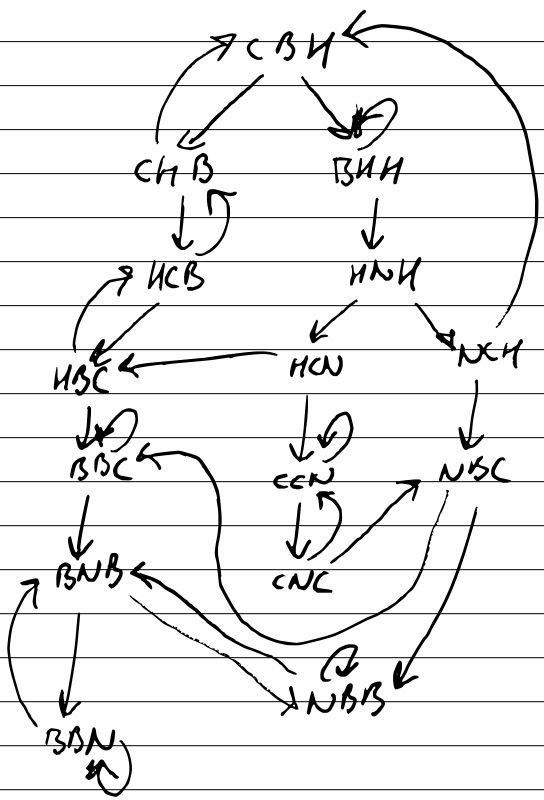
e f — the other appears in except '2' and '3'

gg → 3 containing both from '1', '2' despite

of remaining '5' has 5 chars, '9' has both from '1'

'6' is whatever is left

Day 14



Day 15

0	1
1	

0	1	7
1	4	

0	1	7
1	4	12
5		

0	1	7
1	4	12
3	5	

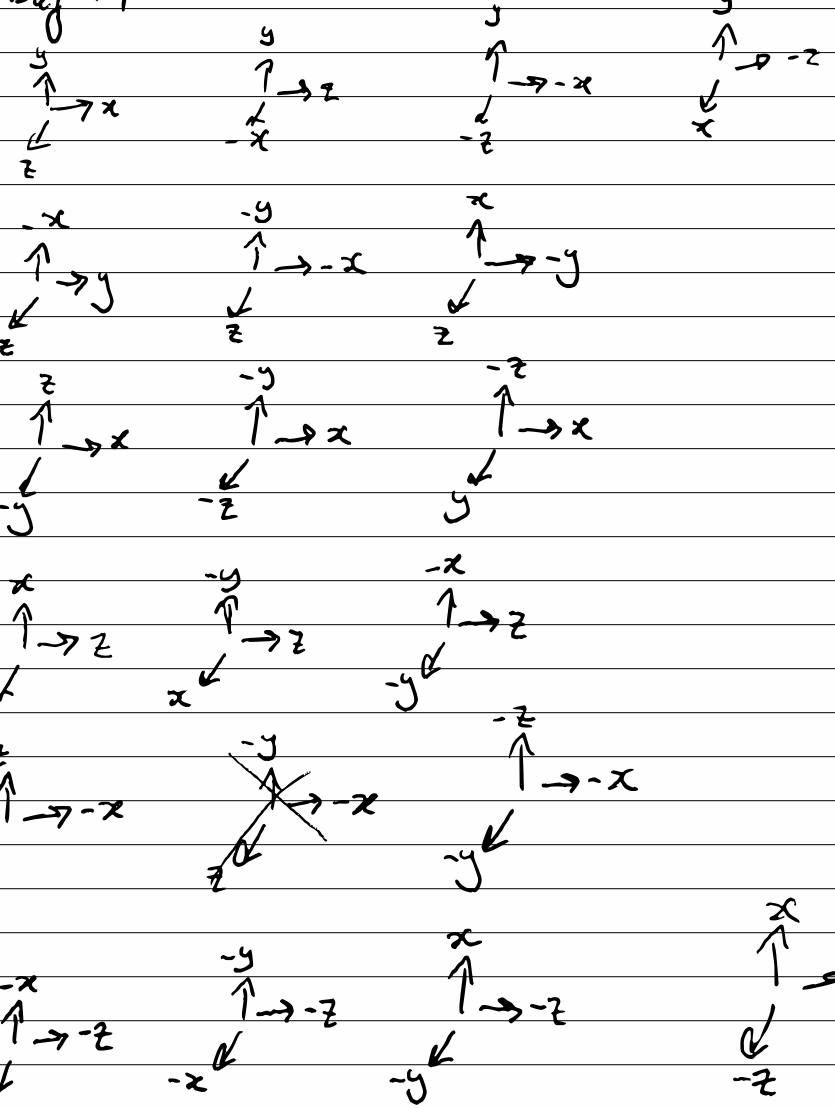
0	1	7
1	4	12
3	4	
6		

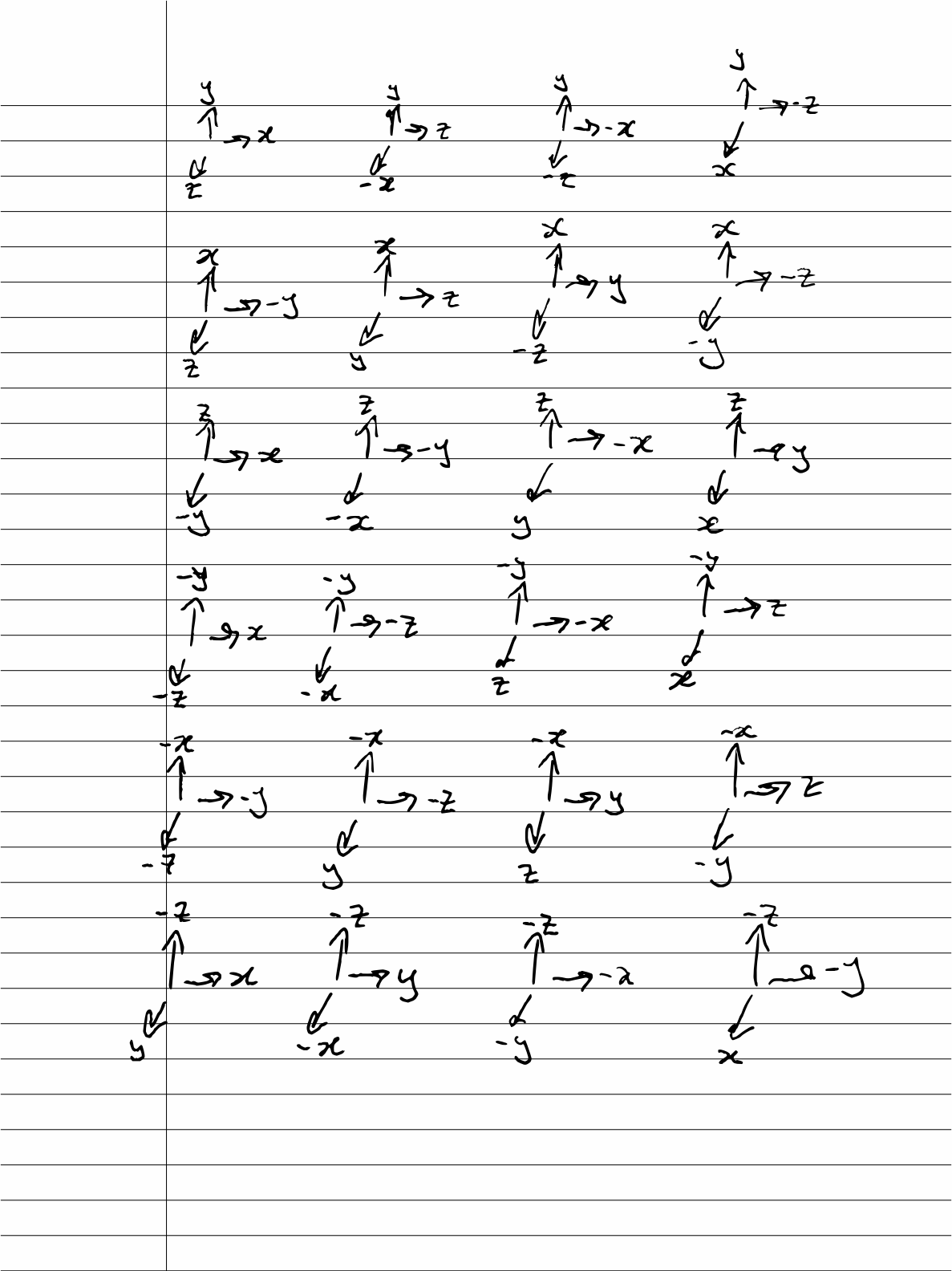
0	1	7
1	4	12
3	4	7
6	11	

0	1	7
1	4	12
3	4	7	13
6	11	16

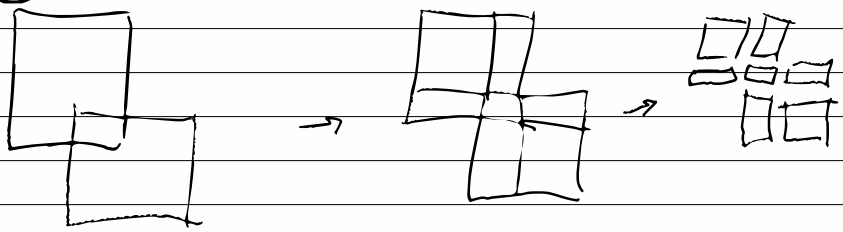
0	1	7
1	4	12	13
3	4	7	13
6	11	16

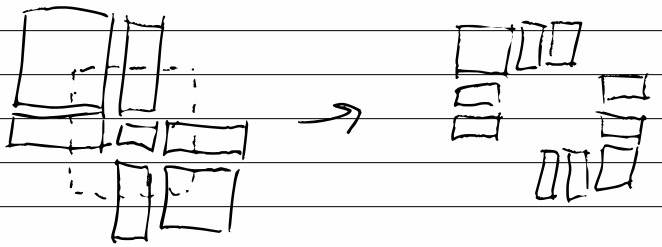
Day 19

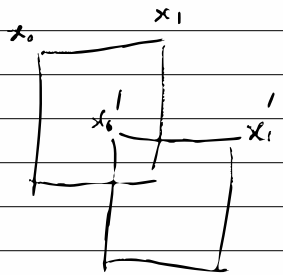

y
x
z
y
z
-x
y
-z
-x
y
-x
z
-y
-x
z
x
-y
z
-x
z
-y
x
-z
-y
x
z
-y
z
x
-x
z
-y
-z
x
y
z
-x
y
-y
x
z
-z
-x
y
-y
-z
-x
x
-z
-y
x
y
-z



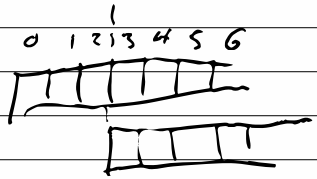
Day22

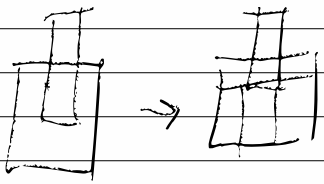


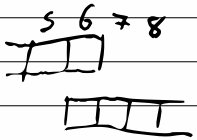


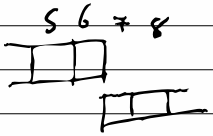


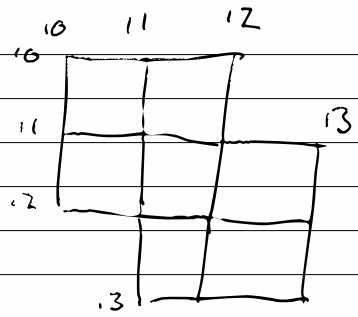
$x_0 - x_0'$ $y_0 - y_0'$
$x_0' - x_1$ $y_0 - y_0'$
$x_1 - x_1'$

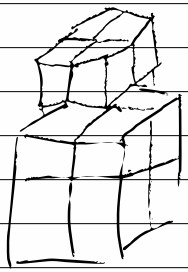


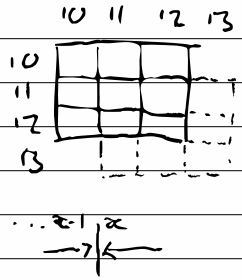


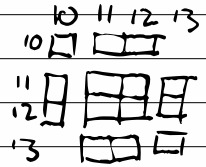


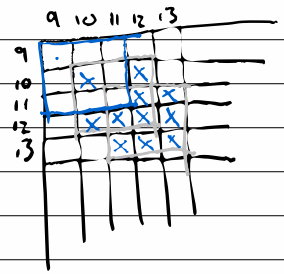



10
11
12
10
11
13
12
13




10 11 12 13
10
11
12
13


10 11 12 13
10
11
12
13


9 10 11 12 13
9
10
11
12
13

Add whole area (from)
- for each previous
  find overlap (if any)
  if on and layer is on → subtract
  if off and layer is on → subtract

? need some sort of cascade

top down
  if on → add total area minus overlap

still need a cascade

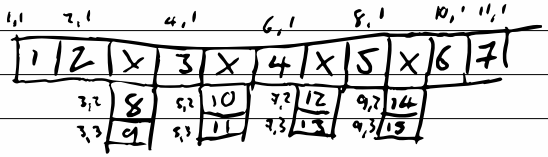
a \ b	on	off
on	off	on
off	off	on

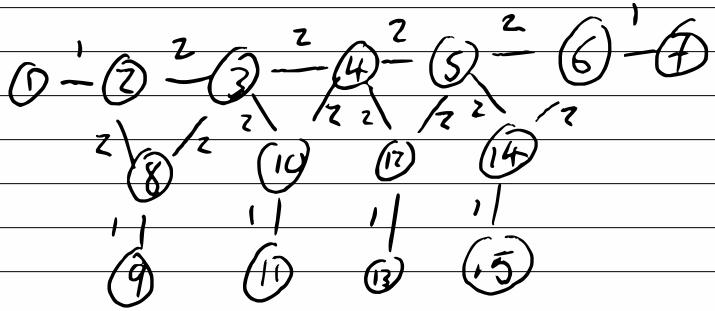
Day 23

for c in areas: # combinatorial explosion
  for m in possible_moves(c)
    move → recurs
    scores = size(move) + recursal

return scores

& no moves or backtrack → return None





Cave
id: int
type: int (move cost)
position: int

moves (c) → neighbors(c.position)
if not occupied
and can enter if is room

if game over, return score
else return None

Day 24

1	11, 1, 6	$\rightarrow z_1 = w_1 + 6$
2	13, 1, 14	$\rightarrow z_2 = 26 \cdot z_1 + w_2 + 14$
3	15, 1, 14	$\rightarrow z_3 = 26 \cdot z_2 + w_3 + 14$
4	-8, 26, 10	$(z_3 \bmod 26 - 8) = 9 \rightarrow (w_3 + 14) \overset{\text{mod } 26}{-} 8 = 9$
5	13, 1, 9	$z_4 = z_3$ $\quad (w_3 + 14) \bmod 26 = 17$
6	15, 1, 12	$\therefore w_3 = 3$ $\quad w_3 + 6 = w_4$
7	-11, 26, 8	
8	-4, 26, 13	$w_{11} + 9 - 1 = w_{12} = w_{11} + 8$
9	-15, 26, 12	
10	14, 1, 6	$z_{12} = z_{10} = 26 \cdot z_9 + w_{10} + 6$
11	14, 1, 9	
12	-1, 26, 15	$w_{10} + 6 - 8 = w_{13} = w_{10} - 2$ $\quad z_{13} = z_9 = w_1 + 6$
13	-8, 26, 4	
14	-14, 26, 10	$z_{13} < 26$, $z_{13} - 14 = w_{14}$ $\max \rightarrow w_{14} = 9 \rightarrow z_{13} = 23$

$z_5 = 26(z_2) + w_5 + 9$

$z_6 = 26(z_5) + w_6 + 12$

$w_1 + 6 - 14 = w_{14}$

$w_1 = 9 \rightarrow w_{14} = 1$

$w_6 + 12 - 11 = w_7$ $\quad w_6 + 1 = w_7$ $\quad \rightarrow z_1 = 15$

$z_7 = z_5 = 26(z_2) + w_5 + 9$

$w_5 + 9 - 4 = w_8 \rightarrow w_5 + 5 = w_8$

$z_8 = z_7 / 26 = z_2 = 26(z_1) + w_2 + 14$

$w_2 + 14 - 15 = w_9 \rightarrow w_2 - 1 = w_9$

$z_9 = z_1 = w_1 + 6$

$z_{10} = 26 \cdot z_9 + w_{10} + 6$

$z_{11} = 26 \cdot z_{10} + w_{11} + 9$

$W_1 - 8 = W_{14}$

$\boxed{W_1 = 9}$ $\boxed{W_{14} = 1}$

$W_3 + 6 = W_4 \rightarrow \boxed{W_3 = 3}$ $\boxed{W_4 = 9}$

$W_{12} = W_{11} + 8$

$W_{13} = W_{10} - 2$

$W_6 + 1 = W_7$ & $\boxed{W_5 = 4}$ $\boxed{W_8 = 9}$

$W_5 + 5 = W_8$

$W_2 - 1 = W_9 \rightarrow \boxed{W_2 = 9} \rightarrow \boxed{W_9 = 8}$

$\boxed{W_6 = 8}$ $\boxed{W_7 = 9}$

$W_{13} = W_{10} + 2 \rightarrow \boxed{W_{10} = 9}$ $\boxed{W_{13} = 7}$

$W_{11} + 8 = W_{12} \rightarrow \boxed{W_{11} = 1}$ $\boxed{W_{12} = 9}$

99394899891971

$W_1 = 9$ $W_{14} = 1$

$W_2 = 2 \rightarrow W_9 = 1$

$W_3 = 1 \rightarrow W_4 = 7$

$W_5 = 1 \rightarrow W_8 = 6$

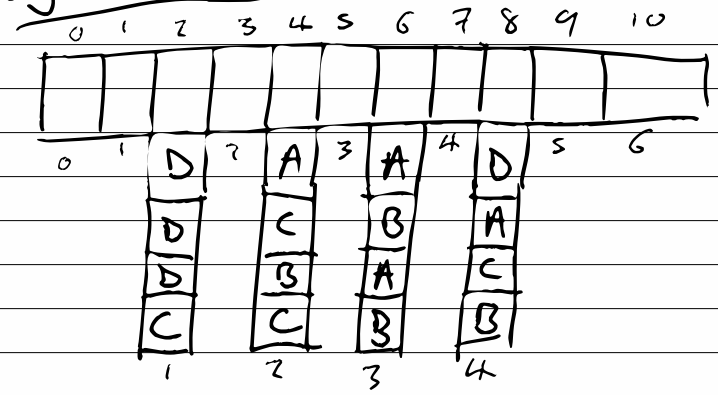
$W_6 = 1 \rightarrow W_7 = 2$

$W_{10} = 3 \rightarrow W_{13} = 1$

$W_{11} = 1 \rightarrow W_{12} = 9$

92171126131911

Day 23 (P2)



A - 7 + 9 + 4 + 7 + 8 + 4 = 39
B - 7 + 5 + 7 + 5 + 4 + 6 + 11 = 45
C - 4 + 7 + 8 + 8 + 5 + 5 + 11 + 11 = 59
D - 5 + 10 + 10 + 10 + 2 + 2 = 39

```
  39000
   5900
    450
     39
  ,  ,
  45389
```

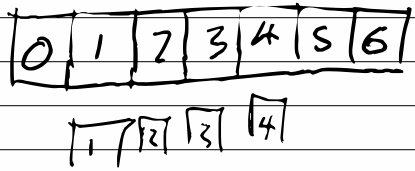
A	4 + 7 + 8 + 9 + 9	37
B	11 + 4 + 5 + 6 + 6 + 7	39
C	11 + 11 + 5 + 5 + 4 + 5 + 6 + 7 + 7	61
D	2 + 2 + 5 + 10 + 10 + 10	39

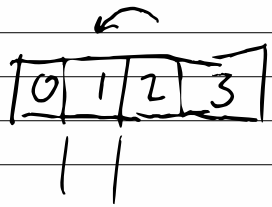
45527

corridor
HomeA
HomeB
HomeC
HomeD

for member in corridor
  if can enter room and not isBlocked
    move
  else stay

for each house
  (enumerate possible corridor positions
  that the top entry could move to





5A 5A 5B 8A 3C 4B 5B
5C 5C 5B 4C 6B 7B 6D
3A 4C 3C 5B 4B 8D 6D
4D 7D 3D 8D 7C 5A 5A
2C 2D 9A 9A

A	5+5+8+3+5+5+9+9	49
B	5+4+5+5+6+7+5+4	41
C	3+5+5+4+4+3+7+2	33
D	6+8+6+4+7+3+8+2	44

47759