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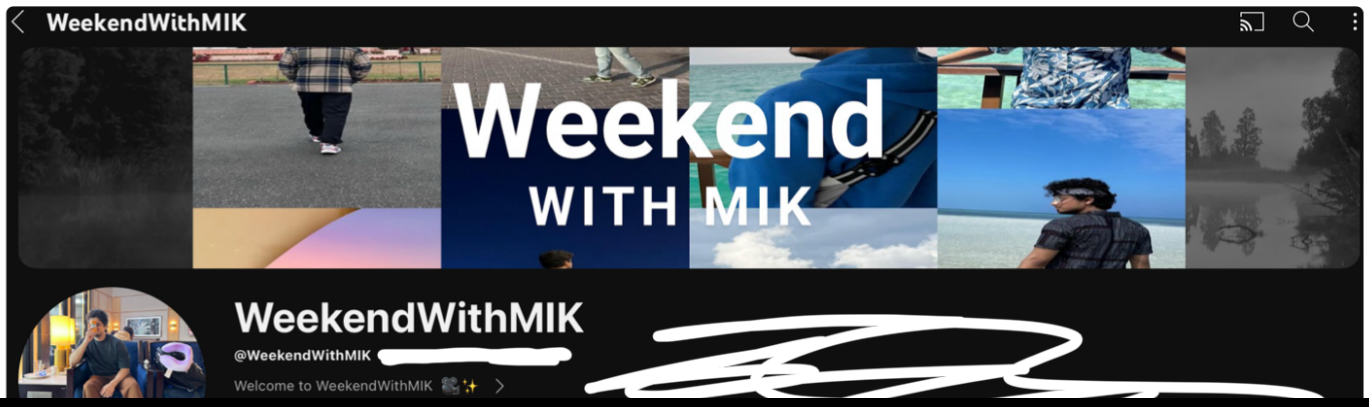

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Motivation Of the Day :-

~~I failed~~ → I learned

~~Dreaming~~ → Doing

~~I give up~~ → I'll try in a different way

~~I can't do it~~ → I'll keep trying

~~I don't want to try~~ → I don't want to regret anything

3443. Maximum Manhattan Distance After K Changes

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You are given a string `s` consisting of the characters `'N'`, `'S'`, `'E'`, and `'W'`, where `s[i]` indicates movements in an infinite grid:

- `'N'` : Move north by 1 unit.

- `'S'` : Move south by 1 unit.
- `'E'` : Move east by 1 unit.
- `'W'` : Move west by 1 unit.

Initially, you are at the origin `(0, 0)`. You can change **at most** `k` characters to any of the four directions.

Find the **maximum Manhattan distance** from the origin that can be achieved **at any time** while performing the movements **in order**.

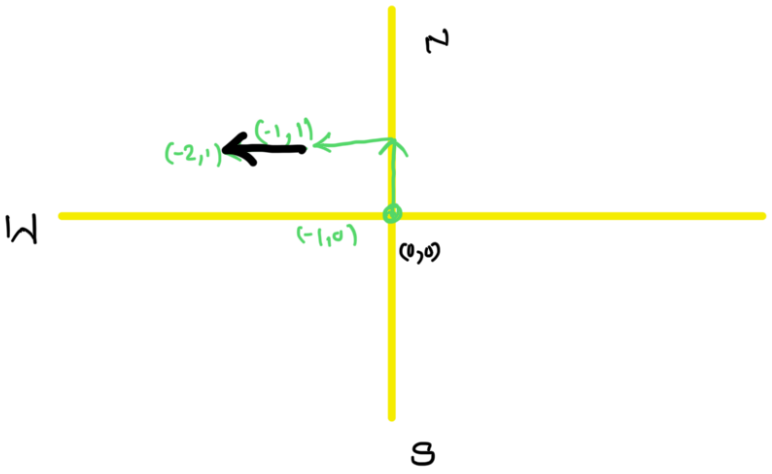
The **Manhattan Distance** between two cells `(xi, yi)` and `(xj, yj)` is `|xi - xj| + |yi - yj|`.

"NSEWEEEW"

(0,0)

Example :- "NWSE" , K = 1

output : 3



(x, y) = (0, 1)

|x - 0| + |y - 0|

|x| + |y| = |0| + |1| = 1

|-2| + |1| = 3

max d = ~~1~~ ~~2~~ 3

Thought Process

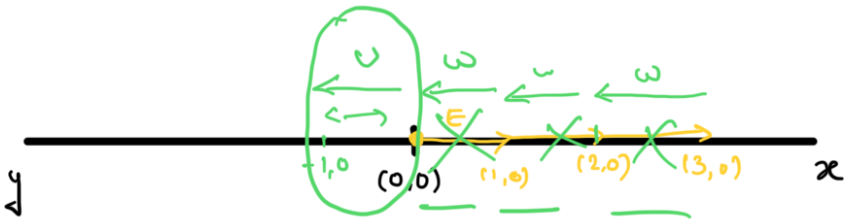
① $|x_1 - x_2| + |y_1 - y_2| = MD$

Origin: (0,0)

$|x| + |y|$ = Manhattan Distance

② $|x| + |y|$

1 + 0 = 1
2 + 0 = 2
2 + 0 = 3
2 + 0 = 2
1 + 0 = 1
0 + 0 = 0



$|-1| + |0| = 1$

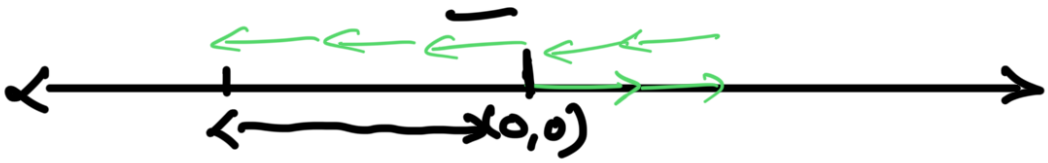
E ⇒ 3

W = 4

Horizontal Net distance = $|E - W|$

$= |3 - 4|$

= 1



E = 1 +1

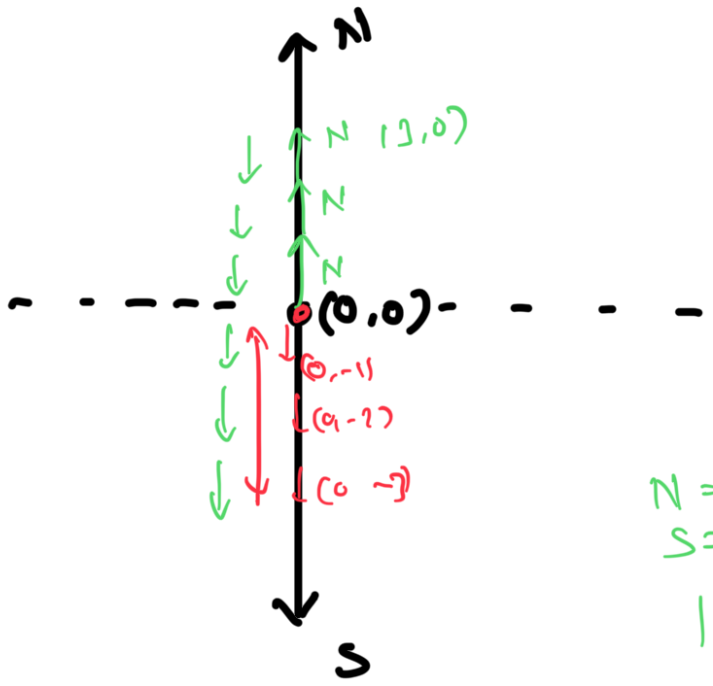
W = 1+1+1+1 +1

Net = |E - W| = |2-5| = 3

E = 1

W = 1+1

MD = |E-W|



N = 3

S = 6

|N-S| = |6-3|

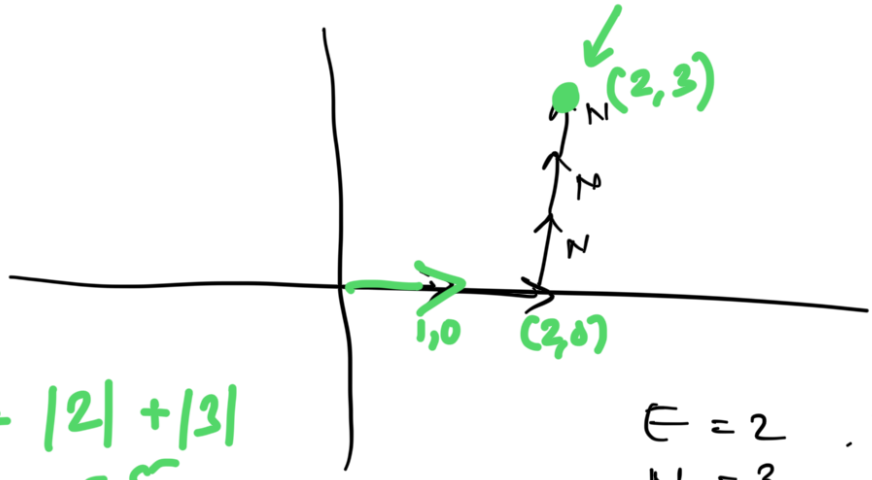
= 3

Vertical Net movement = |N - S|

$|x| + |y|$

↓ ↓

$|E-W| + |N-S|$



M.D = |2| + |3|
= 5

E = 2 , W = 0
N = 3 , S = 0

$|x| + |y|$

$|E-W| + |N-S|$

$|2-0| + |3-0|$

$= 5$

"NW E SSE"
i

W = 1

E = 1

$|E-W| + |N-S|$

$= 1 + |1-0|$

$= 2$

$|E-W| + |N-S|$

3

K = 1

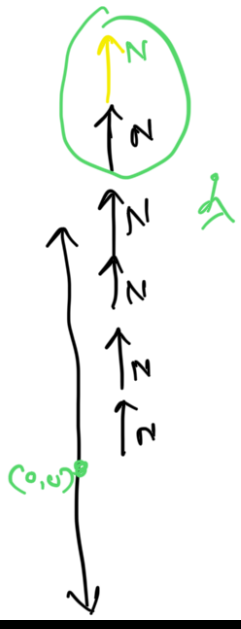
E = ~~4~~ 5, W = ~~1~~ 0

M.D = $|E-W| + |N-S|$ = $|5-0| + |0-0|$

= 5 + 0

M.D = 3

New M.D = 5



K = 1

M.D = $|E-W| + |N-S|$

= 0 + |5-1|

= 4

N = 6

W = S

MD = |6| + |6|

= 6

+2

Changing one step gives you +2 steps.

K modific. allowed

2*K steps ant benefit

OA:

④ Applying atmost K modifications :-

"EENS"

i

|x| + |y|

|E-W| + |N-S|

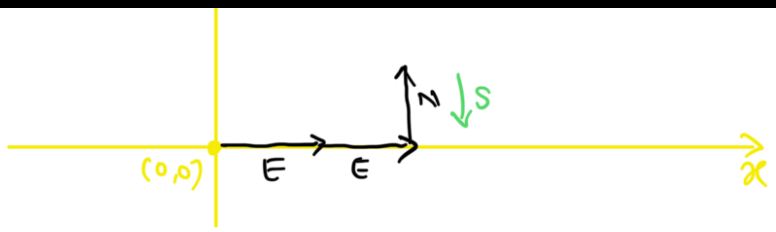
|2-0| + |2-1|

= 2

steps = 2+1 = 3+1 = 4

waste = 4 - 2 = 2

y



waste.

$4 \neq 2$

steps M.D

"EENS"
0 1 2 3
i

East = 1, west = 0, North = 0, South = 0

current MD = |E-W| + |N-S| = 1
stepstillnow = (i+1);

wastedSteps = stepstillnow/4 − curMD/3

1

if (stepstillnow != curMD) {
extraincrement = min(2*K, unusedsteps);
}

Ri = curMD + extra

K = 100
2*K = 200