Exercise: Multidimensional Lists

Problems for exercise and homework for the Python Advanced Course @SoftUni.
Submit your solutions in the SoftUni judge system at https://judge.softuni.org/Contests/3194.

1. Flatten Lists

Write a program to flatten **several lists** of numbers received in the following format:

- String with numbers or empty strings separated by **"|"**
- Values are separated by spaces (**" "**, one or several)
- Order the output list from the **last** to the **first matrix sub-lists** and their values from **left** to **right** as shown below

Examples

Input	Output
1 2 3 |4 5 6 | 7 88	7 88 4 5 6 1 2 3
7 | 4 5|1 0| 2 5 |3	3 2 5 1 0 4 5 7
1| 4 5 6 7 | 8 9	8 9 4 5 6 7 1

2. Matrix Modification

Write a program that **reads a matrix** from the console and **changes its values**. On the first line, you will get the matrix's **rows - N**. You will get elements for each **column** on the following **N** lines, separated with a **single space**. You will be receiving commands in the following format:

- **"Add {row} {col} {value}"** – **Increase** the number at the given **coordinates** with the **value.**
- **"Subtract {row} {col} {value}"** – **Decrease** the number at the given **coordinates** by the **value**.

If **the coordinate is invalid**, you should **print "Invalid coordinates"**. A coordinate **is valid** if both of the given indexes are in range **[0; len() – 1]**.

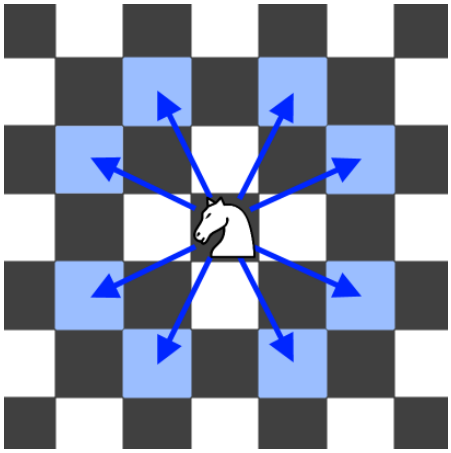
When you receive **"END"**, you should **print the matrix** and **stop the program**.

Examples

Input	Output
3 1 2 3 4 5 6 7 8 9 Add 0 0 5 Subtract 1 1 2 END	6 2 3 4 3 6 7 8 9
4 1 2 3 4 5 6 7 8	Invalid coordinates Invalid coordinates -41 2 3 4

8 7 6 5 4 3 2 1 Add 4 4 100 Add 3 3 100 Subtract -1 -1 42 Subtract 0 0 42 END	5 6 7 8 8 7 6 5 4 3 2 101

3. Knight Game



Chess is the oldest game, but it is still popular these days. It will be used only one chess piece for this task - the **Knight**.

A chess knight has **8 possible moves** it can make, as illustrated. It can move to the **nearest** square but **not on the same row**, **column**, or **diagonal**. (e.g., it can move two squares horizontally, then one square vertically, or it can move one square horizontally then two squares vertically - i.e., in an "**L**" pattern.)

The knight game is played on a board with dimensions **N x N**.

You will receive a board with **"K"** for knights and **"0"** for empty cells. Your task is to **remove knights** until **no knights that can attack one another** with one move **are left**.

Always **remove** the knight who **can attack the greatest number of knights**. If there are **two or more knights** with the same number of attacks, remove the **top-left one**.

Input

- On the first line, you will receive integer **N** - the size of the board
- On the following **N** lines, you will receive strings with **"K"** and **"0"**

Output

- Print a **single integer** with the **number of knights that need to be removed**.

Constraints

- The size of the board will be **0 < N < 30**
- Time limit: **0.3 sec**. Memory limit: **16 MB**

Examples

Input	Output				
5 0K0K0 K000K 00K00 K000K 0K0K0	1	2 KK KK	0	8 0K0KKK00 0K00KKKK 00K0000K KKKKKK0K K0K0000K KK00000K 00K0K000	12

				000K00KK	

4. Easter Bunny

Your task is to collect as many eggs as possible.

On the first line, you will be given a **number** representing the **size of the field**. On the following few lines, you will be given a **field** with:

- **One bunny** - randomly placed in it and marked with the symbol **"B"**
- **Number** of eggs placed at different positions of the field and **traps** marked with **"X"**

Your job is to determine the direction in which the bunny should go to collect the **maximum** number of eggs. The directions that should be considered as possible are **up, down, left,** and **right.** If you reach a **trap** while checking some of the directions, you should **not** consider the fields after the trap in this direction. For more clarifications, see the examples below.

Note: Consider **ONLY** the paths from which the bunny has collected 1 or more eggs.

Input

- **A number** representing the size of the field
- **The matrix** representing the field (each position **separated by a single space**)

Output

- **The direction** which should be considered as **best (lowercase)**
- The field **positions** from which we are **collecting eggs as lists**
- The **total** number of eggs collected

Constraints

- There will **NOT** be two or more paths consisting of the same total amount of eggs.

Examples

Input	Output	Comment
5 1 3 7 9 11 X 5 4 X 63 7 3 21 95 1 B 1 73 4 9 9 2 33 2 0	right [3, 1] [3, 2] [3, 3] [3, 4] 87	The number of eggs if the bunny goes up is equal to 7. If he goes down = 9, there are no eggs on the left and 87 on the right. That's why the bunny should follow this direction (right) and collect the eggs provided there.
8 4 18 9 7 24 41 52 11 54 21 19 X 6 34 75 57 76 67 7 44 76 27 56 37 92 35 25 37 52 34 56 72 35 X 1 45 4 X 37 63 105 X B 2 12 43 5 19 48 19 35 20 32 27 42 4 73 88 78 32 37 52 X 22	down [6, 2] [7, 2] 113	

5. Alice in Wonderland

Alice is going to the mad tea party, to see her friends. On the way to the party, she needs to collect bags of tea.

You will be given an integer **n** for the **size** of the Wonderland territory with a **square** shape. On the following **n** lines, you will receive the **rows** of the territory:

- Alice will be placed in a **random position**, marked with the letter **"A"**.
- On the territory, there will be bags of tea, represented as numbers. If Alice **steps on a number position**, she collects the tea bags and **increases the quantity with the corresponding number**.
- There will **always** be **one rabbit hole** on the territory **marked** with the **letter "R"**.
- **All of the empty positions** will be marked with **"."**.

After the field state, you will be given **commands** for **Alice's movements**. Move commands can be: "**up**", "**down**", "**left**" or "**right**".

When Alice collects **at least 10 bags of tea, she is ready to go to the tea party,** and she does **not need** to continue collecting. Otherwise, **if she steps on the rabbit hole** or **goes out of the territory**, she **can't return,** and the program **ends**.

In the end, the path she walked had to be marked with **'*'**.

For more clarifications, see the examples below.

Input

- On the first line, you will be given the integer **n** – the size of the **square** matrix
- On the following n lines - **matrix** representing the field (each position **separated by a single space**)
- On each of the following lines, you will be given a move command

Output

- On the first line:
  - If Alice steps on the rabbit hole or she go out of the territory, print:
    "Alice didn't make it to the tea party."
  - If she collected at least 10 bags of tea, print:
    "She did it! She went to the party."
- On the following lines, print the matrix.

Constraints

- Alice will **always** either **go outside the Wonderland** or **collect 10 bags of tea**
- All the commands will be valid
- All of the given **numbers** will be valid **integers** in the range [0, 10]

Examples

Input	Output
5 . A . . 1 R . 2 . . 4 7 . 1 .	Alice didn't make it to the tea party. . * . . 1 * * * . . 4 * . 1 .

. . . 2 . . 3 . . . down right left down up left	. . . 2 . . 3 . . .
7 . A . 1 1 . . 9 . . . 6 . 5 . 6 . R . . . . 3 . . 1 . . . . . 2 . . 2 . 3 . . 1 . . . 8 3 . . . 2 left down down right	She did it! She went to the party. * * . 1 1 . . * . . . 6 . 5 * * . R . . . . 3 . . 1 . . . . . 2 . . 2 . 3 . . 1 . . . 8 3 . . . 2

6. Range Day

You are participating in a Firearm course. It is a training day at the shooting range.

You will be given a **matrix with 5 rows and 5 columns**. It is a **shotgun range** represented as some **symbols** separated by a **single space**:

- **Your position is** marked with the symbol **"A"**
- **Targets** marked with symbol **"x"**
- **All of the empty positions** will be marked with **"."**

After the field state, you will be given an integer representing the **number of commands** you will receive. The possible commands are:

- **"move {right/left/up/down} {steps}"** – you should **move** in the given **direction** with the given **steps**. **You can only move** if the field you want to **step on is marked with "."**.
- **"shoot {right/left/up/down}"** – you should **shoot** in the given direction (from your **current position without moving**). Beware that there might be targets that **stand in the way** of other targets, and you **cannot reach** them - you **can shoot** only **the nearest** target. **When you have shot a target, the field becomes empty position ("**.**").**

Validate the positions since they can be **outside** the field.

Keep track of all the **shot targets**:

- If at any point there are **no targets left**, **end** the program and print: **`"Training completed! All {count_targets} targets hit."`**.
- If, after you perform all **the commands,** there are some **targets left** print: **`"Training not completed! {count_left_targets} targets left."`**.

Finally, print the **index positions** of the **targets that you hit,** as shown in the examples.

Input

- **5 lines** representing the field (symbols, **separated by a single space**)
- **N** - count of **commands**
- On the following **N lines** - the commands in the format described above

Output

- On the **first line,** print one of the following:
  - If all the **targets** were **shot**

    `"Training completed! All {count_targets} targets hit."`

  - Otherwise:

    `"Training not completed! {count_left_targets} targets left."`

- Finally, print the **index positions `"[{row}, {column}]"`** of the **targets that you hit**, as shown in the examples.

Constrains

- All the **commands** will be **valid**
- There will **always be at least one target**

Examples

Input	Output
. . . . . x . . . . . A . . . . . . x . . x . . x 3 shoot down move right 4 move left 1	Training not completed! 3 targets left. [4, 1]
. . . . A x . . . . x . . . 2 shoot down	Training completed! All 2 targets hit. [4, 1] [2, 2]

shoot right	
. . . . x . . . . x . . A 3 shoot down move right 2 shoot left	Training not completed! 1 targets left. [4, 1]

7. Present Delivery

The presents are ready, and Santa has to deliver them to the kids.

You will receive an integer **m** for the **number** of **presents** Santa has and an integer **n** for the **size** of the **neighborhood** with a **square** shape. On the following lines, you will receive the **matrix**, which represents the neighborhood.

Santa will be in a **random cell**, marked with the letter **"S"**. Each cell stands for a house where children may live. If the cell has **"X"** on it, that means there lives a **naughty** kid. Otherwise, if a **nice** kid lives there, the cell is marked by **"V"**. There can also be cells marked with **"C"** for cookies. **All of the empty positions** will be marked with **"-"**.

Santa can move **"up"**, **"down"**, **"left"**, **"right"** with **one position** each time. These will be the **commands** that you receive. If he moves to a house with a **nice** kid, the kid **receives a present**, but if Santa reaches a house with a **naughty** kid, he **doesn't** drop a present. If the command sends Santa to a cell marked with **"C"**, Santa eats cookies and becomes happy and extra generous to **all the kids around him*** (meaning all of them will receive presents - it doesn't matter if naughty or nice). If Santa has been to a house, the cell becomes **"-"**.

Note: *around him means on his left, right, upwards, and downwards by one cell. In this case, **Santa** doesn't move to these cells, or if he does, he **returns** to the **cell** where the **cookie** was.

If Santa runs out of presents **or** receives the command **"Christmas morning"**, you should end the program.

Keep in mind that you should check whether all the nice kids received presents.

Input

- On the first line, you are given the integer **m** - the count of presents
- On the second - integer **n** - the size of the neighborhood
- The **following n lines** hold the values for every **row**
- On each of the following lines you will get a command

Output

- On the first line:
  - If Santa runs out of presents, **but** there are still some **nice** kids left print: **"Santa ran out of presents!"**
- Next, print the matrix.
- In the end, print one of these messages:
  - If he manages to give **all** the nice kids presents, print:
    "Good job, Santa! {count_nice_kids} happy nice kid/s."

- Otherwise, print:
  "No presents for {count nice kids} nice kid/s."

Constraints

- The size of the **square** matrix will be between **[2…10].**
- Santa's position will be marked with **'S'**.
- There will **always** be **at least 1 nice** kid.
- There **won't be a case** where the cookie is on the border of the matrix.

Examples

Input	Output	Comments
5 4 - X V - - S - V - - - - X - - - up right down right Christmas morning	- - - - - - - S - - - - X - - - Good job, Santa! 2 happy nice kid/s.	Santa has 5 presents. The size of the matrix is 4. After we receive the matrix, we start reading commands. The first one is "up". The "X" means there is a naughty kid, so Santa moves on without dropping any presents. Next, he reaches a nice kid and drops a present. The "down" command moves Santa to an empty cell. The last command before the "Christmas morning" message is "right". Again we have a nice kid. The count of nice kids reached 2, and we don't have any nice kids without presents left. So we print the appropriate message.
3 4 - - - - V - X - - V C V - - - S left up	Santa ran out of presents! - - - - V - - - - - S - - - - - No presents for 1 nice kid/s.	The commands send Santa to a cell with a cookie, so all of the kids around him receive presents. He runs out of presents because we have 3 kids there and only 3 presents. The program ends, and we have 1 nice kid that hasn't received a present.