Book Worm

You will be given a **string**. Then, you will be given an **integer N** for the **size** of the field with **square** shape. On the next **N** lines, you will receive the **rows** of the field. The player will be placed on a **random position**, marked with **"P"**. On **random positions** there will be **letters**. **All of the empty positions** will be marked with **"-"**.

Each turn you will be given commands for the **player's movement**. If he moves to a **letter**, he **consumes** it, **concatenates** it to the **initial string** and the letter **disappears from the field**. If he tries to move **outside** of the field, he **is punished** - he **loses** the **last** letter **in the string**, **if there are any**, and the **player's position** is **not changed**.

When the command "**end**" is received, **stop the program**, **print all letters and the field**.

Input

- On the **first line**, you are given the **initial string**
- On the **second line**, you are given the integer **N** - the size of the **square** matrix
- The **next N lines** holds the values for every **row**
- On each of the next lines you will get a move command

Output

- On the first line the **final** state of the **string**
- In the end print **the matrix**

Constraints

- The size of the **square** matrix will be between **[2…10]**
- The **player position** will be **marked** with "**P**"
- The **letters** on the field will be **any letter except** for "**P**"
- Move commands will be: **"up"**, **"down"**, **"left"**, **"right"**
- Stop command will be "**end**"

Examples

Input	Output	Comments
Hello 4 P--- Mark -l-y --e- down right right right end	HelloMark ---- ---P -l-y --e-	The initial string we receive is "Hello". Then we receive 4x4 field and the player is on index [0;0]. Then, we start receiving commands. First the player moves to [1;0], where he consumes 'M', and then all letters on the right. When we receive the "end" command, our string is "HelloMark" and the player is on index [1;3].
Initial 5 ----- t-r-- --Pa- --S-- z--t- up left left left end	Initialr ----- P---- ---a- --S-- z--t-	The initial string we receive is "Initial". Then we receive 5x5 field and the player is on index [2;2]. The player consumes 'r' and 't', but also tries to go out of the matrix once, so he loses the last character of his string – 't'. The string after the "end" command is "Initialr".