

10 Melody

Max and Greta are exo-linguists traveling the galaxy learning languages. They are building a translator application to help Earthlings communicate with the people of Giwdul.

In the Giwdul language, each word is a melody of up to 16 notes. The actual notes in a word aren't as important as whether each note has a frequency lower, the same, or higher than the previous note in the word. For example, if two consecutive notes have frequencies of 440 and 698 this is an Up transition. Another pair of notes may have frequencies of 587 and 622, which is also an Up transition. While another pair of notes may have frequencies of 622 and 440, which is a Down transition.

To translate from a sequence of frequencies into a sequence of characters to use in a dictionary, we use U for up transitions, D for down transitions, R for repeat, and * for the first note in the word. For example, given a word with these 7 notes: 493 466 830 830 830 659 659 we would spell the word *DURRDR.

Max and Greta already have a machine that listens to a melody and records the frequencies in the word as numbers. They also have a dictionary that translates the character words, like *DURRDR into English. Help them complete the task of creating a translator by writing a program that receives a list of frequencies and translates it into a list of characters as described above.

The first line of input to the program contains a single integer $1 \leq N \leq 1000$ that specifies the number of lines remaining in the input. All other lines specify a single word. These lines begin with a number $1 \leq M \leq 16$ that specifies the number of notes in the word, followed by M numbers. The numbers on the line are separated by spaces.

The output for the program contains N lines, with one set of characters per line. The characters are those created using the translation process described above.

Note: The \leftarrow symbol in the examples below represents a newline character.

Sample Input

```
4←
7 493 466 830 830 830 659 659←
16 698 784 493 493 493 659 740 659 659 440 440 440 587 740 740 830←
2 554 523←
10 784 622 622 622 466 659 466 740 784 784←
```

Sample Output

```
*DURRDR←
*UDRRUUDRDRRUURU←
*D←
*DRRDUDUUR←
```