Problem B2: Dots and Dashes - Medium

15 points Accepted

Problem My Submissions

Dots and Dashes is a text encoding, similar to (but not the same as!) other formats used in electric telegraphy. Like those other formats, it uses sequences of dots "." and dashes "-" to encode characters, but unlike those other formats, it uses the following translation table:

A .	B ...	C ..-	D .-.
E -	F .--	G -..	H -.-
I ..	J .---	K ---	L ....
M ...-	N ..-.	O .-	P ..--
Q .-..	R .-.-	S .--.	T .---
U -.	V -...	W .--	X -.-.
Y --	Z -.--	. .....	, ...-
! ...-.	? ...--	' ..-..	" ..-.-
; ..--.	: ..---	(.-...	) .-..-
[.-.-.	] .-.--	{ .--..	} .--.-
0 --..	1 --.-	2 ---.	3 ----
4 --...	5 -..-	6 --.-.	7 --.--
8 ---..	9 ---.-	+ ----.	- -----
* -.--.	/ -.----	% -.-.-	

As an optional aid, a copy of the translation table can be found here, with each translation on its own line, i.e.

```
A .
B ...
```

describing open source projects using the *dots and dashes* protocol. Your task is to **decode these descriptions**.

Unfortunately, your state of the art telegraph machine broke, and to your surprise, nobody makes replacement parts anymore, so you'll have to make do with what you've got (everyone else switched to telephones a hundred years ago, who knew).

The part that broke translated low/high signals into dots, dashes and pauses, so you will have to compensate for this. The machine now populates the ticker tape at every time step with a "-" if the signal is low, and a "+" if the signal is high. Dots and dashes are represented by consecutive time steps containing high signals, pauses are represented by consecutive time steps contains low signals. Your input contains N messages in this new encoding.

This introduces a complication -- each telegraph operator broadcasts at a different rate, according to the following constraints:

- Dots take the shortest period of time.
- Pauses between dots and dashes have the same duration as dots.
- Dashes are **at least** three times as long as dots.
- Pauses between characters have the same duration as dashes.
- Pauses between words are **at least** twice as long as pauses between characters.
- Durations are always a whole multiple of time steps.
- The timings of dots, dashes and the various pauses are consistent within a message (i.e. two dots in the same message will take exactly the same time, etc).

You will need to figure out each operator's timings from their message.

Constraints

$1 \leq N \leq 20$

negative integer, N on the first line, followed by N lines, each containing the description of an open source project **sent by a different telegraph operator**, this time encoded using its *low/high signal*. Dot, dash, and pause timings are guaranteed to be unambiguous for each message.

Output

Your output should be a file containing N lines, with the ith line containing the decoded version of the ith encoded message in the input, **in all-caps**.

Explanation of Sample

The first message is encoded by a very efficient operator taking 1, 3 and 6 time steps for dot, character and word pauses.

The second message was sent by a slower operator taking 2, 7 and 14 time steps respectively, but sending the same text.

The last message is a longer piece of text transmitted once again by the efficient operator.

Sample Input

```
3
+-+++-+++---+-+-+------+
++--+++++++--+++++++----
+-+-+-+---+-+---+-+-+++-
```

Sample Output

```
FB HACK!
FB HACK!
LINUX KERNEL CONTROL GRO
```