The AMSCO cipher

Due to A.M.SCOtt in the 19th century, it's an incomplete columnar transposition cipher with alternating single letters and digraphs. The first entry must be a digraph.
In both even and odd periods the first column and the first row always alternate:

4	1	3	2	5
IN	C	OM	P	LE
T	EC	O	LU	M
NA	R	WI	T	HA
L	TE	R	NA	T
IN	G	SI	N	GL
E	LE	T	TE	R
SA	N	DD	I	GR
A	PH	S		

Input

N lines (N<1000)
Each line of the input contains the numeric key (permutation order of the columns) and a plaintext. Plaintext letters are in [A-Z] only with no punctuation.
The keylength max is 9 and the length of the plaintext is limited to 250.
The last line ends with EOF.

Output

Output consist of exactly N lines of ciphertexts with letters in [A-Z] with no spaces.

Example

Input:

41325 INCOMPLETECOLUMNARWITHALTERNATINGSINGLELETTERSANDDIGRAPHS

Output:

CECRTEGLENPHPLUTNANTEIOMOWIRSITDDSINTNALINESAALEMHATGLRGR