Problem ID: cryptanalysis

AVTCCMIPTJEOOTNKNI – this is the first thing you read on a small note during a visit to the 16th century. There are plenty of similar notes on the table, all with unreadable texts written on them. Very soon you realise that you are standing inside an office for cryptanalysis.

One guy explains to you what they are currently working on:

> "We intercepted hundreds of these military notes from our enemy, the Bellaso syndicate. A command given by their leader will eventually be spread around to all members, but for different recipients it will be encrypted with different keys. We may be lucky and own several notes that contain the same message but are encrypted with different keys. This would help break the code. Our plan is to separate the notes onto different piles, with each pile consisting of notes that might contain the same hidden message."

How do you know which messages belong to the same group? And how were they encrypted?

```
  BLI  ZZA  RD        BLI  ZZA  RD
+253  253  25      +977  977  97
=DQL  BED  TI       =KSP  IGH  AK
```

Figure 1: Encrypting the word BLIZZARD with two different keys (2, 5, 3) and (9, 7, 7).

> "As the Vigenère cipher is quite new and unbreakable, we are confident that all n notes are encrypted using this cipher.
>
> As shown in Figure 1, a message is encrypted by first repeating the secret key and aligning it with the message, and then shifting each letter the appropriate amount, wrapping around from Z to A if necessary.
>
> We already managed to get the key length k they use, so we can use this information to find out which messages belong together. For instance, both words DQLBEDIT and KSPIGHAK *can* result from the same original message and therefore go on the same pile. There is still the chance that, for example, KSPIGHAK is the result of a different message with a different key, but we do not yet care about that."

You realise that cryptanalysis was a really frustrating job back in this time with no computers that could solve this problem in seconds...

Input

The input consists of:

- One line with two integers n and k ($1 \leq n \leq 5 \cdot 10^4$), the number of notes n and the key length k ($1 \leq k \leq 50$).
- n lines, each with one word w ($1 \leq |w| \leq 50$) consisting of uppercase letters A-Z. All words are distinct and have the same length $|w| \geq k$.

Output

Output one line for each pile, containing all messages that go on that pile. The order of piles does not matter, nor does the order within a pile.

Sample Input 1

```
3 3
DQLBEDTI
KSPIGHAK
ANBEJDSI
```

Sample Output 1

```
ANBEJDSI
DQLBEDTI KSPIGHAK
```

Sample Input 2

```
3 2
AVTCCMIPTJEOOTNKNI
BAUHDRJUUOFTPYOPON
BAGVVYNLFAJUUOFIBY
```

Sample Output 2

```
AVTCCMIPTJEOOTNKNI BAUHDRJUUOFTPYOPON
BAGVVYNLFAJUUOFIBY
```