Yet Another Contest 1 P4 - No More Searching

Time limit: 1.0s	**Memory limit:** 128M
Java: 4.0s	Java: 256M
Python: 2.0s	Python: 256M

Mike is growing tired of searching for strings, and has instead become interested in breaking them apart! Given a string S, he wants to break it into any number of subsequences. Each character in S should belong to exactly one subsequence.

The i-th letter in the English alphabet is assigned the value i (e.g. `A` $\rightarrow 1$, `B` $\rightarrow 2$, ..., `Z` $\rightarrow 26$).

For each subsequence, let v_{c_i} and v_{c_j} be the value of the first and last characters. Then, the score of the subsequence is equal to $(v_{c_i} - v_{c_j})(v_{c_i} + v_{c_j})$. Note that scores can be negative. For example, the sequence `HELLO` will have a score of $(8 - 15)(8 + 15) = -161$.

The total score of a string is equal to the sum of all the scores of its subsequences. To satisfy Mike's curiosity, you want to determine all the possible total scores for a given string.

Constraints

$1 \leq N \leq 250$

S only consists of uppercase letters `A` ... `Z`.

Subtask 1 [10%]

$1 \leq N \leq 5$

Subtask 2 [10%]

S only consists of uppercase letters `A` and `B`.

Subtask 3 [30%]

$1 \leq N \leq 50$

Subtask 4 [50%]

No additional constraints.

Input Specification

The first line contains one integer N, the length of the string.

The second line contains the string S.

Output Specification

On the first line, output a single integer M, the total number of possible scores.

On the next M lines, output the possible scores sorted in ascending order.

Sample Input 1

```
3
ADB
```

Sample Output 1

```
4
-15
-3
0
12
```

Explanation for Sample Output 1

There are five possible ways to break up the string into subsequences:

`AD` `B`

The total score for the first arrangement is $(1-4)(1+4)+(2-2)(2+2)=-15$.

`AB` `D`

The total score for the second arrangement is $(1-2)(1+2)+(4-4)(4+4)=-3$.

`A` `D` `B`

The total score for the third arrangement is $(1-1)(1+1)+(4-4)(4+4)+(2-2)(2+2)=0$.

`A` `DB`

The total score for the fourth arrangement is $(1-1)(1+1)+(4-2)(4+2)=12$.

`ADB`

The total score for the fifth arrangement is $(1-2)(1+2)=-3$, which results in the same total score as the second arrangement.

Sample Input 2

```
3
AAC
```

Sample Output 2

```
2
-8
0
```

Explanation for Sample Output 2

One way to achieve a total score of -8 is by breaking the string into the following subsequences:

`A` `AC`

One way to achieve a total score of 0 is by breaking the string into the following subsequences:

`AA` `C`

Sample Input 3

```
4
ABAB
```

Sample Output 3

```
4
-6
-3
0
3
```

Sample Input 4

```
4
JHVM
```

Sample Output 4

```
9
-489
-420
-384
-105
-69
0
36
315
351
```