Again Make UTPC

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

You are given a string S of length N. Each letter of S is either `U`, `T`, `P` or `C`.

You can do the following operation zero or more times:

- Choose a pair of integers (i, j) which meets $1 \leq i \leq j \leq N$. Sort from the i-th letter to the j-th letter of S in ascending alphabetical order.

Find if it is possible to satisfy the following condition, and calculate the minimum number of operations if possible.

- S includes `UTPC` as a consecutive substring.

You have T test cases to solve.

Input

The input is given from Standard input in the following format, where case_i represents the i-th test case:

T
case_1
case_2
$\vdots$
case_T

Each case is given in the following format:

N
S

- T, N are integers.
- $1 \leq T \leq 2 \times 10^5$
- $1 \leq N \leq 2 \times 10^5$
- S is a string which consists of `U`, `T`, `P` and `C`, and whose length is N.
- For each input file, the sum of N over all test cases does not exceed 2×10^5.

Output

Print T lines. The i-th line should contain the answer for the i-th test case. In detail, print the minimum number of operations if it is possible to satisfy the condition. If it is not possible, print `-1`.

Example

standard input	standard output
3 10 UCUCTPUCUC 5 UTCUP 12 TUPCTTPCUTPC	2 -1 0

Note

For the first test case, it is possible to satisfy the condition by the following two operations. It is not possible within one operation.

- Choose $(i, j) = (1, 4)$. S becomes `CCUUTPUCUC`.
- Choose $(i, j) = (7, 10)$. S becomes `CCUUTPCCUU`.

For the second test case, there is no way to satisfy the condition.

For the third test case, an operation is not necessary to satisfy the condition.