Round C 2022 - Kick Start 2022

New Password

PROBLEM	ANALYSIS

Problem

A company named Gooli has issued a new policy that their employees account passwords must contain:

1. At least 7 characters.
2. At least one uppercase English alphabet letter.
3. At least one lowercase English alphabet letter.
4. At least one digit.
5. At least one special character. There are four special characters: #, @, *, and &.

The company has asked all the employees to change their passwords if the above requirements are not satisfied. Charles, an employee at Gooli, really likes his old password. In case his old password does not satisfy the above requirements, Charles will fix it by appending letters, digits, and special characters. Can you help Charles to find the shortest possible new password that satisfies his company's requirements?

Input

The first line of the input gives the number of test cases, T. T test cases follow. Each test case consists of two lines. The first line of each test case contains an integer N, denoting the length of the old password. The second line of each test case contains the old password of length N. Old password contains only digits, letters, and special characters.

Output

For each test case, output one line containing `Case #xx: yy`, where xx is the test case number (starting from 1) and yy is a valid new password, obtained by possibly fixing the old password in the way that Charles wants and satisfying the company's requirements.

It is guaranteed that at least one solution exists. If there are multiple solutions, you may output any one of them.

Limits

Time limit: 20 seconds.
Memory limit: 1 GB.
$1 \leq T \leq 100$ 1≤T≤100.

Test Set 1

$7 \leq N \leq 10^4$ 7≤N≤104.
The old password contains only digits.

Test Set 2

$1 \leq N \leq 10^4$ 1≤N≤104.
The old password contains only digits, letters, and special characters.

Sample
Note: there are additional samples that are not run on submissions down below.

Sample Input save_alt content_copy	Sample Output save_alt content_copy
2 7 1234567 10 1111234567	Case #1: 1234567aA& Case #2: 1111234567@Rc

In Sample Case #1, the old password does not satisfy requirements 2, 3, and 5. One possible shortest new password is `1234567aA&`.

In Sample Case #2, the old password does not satisfy requirements 2, 3, and 5. One possible shortest new password is `1111234567@Rc`.

Additional Sample - Test Set 2
The following additional sample fits the limits of Test Set 2. It will not be run against your submitted solutions.

Sample Input save_alt content_copy	Sample Output save_alt content_copy
3 1 A 2 1* 7 1234aB&	Case #1: Aa1*111 Case #2: 1*abAA* Case #3: 1234aB&

In Sample Case #1, the old password does not satisfy requirements 1, 3, 4, and 5. One possible shortest new password is `Aa1*111`.

In Sample Case #2, the old password does not satisfy requirements 1, 2, and 3. One possible shortest new password is `1*abAA*`.

In Sample Case #3, the old password already meets all the requirements so Charles does not have to change his password.