7. Optimal Polynomial

The positive integer K and a string S, that contains digits from 0 to 9, are given. The string S can be partitioned into some not empty substrings S[0], S[1], S[2], … so that S[0] + S[1] + S[2] + … = S (+ is a concatenation operation, S[0] is the head of S). Each partition of the string S into M substrings defines a polynom $P(x) = a[0] + a[1]*x + a[2] * x^2 + \ldots + a[M] * x^M$, where a[i] is the number designated by the substring s[i]. For example, the string S = 1204 can be partitioned into S = 1 + 204 (polynom P(x) = 1 + 204 * x), into S = 1 + 2 + 04 (polynom $P(x) = 1 + 2 * x + 4 * x^2$) etc. You must write a program that finds the polynom that has the minimum value P(K) from all possible polynoms that can be built from S. It is known that the maximum magnitude of the result cannot exceed $12*10^{14}$.

Input

There is one number in the first line – the number of tests. Each test is on a single line, containing the number K and the string S separated by one space.

Output

For each test you must write on one line the polynom that has the minimum value P(K). If there exist several optimal polynoms, you must write the one that has the minimal degree. The polynom must be printed beginning with the lowest degree.

For the second test of Sample Input you have K = 3, S = 123. S can be partitioned into (all possible partitions):

S = 123	polynom: P(X) = 123	value: P(3) = 123
S = 1 + 23	polynom: P(X) = 1 + 23 * X	value: P(3) = 70
S = 12 + 3	polynom: P(X) = 12 + 3 * X	value: P(3) = 21
S = 1 + 2 + 3	polynom: $P(X) = 1 + 2 * X + 3 * X^2$	value: P(3) = 34

Minimum polynom's value is 21 on partition S = 12 + 3, so the answer is P(X) = 12+3*X.

Sample Input

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3
1 1234
3 123
1 1001
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Sample Output

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1 + 2 * X^1 + 3 * X^2 + 4 * X^3
12 + 3 * X^1
1 + 1 * X^1
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