



## H. Superstrings

Superstrings.in  
Superstrings.cpp

An *alphabet* is a set of letters from which we can construct a string. For example, given the alphabet  $\{x,y,z\}$  we can construct strings like  $yzxxy$ ,  $zyxxzy$ ,  $zyyyy$ ,  $z$ , etc.

A string  $S_1$  is said to be a *superstring* of  $S_2$  if all the characters of  $S_2$  exist contiguously and in the same order within  $S_1$ . For example,  $xyzy$  is a superstring of  $xyz$ , but  $yxyzy$  is not a superstring of  $xyz$  because the characters of  $xyz$  don't exist contiguously within  $yxyzy$ , and also  $yxzy$  is not a superstring of  $xyz$  because the characters of  $xyz$  don't exist in the same order within  $yxzy$ .

If  $S_1$  is a superstring of  $S_2$  then  $S_2$  is a *substring* of  $S_1$ . Every string is a superstring and a substring of itself. Substrings/superstrings are different from subsequences/supersequences, since the latter doesn't require the elements of the subsequence to exist contiguously in the supersequence.

Given an alphabet  $A$ , a string  $S$  that is constructed from the alphabet  $A$ , and an integer value  $L$ , calculate the number of possible strings of length  $L$  that can be constructed from the alphabet  $A$  and are superstrings of  $S$ .

To make the problem easier to solve, let us assume that the string  $S$  always consists of distinct characters (i.e., no character exists twice within  $S$ ).

### Input Specifications:

The input starts with a line containing a positive integer  $k$  that indicates the number of test cases. Then  $k$  test cases follow. Each test case consists of two lines: The first line begins with a positive integer  $N$  that represents the size of the alphabet  $A$ , followed by the  $N$  distinct letters that comprise the alphabet  $A$  itself. The second line begins with a substring  $S$  for which we are counting superstrings, followed by a positive integer  $L$  that represents the length of the required superstrings.

The alphabet  $A$  is always comprised of small English letters (i.e.,  $A$  is subset of  $\{a, b, c, \dots, z\}$ ). Also,  $1 \leq N \leq 8$  and  $1 \leq L \leq 20$ .

### Output Specifications:

For each test case, output the number of possible superstrings in a separate line.

### Sample Input:

```
2
3 x y z
xyz 5
3 x y z
xy 5
```

### Sample Output:

```
27
99
```

**Hint:** Use 64-bit integers.