

Problem 5: Longest Prefix

The structure of some biological objects *is* represented by the sequence of their constituents. These constituents are denoted by uppercase letters. Biologists are interested in decomposing a long sequence into shorter ones. These short sequences are called primitives. We say that a sequence S can be composed from a given set of primitives P , if there are n primitives p_1, \dots, p_n in P such that the concatenation $p_1 \dots p_n$ of the primitives equals S . By the concatenation of primitives p_1, \dots, p_n we mean putting them together in that order without blanks. The same primitive can occur more than once in the concatenation and not necessarily all primitives are present. For instance the sequence `ABABACABAAB` can be composed from the set of primitives

`{A, AB, BA, CA, BBC}`.

The first K characters of S are the prefix of S with length K . Write a program which accepts as input a set of primitives P and a sequence of constituents T . The program must compute the length of the longest prefix, that can be composed from primitives in P .

Input Data

The input data appear in two files. The file `INPUT.TXT` describes the set of primitives P , while the file `DATA.TXT` contains the sequence T to be examined. The first line of `INPUT.TXT` contains N , the number of primitives in P ($1 \leq N \leq 100$). Each primitive is given in two consecutive lines. The first line contains the length L of the primitive ($1 \leq L \leq 20$). In the second line there is a string of uppercase letters (from 'A' to 'Z') of length L . The N primitives are all different.

Each line of the file `DATA.TXT` contains one uppercase letter in the first position. This file ends with a line containing a single period ('.').

The length of the sequence is at least 1 and at most 500,000.

Output Data

Write into the first line of file `OUTPUT.TXT` the length of the longest prefix of T that can be composed from the set P .

Example Input and Output

Figure 2 gives two input files and a corresponding output file.

INPUT.TXT	DATA.TXT	OUTPUT.TXT
5	A	11
1	B	
A	A	
2	B	
AB	A	
3	C	
BBC	A	
2	B	
CA	A	
2	A	
BA	B	
	C	
	B	
	.	

Figure 2