



**Problem D**  
 The Cave of Ali Ba-Ba

Input File: D.DAT

Program Source File: D.PAS or D.C or D.CPP

According to the legend, somewhere in the desert there is a cave full of treasures. The cave is sealed with a cipher lock as that illustrated in figure 1. The lock has  $n$  wheels. Each wheel is engraved with  $m$  decimal digits, from 0 to  $m-1$ . A lock code is a sequence of  $n$  wheel digits aligned between the two  $\blacklozenge$  markings on the lock. Digit  $i$  of the code corresponds to the wheel  $i$  of the lock, for  $i=0, n-1$  from left to right. There is a single code that opens the lock and many have tried in vain their luck to guess this code. They did not know that nearby the cave dwells an old man, called Ali Ba-Ba, who, for a dime, could tell how many digits from a trial lock code are positioned precisely as in the opening code of the lock.

Get ready to visit the Ali Ba-Ba's cave. Write a program that uses sets of data from a text file to compute the opening codes of several locks. Each data set specifies the parameters of a lock and contains a number of trial codes assessed by Ali Ba-Ba. The format of a data set is:

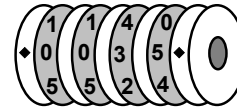


Figure 1. A cipher lock with  $N=4$ ,  $M=6$  and the code 0035

$N$   $M$   $Q$   $code_0$   $A_0$  ...  $code_{Q-1}$   $A_{Q-1}$

where  $1 \leq n \leq 10$  is the number of the lock wheels,  $2 \leq m \leq 10$  is the number of digits engraved on each wheel,  $Q \geq 1$  is the number of trial codes,  $code_k$  is the  $k$ -th code tried, and  $0 \leq A_k \leq m$  is the Ali Ba-Ba's assessment for  $code_k$  - i.e. how many digits from  $code_k$  are positioned precisely as in the opening code of the lock.  $n$ ,  $m$ , and  $Q$  are integers,  $code_k$  is a string of  $n$  decimal digits, each digit in the range  $0..m-1$ , and  $A_k$  is an integer. The items of the text file are separated freely by white spaces (spaces, tabs and line breaks). The input data are correct and Ali Ba-Ba tells the truth. In addition, the information provided by each data set from the input file is sufficient for computing the opening lock code.

For each data set from the input file, the program prints on the standard output the opening lock code for the lock described by the data set. The results are printed on successive lines, as illustrated in figure 2.

input		output
3 4 4		120
111 1 333 0 210 1 122 2		2201
4 3 3		
2010 1 1200 2 2202 3		

Figure 2. Input and output sample of the program

The input file from figure 2 contains two data sets. The first data set corresponds to a lock with  $n=3$  wheels, and  $m=4$  digits engraved on each wheel. There are  $Q=4$  trial codes. The first trial code is 111 and only one digit from this code is positioned precisely as in the opening code of the lock. The trial codes provide enough information for computing the opening lock code: 120. The second data set corresponds to a lock with  $n=4$  wheels, and  $m=3$  digits engraved on each wheel. There are  $Q=3$  trials and the opening code is 2201.