You are working in a robot factory. You are responsible to write programs that run in the hardware of robots. You have implemented your first program into a robot and turn the robot on. But your robot is not acting according to your program. You have decided to debug your program. To do so, you have opened the robots brain and created a copy of the whole RAM. The RAM contains different things like interrupt service routines, functions, variables etc. You are interested to look into what the variables hold at a particular time. But since it is a tedious task, you have decided to write another program to simplify your task.

Input

There will be several test cases in the input file. The first line of each test case starts with two positive integers $b \leq 8$ and $v \leq 200$, where b is the number of bits in a byte and v is the total number of variables in the RAM. These two integers will be separated by a single space. Each of the next v lines will contain a variable name, s_i, and number of bytes that variable will occupy in RAM, t_i, $1 \leq i \leq v$ and $1 \leq t_i \leq 8$. A variable name consists of lower case and upper case letters and the length of a variable name is not more than 20. Variable names are case sensitive. It is guaranteed that no two variable names are same in a set and all variables are unsigned. From the next line contents of the RAM will start. There will be exactly $\Sigma_{i=1}^{v} t_i$ lines and each line will have exactly b characters. Each character in the RAM is either 0 or 1. First t_1 lines are value for the variable s_1, next t_2 lines are value for the variable s_2 and so on. RAM contents are aligned as most significant byte first. Next line will have single integer, $1 \leq q \leq v$, number of variables for which you need to output the content of variable. Next q lines will each have a variable name. These variable names may or may not be one of the s_i's.

Output

If it is one of the s_i, output the variable name, and equal sign '=' (quotes for clarity only), and contents of the variable (in unsigned decimal number). If the queried variable name is not one of those s_i's, then output the variable name and equal sign only.

For clarification, see sample input and output.

Sample Input

```
4 4
ab 2
Cd 2
ef 3
gh 1
0101
1111
1111
0101
1010
1010
1010
1000
4
Ab
Cd
ef
gh
```

Sample Output

```
Ab=
Cd=245
ef=2730
gh=8
```