



## Selling RNA Strands

Do you know Just Odd Inventions Co., Ltd? The bussiness of this company is doing “just odd inventions.” Here we shall abbreviate its name, and call it the JOI Company.

Recently, the JOI Company is faced with a serious decline in its profitability by doing just odd inventions only. It is planning to start a new business. The plan is to sell liquid containing RNA chains. An RNA chain is considered as a string consisting of 4 characters ‘A’, ‘G’, ‘C’, ‘U’. For its business, the JOI Company prepares  $N$  chains of RNA.

The JOI Company will accept an order of RNA chains from customers in the following form:

- A customer chooses two strings  $P, Q$ . Then, among RNA chains prepared by the JOI Company, it sells strings whose first  $|P|$  characters are  $P$  and last  $|Q|$  characters are  $Q$ . Here,  $|P|, |Q|$  are the length of  $P, Q$ , respectively.

How many RNA chains prepared by the JOI Company match the conditions of orders from customers?

### Task

Given the information on RNA chains prepared by the JOI Company and orders from customers, write a program which calculates the number of RNA chains prepared by the JOI Company which match the conditions of orders from customers.

### Input

Read the following data from the standard input.

- The first line of input contains two space separated integers  $N, M$ . This means the JOI Company prepares  $N$  chains of RNA, and there are  $M$  orders from customers.
- The  $i$ -th line ( $1 \leq i \leq N$ ) of the following  $N$  lines contains a string  $S_i$ , which is the  $i$ -th RNA chain prepared by the JOI Company.
- The  $j$ -th line ( $1 \leq j \leq M$ ) of the following  $M$  lines contains two space separated strings  $P_j, Q_j$ . This means, in the  $j$ -th order, the customer chooses two strings  $P_j, Q_j$ .

### Output

The output consists of  $M$  lines. The  $j$ -th line ( $1 \leq j \leq M$ ) contains an integer, the number of RNA chains prepared by the JOI Company which match the condition of the  $j$ -th order.



## Constraints

All input data satisfy the following conditions.

- $1 \leq N \leq 100\,000$ .
- $1 \leq M \leq 100\,000$ .
- Each string consists of 4 characters A, G, C, U.
- $1 \leq |S_i| \leq 100\,000$  ( $1 \leq i \leq N$ ).
- $1 \leq |P_j| \leq 100\,000$  ( $1 \leq j \leq M$ ).
- $1 \leq |Q_j| \leq 100\,000$  ( $1 \leq j \leq M$ ).
- $|S_1| + |S_2| + \dots + |S_N| \leq 2\,000\,000$ .
- $|P_1| + |P_2| + \dots + |P_M| \leq 2\,000\,000$ .
- $|Q_1| + |Q_2| + \dots + |Q_M| \leq 2\,000\,000$ .

## Subtask

### Subtask 1 [10 points]

The following conditions are satisfied.

- $N \leq 100$ .
- $M \leq 100$ .
- $|S_i| \leq 100$  ( $1 \leq i \leq N$ ).
- $|P_j| \leq 100$  ( $1 \leq j \leq M$ ).
- $|Q_j| \leq 100$  ( $1 \leq j \leq M$ ).

### Subtask 2 [25 points]

The following conditions are satisfied.

- $N \leq 5\,000$ .
- $M \leq 5\,000$ .

**Subtask 3 [25 points]**

The following conditions are satisfied.

- $|S_1| + |S_2| + \dots + |S_M| \leq 100\,000$ .
- $|P_1| + |P_2| + \dots + |P_M| \leq 100\,000$ .
- $|Q_1| + |Q_2| + \dots + |Q_M| \leq 100\,000$ .

**Subtask 4 [40 points]**

There are no additional constraints.

**Sample Input and Output**

Sample Input 1	Sample Output 1
2 3	0
AUGC	1
AGC	2
G C	
AU C	
A C	

In this sample input, the JOI Company prepares two RNA chains AUGC, AGC.

- For the first order, output 0 because there is no RNA chain whose first character is G and last character is C.
- For the second order, output 1 because there is only one RNA chain AUGC whose first characters are AU and last character is C.
- For the third order, output 2 because there are two RNA chains AUGC, AGC whose first character is A and last character is C.



Sample Input 2	Sample Output 2
3 3	2
AA	1
AA	1
AGA	
AA AA	
AG GA	
AG GA	

Note that the same RNA chains and/or the same orders can appear more than once. Also, there can be an overlap between the first characters and the last characters chosen for an order. For example, the RNA chain AGA is considered as a string whose first characters are AG and last characters are GA.

Sample Input 3	Sample Output 3
8 7	1
GCGCUACCCCAACACAAGGCAAGAUUA	0
G	1
GGAC	2
GCGG	3
U	2
GCGCUACCCCAACACAAGGCAAGAUGGUC	0
GCCG	
GCGCUGA	
GCGCUACCC A	
GCGCUACCC AC	
GCG C	
GCGC A	
G G	
G C	
G GGA	