

### Question 1

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#### Digits in a Number

Let's say 1, 2, 3 are the only digits which exists in a unique number system, so the numbers will be 1, 2, 3, 11, 12, 13, 21, ... in ascending order .

1<sup>st</sup> number is 1 and number of digits is 1

4<sup>th</sup> will be 11 and number of digits is 2

14<sup>th</sup> will be 112 and number of digits will be 3

40<sup>th</sup> will be 1111 and number of digits will be 4

You have to find number of digits of  $N^{th}$  term in unique number system .

**Input :**

First line  $T$  contains number of testcases

Next  $T$  lines contains  $N$


**Output :**

Number of digits in  $N^{th}$  number

#### Constraints

$$1 \leq T \leq 10^5$$

$$1 \leq N \leq 10^{18}$$

**Sample Input** 

```
4
1
4
14
40
```

**Sample Output** 

```
1
2
3
4
```

#### Explanation

1<sup>st</sup> number is 1 and number of digits is 1

4<sup>th</sup> will be 11 and number of digits is 2

14<sup>th</sup> will be 112 and number of digits will be 3

40<sup>th</sup> will be 1111 and number of digits will be 4

Question 2

Compare Strings

You have been given two strings,  $A$  and  $B$  (of length  $N$  each) and  $Q$  queries. The strings contain only  $0$ s and/or  $1$ s.

For every query, you are given an index  $i$ . You have to update the value at index  $i$  to  $1$  in string  $B$  and check if  $B$  is lexicographically equal to or larger than  $A$  or not. If yes, then print "YES" and if not, print "NO" (without quotes).

Input format

- First line contains two space-separated integers  $N$  and  $Q$ .
- Next line contains the string  $A$ .
- Next line contains the string  $B$ .
- Next  $Q$  lines contains an integer  $i$  (1 - based indexing)

Output Format

For each query, print the desired output in a new line.

Input Constraints

$$1 \leq N, Q \leq 10^6$$
$$1 \leq i \leq N$$

Sample Input

```
5 5
11111
00010
1
2
3
4
5
```

Sample Output

```
NO
NO
NO
NO
YES
```

Explanation

After 1st query:  $B = 10010$ .  $B < A$ . (NO)  
After 2nd query:  $B = 11010$ .  $B < A$ . (NO)  
After 3rd query:  $B = 11110$ .  $B < A$ . (NO)  
After 4th query:  $B = 11110$ .  $B < A$ . (NO)  
After 5th query:  $B = 11111$ .  $B = A$ . (YES)

Note: Your code should be able to convert the sample input into the sample output. However, this is not enough to pass the challenge, because the code will be run on multiple test cases. Therefore, your code must solve this problem statement.