### #Problem 1: Basic Prime Checking

Description:

In this problem, first you will be given the number of test cases T. Then you will be given T numbers. For each number ti (1<=i<=T), you need to find if it's a prime number or not. Look at the input output section for more clarification.

Limits

1<=T<=100

1<=ti<=10^9

Test Cases:

| Input | Output |
| --- | --- |
| 3  2  3  12 | PRIME  PRIME  NOT PRIME |
| 7  10007000  1111113  3111391  100000003  100099897  300099973  244499972 | NOT PRIME  NOT PRIME  NOT PRIME  NOT PRIME  NOT PRIME  PRIME  NOT PRIME |

### #Problem 2: Finding the Pattern’s occurrences

Description:

In the first line, you will be given a text T and in the following line you will be given a pattern P. You need to find the occurrences of P in T. Print each occurrence (start and end index in T) in separate lines keeping the ascending order of the starting indexes. Look at the input output section for more clarification. The output will follow 0 based indexing.

Limits

P and T both will always contain only English upper case letters, ‘A’ <= Pi, Ti <=’Z’.

1<=|P|<=1000

1<=|T|<=10000000

Test Cases:

| Input | Output |
| --- | --- |
| ABCABCDABCADDD  BCA | 1 3  8 10 |
| AABABABCABABABABBABAB  ABAB | 1 4  3 6  8 11  10 13  12 15  17 20 |
| DDACBDBBBBBCBABBBCACBDDBBDBBBC  BBB | 6 8  7 9  8 10  14 16  26 28 |
| CAABCBBBBCBBCCACCACAAAABBBCCBB  CAABC | 0 4 |

### #Problem 3: Calculate Prefix Function of a String

Description:

In this problem, you will be given a string P. You need to calculate the prefix function’s value of P. For each length prefix Pi  (1 length, 2 length, 3 length, etc. ) of P, prefix function calculates the length of the maximum prefix that matches with the suffix of Pi.

Let the length of the given string be m. Then the output will have a single line containing m integer values separated with a single space denoting the length of the maximum prefix that matches with the suffix for each length prefix of Pi .

Limits

P will always contain only English upper case letters, ‘A’ <= Pi, Ti <=’Z’.

1<=|P|<=100000

Test Cases:

| Input | Output |
| --- | --- |
| ABABABABCA | 0 0 1 2 3 4 5 6 0 1 |
| ABABABABABABABABCA | 0 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 0 1 |
| AAACBBBCCAACAABBABCCACAAACBCCC | 0 1 2 0 0 0 0 0 0 1 2 0 1 2 0 0 1 0 0 0 1 0 1 2 3 4 5 0 0 0 |