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Coding Arena

<C∗deVita/>
the TCS Coding Contest

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Problem : Identify bases in which a given number representation is prime

We are familiar with base 10 (also called decimal) representation of numbers. For example, 234 is 2 x 100 + 3 x 10 + 4. Numbers can be represented in any base, B. Here, any number is expressed as $n_1, n_2,.... n_k$ representing the value $n_k + B\ n_{k-1}$

+.... + $n_1\ B^{k-1}$. Note than all $0 \le n_i < B$

The number 10 in decimal representation has value 2 in base 2 representation and value 3 in base 3 representation. Both 2 and 3 are primes even though the decimal representation has a value that is not prime.

Given a representation α β where α, β can be 0, 1, 2,...9, A, B,... Z, where A has value 10, B has value 11, and so on up to Z has value 36 (in decimal), we need to find all bases (in the range 2 to 36) in which α, β is a prime number. For example, 2J in base 20 is 2 x 20 + 19 = 59, a prime number.

Input Format:

T an integer indicating the number of test cases

T lines each containing a string of length 2; characters in the string would be from the set 0, 1, 2, ...9, A, B, ..., Z

Output Format:

Output

T lines each line containing a space separated list of numbers (in the range 2-36) in which the given string has prime value or NONE if no such base exists.

Constraints:

None

Example 1

Input
1
A0

Output
NONE

Explanation
The string A0 is not a valid representation in the bases 2 to 10. In bases from 11 to 36, its value is 10 times the base, and is not a prime. Hence NONE is the output.

Example 2

Input
1
2J

Output
20 21 24 26 27 30 32 35

Explanation
This representation 2J is not valid in bases 2 through 19.

Value of '2J' in base 20: 59, which is prime *
Value of '2J' in base 21: 61, which is prime *
Value of '2J' in base 22: 63, which is not prime
Value of '2J' in base 23: 65, which is not prime
Value of '2J' in base 24: 67, which is prime *
Value of '2J' in base 25: 69, which is not prime.
Value of '2J' in base 26: 71, which is prime *
Value of '2J' in base 27: 73, which is prime *
Value of '2J' in base 28: 75, which is not prime
Value of '2J' in base 29: 77, which is not prime
Value of '2J' in base 30: 79, which is prime *
Value of '2J' in base 31: 81, which is not prime
Value of '2J' in base 32: 83, which is prime *
Value of '2J' in base 33: 85, which is not prime
Value of '2J' in base 34: 87, which is not prime
Value of '2J' in base 35: 89, which is prime *
Value of '2J' in base 36: 91, which is not prime

Hence the bases in which '2J' is prime are 20, 21, 24, 26, 27, 30, 32 and 35.

Note:

Please do not use package and namespace in your code. For object oriented languages your code should be written in one class.

Note:

Participants submitting solutions in C language should not use functions from <conio.h> / <process.h> as these files do not exist in gcc

Note:

For C and C++, return type of main() function should be int.

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◉ I , **DEEPAK PATEL** confirm that the answer submitted is my own.

○ I would like to provide attribution to the following sources.

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