

## 6182 Ginkgo Numbers

We will define Ginkgo numbers and multiplication on Ginkgo numbers.

A *Ginkgo number* is a pair  $\langle m, n \rangle$  where  $m$  and  $n$  are integers. For example,  $\langle 1, 1 \rangle$ ,  $\langle -2, 1 \rangle$  and  $\langle -3, -1 \rangle$  are Ginkgo numbers.

The multiplication on Ginkgo numbers is defined by  $\langle m, n \rangle \cdot \langle x, y \rangle = \langle mx - ny, my + nx \rangle$ . For example,  $\langle 1, 1 \rangle \cdot \langle -2, 1 \rangle = \langle -3, -1 \rangle$ .

A Ginkgo number  $\langle m, n \rangle$  is called a divisor of a Ginkgo number  $\langle p, q \rangle$  if there exists a Ginkgo number  $\langle x, y \rangle$  such that  $\langle m, n \rangle \cdot \langle x, y \rangle = \langle p, q \rangle$ .

For any Ginkgo number  $\langle m, n \rangle$ , Ginkgo numbers  $\langle 1, 0 \rangle$ ,  $\langle 0, 1 \rangle$ ,  $\langle -1, 0 \rangle$ ,  $\langle 0, -1 \rangle$ ,  $\langle m, n \rangle$ ,  $\langle -n, m \rangle$ ,  $\langle -m, -n \rangle$  and  $\langle n, -m \rangle$  are divisors of  $\langle m, n \rangle$ . If  $m^2 + n^2 > 1$ , these Ginkgo numbers are distinct. In other words, any Ginkgo number such that  $m^2 + n^2 > 1$  has at least eight divisors.

A Ginkgo number  $\langle m, n \rangle$  is called a *prime* if  $m^2 + n^2 > 1$  and it has exactly eight divisors. Your mission is to check whether a given Ginkgo number is a prime or not.

The following two facts might be useful to check whether a Ginkgo number is a divisor of another Ginkgo number.

- Suppose  $m^2 + n^2 > 0$ . Then,  $\langle m, n \rangle$  is a divisor of  $\langle p, q \rangle$  if and only if the integer  $m^2 + n^2$  is a common divisor of  $mp + nq$  and  $mq - np$ .
- If  $\langle m, n \rangle \cdot \langle x, y \rangle = \langle p, q \rangle$ , then  $(m^2 + n^2)(x^2 + y^2) = p^2 + q^2$ .

### Input

The first line of the input contains a single integer, which is the number of datasets.

The rest of the input is a sequence of datasets. Each dataset is a line containing two integers  $m$  and  $n$ , separated by a space. They designate the Ginkgo number  $\langle m, n \rangle$ . You can assume  $1 < m^2 + n^2 < 20000$ .

### Output

For each dataset, output a character 'P' in a line if the Ginkgo number is a prime. Output a character 'C' in a line otherwise.

### Sample Input

```
8
10 0
0 2
-3 0
4 2
0 -13
-4 1
-2 -1
3 -1
```

**Sample Output**

C  
C  
P  
C  
C  
P  
P  
C