Coprime Conundrum

HackerRank

Arthur defines a function, $f(k)$, to be the number of (p, q) pairs such that:

- $1 < p \leq q \leq k$
- p and q are coprime.
- $p \cdot q = k$

Given an integer, n, help Arthur find and print the result of:

$$\sum_{k=1}^{n} f(k)$$

Input Format

The first line contains a single integer denoting n.

Constraints

- $1 \leq n \leq 10^9$

Subtasks

- $1 \leq n \leq 150$ for 30% of the maximum score.
- $1 \leq n \leq 10^6$ for 60% of the maximum score.

Output Format

Print the result of $\sum_{k=1}^{n} f(k)$ on a new line.

Sample Input

```
12
```

Sample Output

```
3
```

Explanation

The value of $f(k)$ for $1 \leq k \leq 12$ is:

- For $k = 6$, there is only 1 valid pair, $(2, 3)$, so $f(6) = 1$.
- For $k = 10$, there is only 1 valid pair, $(2, 5)$, so $f(10) = 1$
- For $k = 12$, there is only 1 valid pair, $(3, 4)$, so $f(12) = 1$

- For all other $1 \leq k \leq 12$, the function returns 0.

Thus, our final sum is the result of $1 + 1 + 1 = 3$.