Evasione dall'armadio (`armadio`)

The evil Alessandro locked up Valerio in a wardrobe! The poor guy must answer some questions about some numbers to exit from the wardrobe.

Figure 1: Valerio while he is trying to escape

In particular, Alessandro asks Valerio Q queries. For each query, Alessandro shouts an integer N_i with a threatening tone. Valerio must count the integer solutions to

$$a + b + \gcd(a, b) = N_i$$

with $a, b \geq 1$.

Help Valerio to escape from the wardrobe by answering the queries!

> ☞ $\gcd(a, b)$ is the greatest common divisor of a, b, that is the maximum positive integer k such that a/k, b/k are both integers.

Implementation

You should submit a single file, with a `.cpp` extension.

> ☞ Among the attachments in this task you will find a template `armadio.cpp` with a sample implementation.

You will have to implement the following function:

```
C++    void evadi(int Q, vector<int>& N);
```

- The integer Q represents the number of queries.
- The vector N, indexed from 0 to $Q-1$, contains the integers shouted by Alessandro. In particular, for each $0 \leq i < Q$, N_i indicates the integers shouted in the i-th query.
- At the end of the execution of the function, the array N must contain, instead of the integers N_i, the answers to the corresponding queries.

Sample Grader

Among this task's attachments you will find a simplified version of the grader used during the evaluation, which you can use to test your solutions locally. The sample grader reads data from `stdin`, calls the functions that you should implement and writes back on `stdout` using the following format.

The input file consists of 2 lines, containing:

- Line 1: the integer Q.
- Line 2: the Q integers $N_0, \ldots, N_{Q-1}$.

The output file consists of a single line:

- Line 1: the values $N_0, N_1, \ldots, N_{Q-1}$ at the end of the execution of the function `evadi`.

Constraints

- $1 \leq Q \leq 2 \cdot 10^5$.
- $1 \leq N_i \leq 4 \cdot 10^6$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

- **Subtask 1** [**0 points**]: Examples.
- **Subtask 2** [**8 points**]: $Q = 1, N_i \leq 200$
- **Subtask 3** [**8 points**]: $Q = 1, N_i \leq 2000$
- **Subtask 4** [**13 points**]: $Q = 1, N_i \leq 2 \cdot 10^5$
- **Subtask 5** [**8 points**]: $Q = 1, N_i \leq 5 \cdot 10^5$
- **Subtask 6** [**8 points**]: $Q = 1, N_i \leq 10^6$
- **Subtask 7** [**13 points**]: $Q = 1, N_i \leq 4 \cdot 10^6$
- **Subtask 8** [**13 points**]: $Q = 100, N_i \leq 4 \cdot 10^6$
- **Subtask 9** [**13 points**]: $Q = 50000, N_i \leq 4 \cdot 10^6$
- **Subtask 10** [**8 points**]: $Q = 10^5, N_i \leq 4 \cdot 10^6$
- **Subtask 11** [**8 points**]: No additional limitations.

Examples

stdin	stdout
3 6 10 13	5 8 4
6 327 869 541 985 214 736	199 388 144 406 192 974
4 3278695 419852 1473646 1537928	1595840 579790 1107994 2819626

Explanations

Explanation of the **first example**:

- In the **first query**, the solutions (a, b) are $(1, 4)$, $(2, 2)$, $(2, 3)$, $(3, 2)$, $(4, 1)$. For example,
    - $(1, 4)$ is a solution because $1 + 4 + \gcd(1, 4) = 6$;
    - $(2, 2)$ is a solution because $2 + 2 + \gcd(2, 2) = 6$.

- In the **second query**, the solutions (a, b) are $(1, 8)$, $(2, 6)$, $(2, 7)$, $(4, 5)$, $(5, 4)$, $(6, 2)$, $(7, 2)$, $(8, 1)$.

- In the **third query**, the solutions (a, b) are $(1, 11)$, $(5, 7)$, $(7, 5)$, $(11, 1)$.