B. Perfecto

time limit per test: 1.5 seconds
memory limit per test: 256 megabytes

A permutation p of length n^* is *perfect* if, for each index i ($1 \le i \le n$), it satisfies the following:

- The sum of the first i elements $p_1 + p_2 + \ldots + p_i$ is **not** a perfect square†.

You would like things to be perfect. Given a positive integer n, find a *perfect* permutation of length n, or print -1 if none exists.

---

*A permutation of length n is an array consisting of n distinct integers from 1 to n in arbitrary order. For example, $[2, 3, 1, 5, 4]$ is a permutation, but $[1, 2, 2]$ is not a permutation (2 appears twice in the array), and $[1, 3, 4]$ is also not a permutation ($n = 3$ but there is 4 in the array).

†A perfect square is an integer that is the square of an integer, e.g., $9 = 3^2$ is a perfect square, but 8 and 14 are not.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

The first and only line of each test case contains a single integer n ($1 \le n \le 5 \cdot 10^5$).

It is guaranteed that the sum of n over all test cases does not exceed 10^6.

Output

For each test case:

- If no solution exists, print a single integer -1.
- Otherwise, print n integers $p_1, p_2, \ldots, p_n$ — the *perfect* permutation you find.

If there are multiple solutions, print any of them.

Example

input Copy

```
3
1
4
5
```

output Copy

```
-1
2 4 1 3
5 1 4 3 2
```

Note

In the first test case, there is only one permutation with length $n = 1$ that is $p = [1]$, which is not *perfect*:

- $p_1 = 1 = x^2$ for $x = 1$.

In the second test case, one possible *perfect* permutation with length $n = 4$ is $p = [2, 4, 1, 3]$:

- $p_1 = 2 \neq x^2$;
- $p_1 + p_2 = 2 + 4 = 6 \neq x^2$;
- $p_1 + p_2 + p_3 = 2 + 4 + 1 = 7 \neq x^2$;
- $p_1 + p_2 + p_3 + p_4 = 2 + 4 + 1 + 3 = 10 \neq x^2$.

In the third test case, one possible *perfect* permutation with length $n = 5$ is $p = [5, 1, 4, 3, 2]$:

- $p_1 = 5 \neq x^2$;
- $p_1 + p_2 = 5 + 1 = 6 \neq x^2$;
- $p_1 + p_2 + p_3 = 5 + 1 + 4 = 10 \neq x^2$;
- $p_1 + p_2 + p_3 + p_4 = 5 + 1 + 4 + 3 = 13 \neq x^2$;
- $p_1 + p_2 + p_3 + p_4 + p_5 = 5 + 1 + 4 + 3 + 2 = 15 \neq x^2$.

Zadanie pochodzi z platformy Codeforces: https://codeforces.com/contest/2071/problem/B