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Special Judge, 64bit IO Format: %lld

🔗

Given an integer N , you need to construct a permutation P of integers from 0 to $N - 1$ such that for all $1 \leq i < N$, $P_i \oplus P_{i+1}$ is a prime number. Here, \oplus denotes the bitwise XOR operation.

Input:

The first line contains an integer T ($1 \leq T \leq 2 \times 10^5$), the number of test cases.

For each test case, there is a single integer N ($1 \leq N \leq 10^6$).

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

Output:

For each test case:

If a valid permutation exists, output a single line containing N space-separated integers representing the permutation P .

If no such permutation exists, output -1 .

Example 1

Input

```
2
4
5
```

Output

```
3 1 2 0
```

C++20clang++18

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ACM