F. Minimize Fixed Points

time limit per test: 3 seconds
memory limit per test: 256 megabytes

Call a permutation* p of length n *good* if $\gcd(p_i, i)^\dagger > 1$ for all $2 \le i \le n$. Find a good permutation with the *minimum* number of **fixed points**‡ across all good permutations of length n. If there are multiple such permutations, print any of them.

* A permutation of length n is an array that contains every integer from 1 to n exactly once, in any order.

† $\gcd(x, y)$ denotes the greatest common divisor (GCD) of x and y.

‡ A **fixed point** of a permutation p is an index j ($1 \le j \le n$) such that $p_j = j$.

Input

The first line contains an integer t ($1 \le t \le 10^4$) — the number of test cases.

The only line of each test case contains an integer n ($2 \le n \le 10^5$) — the length of the permutation.

It is guaranteed that the sum of n over all test cases does not exceed 10^5.

Output

For each test case, output on a single line an example of a good permutation of length n with the minimum number of fixed points.

Example

input

```
4
2
3
6
13
```

output

```
1 2
1 2 3
1 4 6 2 5 3
1 12 9 6 10 8 7 4 3 5 11 2 13
```

Note

In the third sample, we construct the permutation

i	p_i	$\gcd(p_i, i)$
1	1	1
2	4	2
3	6	3
4	2	2
5	5	5
6	3	3

Then we see that $\gcd(p_i, i) > 1$ for all $2 \le i \le 6$. Furthermore, we see that there are only two fixed points, namely, 1 and 5. It can be shown that it is impossible to build a good permutation of length 6 with fewer fixed points.