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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 $2\leq i\leq n$. 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.

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

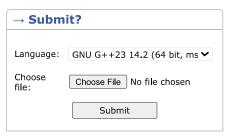
Note

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 $2\leq i\leq 6$. 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.





→ Last submissions				
Submission	Time	Verdict		
326966523	Jul/01/2025 19:39	Accepted		
326963091	Jul/01/2025 19:34	Wrong answer on test 1		
326960764	Jul/01/2025 19:31	Wrong answer on test 1		
326956821	Jul/01/2025 19:25	Wrong answer on test 1		
326943845	Jul/01/2025 19:09	Wrong answer on test 1		
326941074	Jul/01/2025 19:06	Wrong answer on test 1		
326937955	Jul/01/2025 19:02	Wrong answer on test 1		
326905169	Jul/01/2025 18:31	Wrong answer on test 1		
326898291	Jul/01/2025 18:26	Wrong answer on test 1		

 $[\]overline{\ }^*$ A permutation of length n is an array that contains every integer from 1 to n exactly once, in any order.

 $^{^{\}dagger}\gcd(x,y)$ denotes the greatest common divisor (GCD) of x and y.

 $^{^{\}ddagger}$ A **fixed point** of a permutation p is an index j ($1 \leq j \leq n$) such that $p_j = j$.

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