

Generate permutations by Johnson-Trotter Algorithm

Print all permutations of n distinct symbols using the Johnson-Trotter algorithm.

Input

Input begins with t ($1 \leq t \leq 9$) of number of test-cases in the first line and a test-case in each of the following lines. A test-case to have a positive integer n ($1 \leq n \leq 9$) in a single line.

Output

For each test-case, print all the permutations one per line in the order of generation of permutations by the Johnson-Trotter algorithm. A permutation is symbols from 1 to n separated by a space.

Example

Input:

```
3
1
2
3
```

Output:

```
1
1 2
2 1
1 2 3
1 3 2
3 1 2
3 2 1
2 3 1
2 1 3
```