

- 1 Print the square that consists of $N \times N$ cells filled with numbers from 1 to $N \times N$ in a spiral mode (see examples).

Note. Use recursion for solving this problem.

Sample Input 1:

3

Sample Output 1:

```
1 2 3
8 9 4
7 6 5
```

Sample Input 2:

4

Sample Output 2:

```
1 2 3 4
12 13 14 5
11 16 15 6
10 9 8 7
```

2.

Given two positive integers n and k . Your task is to output all sequences like: x_1, x_2, \dots, x_N such that x_i - natural and $1 \leq x_i \leq k$.

Note. Use recursion for solving this problem.

Sample Input 1:

2 3

Sample Output 1:

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

Sample Input 2:

3 3

Sample Output 2:

1 1 1
1 1 2
1 1 3
1 2 1
1 2 2
1 2 3
1 3 1
1 3 2
1 3 3
2 1 1
2 1 2
2 1 3
2 2 1
2 2 2
2 2 3
2 3 1
2 3 2
2 3 3
3 1 1
3 1 2
3 1 3
3 2 1
3 2 2
3 2 3
3 3 1
3 3 2
3 3 3

3.

Given a string (one dimension char array) consisting of M distinct symbols.
Print all the permutations (all possible variants) of the symbols of this string.

Sample Input 1:

AB

Sample Output 1:

ABBA

Sample Input 2:

IOX

Sample Output 2:

XOI
OIX
IXO
XIO
OXI
IOX

4.

. For the following task:

- Any other libraries except very basic ones are NOT allowed.
- Global and Static variables are not allowed.
- You can't add more parameters or call helper functions.

Power of two. Given 1 parameter - an *integer* n , return true if it is a power of two. Otherwise, return false.

An integer n is a power of two, if there exists an integer x such that $n = 2^x$

Test the function properly in main and give the output as shown in Figure 1.

```
0 is not a power of two
1 is a power of two
2 is a power of two
3 is not a power of two
4 is a power of two
5 is not a power of two
6 is not a power of two
7 is not a power of two
8 is a power of two
9 is not a power of two
-----
10 is not a power of two
12 is not a power of two
14 is not a power of two
16 is a power of two
18 is not a power of two
20 is not a power of two
22 is not a power of two
24 is not a power of two
26 is not a power of two
28 is not a power of two
30 is not a power of two
32 is a power of two
```

Figure 1.