Problem 5 - Bits at Crossroads

Bits are usually very boring. They walk only left <-> right and up <-> down. Your task is to write a program which builds diagonal roads to break the monotonous bits' habits.

You are given a **square board** of bits (**size NxN**). Bit positions on **each line** are counted from **right to left**. Line numbers are counted from **top to bottom**. Initially all bits are **set to zero**. You can build **two diagonal roads** easily if you know the coordinates of the **roads' intersection** (line number, bit position). A crossroad is an intersection between two roads.

Example: The line number is 2 and the bit position is 5: (2, 5). There are two diagonal roads – from (0, 7) to (7, 0) and from (0, 3) to (4, 7) and one crossroad (2, 5) (*see Fig. 1*). Cells shaded grey are the roads and cells shaded black are crossroads.

Example 2: We have two predefined crossroads (2, 5) and (3, 2). Now there are 4 crossroads in total – the start points and two additional points (1, 4) and (4, 3) *(see Fig. 2)*.

Your task is to write a program that prints the integer representation of each row from the final board and finds the number of crossroads on the board.

Fig. 1

	7	6	5	4	3	2	1	0	Number
0	1	0	0	0	1	0	0	0	136
1	0	1	0	1	0	0	0	0	80
2	0	0	1	0	0	0	0	0	32
3	0	1	0	1	0	0	0	0	80
4	1	0	0	0	1	0	0	0	136
5	0	0	0	0	0	1	0	0	4
6	0	0	0	0	0	0	1	0	2
7	0	0	0	0	0	0	0	1	1

Fig. 2

	7	6	5	4	3	2	1	0	Number
0	1	0	1	0	1	0	0	0	168
1	0	1	0	1	0	0	0	1	81
2	0	0	1	0	1	0	1	0	42
3	0	1	0	1	0	1	0	0	84
4	1	0	0	0	1	0	1	0	138
5	0	0	0	1	0	1	0	1	21
6	0	0	1	0	0	0	1	0	34
7	0	1	0	0	0	0	0	1	64

Input

- On the first line, you are given an integer number N that represents the size of the board.
- Each of the next lines will hold the position of a predefined crossroad – two integer numbers, separated with a single space:
  - The first integer will be the line number.
  - The second integer will be the bit position.
- When you read the "**end**" command from the console print the result.

The input data will always be valid and in the format described. There is no need to check it explicitly.

Output

The output data must be printed on the console.
- On the first N lines print the integer representations of each row of the board.
- On the last line print the total count of all crossroads on the board.

Constrains

- **The size N of the board** is an integer in the range [3 … 32].
- Each **start point** will **always** be a **zero bit**.
- Each **start point** will **always** be a **valid crossroad - the line number and bit position will both be in the range [0 … N)**.

Examples

Input	Output
8	168
2 5	81
3 2	42
end	84
	138
	21
	34
	65
	4

Input	Output
10	146
3 1	77
0 1	45
5 2	19
end	47
	76
	154
	305
	608
	192
	4

Input	Output
16	41128
2 5	20561
3 2	10282
8 5	5205
12 3	2698
end	1301
	682
	1361
	2208
	4433
	8874
	17684
	35338
	5141
	10274
	20545
	14