



Task Sob

It was a dark and dreary Christmas Eve when our hero pondered, weak and weary, over a quaint and curious COCI task. When he nodded, nearly napping, suddenly he heard a tapping, tapping and a mighty roar. A giant reindeer broke through his chamber door, merely this and nothing more. While our hero's heart slightly fluttered, the beast simply uttered: *"I won't leave until you solve this problem"*.



In the problem you were given two integers N and M and you were supposed to perfectly match the numbers from sets $A = \{0, 1, 2, \dots, N - 1\}$ and $B = \{M, \dots, M + N - 1\}$ into N pairs, such that for the matched numbers $x \in A$ and $y \in B$ it holds $x \& y = x$, where $\&$ denotes a bitwise AND operation.

Input

The first line contains two integers N and M ($1 \leq N \leq M, N + M \leq 10^6$) from the task description.

Output

You should output N lines and in each line you should output two integers x and y , where x belongs to set A and y belongs to set B . Numbers in each line should correspond to one of the matched pairs from task description.

It is possible to prove that the solution always exists.

Scoring

Subtask	Score	Constraints
1	10	N is a power of 2
2	29	$N + M$ is a power of 2
3	39	$N + M \leq 1000$
4	32	No additional constraints.

Examples

input

1 3

output

0 3

input

3 5

output

0 5

1 7

2 6

input

5 10

output

0 12

1 13

2 10

3 11

4 14