Ant droplets

Input file:	**standard input**
Output file:	**standard output**
Time limit:	1 second
Memory limit:	256 megabytes

On a tree there is a stick, which the ants love to climb on, but recently it has rained and the "local"ant population has been devastated. The ant queen needs your help with determining the number of ants still alive and their whereabouts.

We know that on the stick there are N branchings(in the form of a perfect binary tree and not counting the root node) and the ants are designated from 1 to M(alive or dead).

We also know that in the leftmost branch(from the branching downwards) the rain resulted in the death of ants only with index values equal to odd numbers from 1 to ∞(1 points to the leaf node).

Every branch from that onwards(left to right), varies in the type of destruction rain bestowed upon it, in the pattern odd, even, odd, and so on.*

We also know that the ants prefer to first populate the lower- and leftmost(when both are possible, the lower branch is chosen) branchings(including the leaf nodes).

The queen also made very clear to us the difference between branches and branchings.

Input

The only line of input contains two integers, $N(1 \le N \le 10^5)$(where $N+1$ may only be equal to values that correspond to number of nodes in some arbitrary perfect binary tree) and $M(1 \le M \le N)$.

Output

Print A, the number of ants alive and on separate lines their locations in the form b c, where b is the index of the ant alive and c is the number of the branch which the ant is on, in the case of it being conjoined of multiple branches, represented in the form $c_1 - c_2$, where c_1 is equal to the first(left to right) branching on the lowest level which is connected to the uppermost branching of the relevant branch, and c_2 is equal to the rightmost one.

Examples

standard input	standard output
14 4	2 2 2 4 4
2 1	(empty)
6 5	2 2 2 4 4

Note

In the second example, $N = 2$ and $M = 1$, therefore there are $N + 1$ nodes overall(including the root node) in the binary tree and initially there was 1 ant alive located on the lowest and leftmost node. In the drawing the nodes affected by the rain are striped(we ignore the root node), from that we can deduce that the only ant has died and therefore we output nothing.
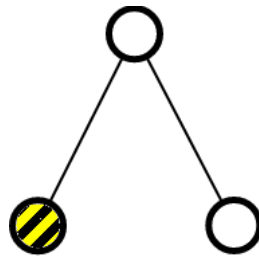
*It is important to note that branches are designated from the leaf of the tree and traversing upwards, that means that the rain may affect some branched more than once.