Problem H. Hall's Theorem

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

Consider a bipartite graph with vertices grouped into two parts, left and right, and edges only between vertices from different parts. Let A be a subset of vertices from the left part. We define $N(A)$ as the set of vertices from the right part which are adjacent to at least one vertex in A.

A subset A of vertices from the left part is **critical** if $|N(A)| < |A|$.

Your task is to find a bipartite graph which has n vertices in the left part, n vertices in right part, and exactly k critical subsets.

Input

The first line contains two integers n and k: the number of vertices in each part of the bipartite graph and the required number of critical subsets ($1 \le n \le 20$, $0 \le k < 2^n$).

Output

On the first line, print one integer m: the number of edges in your bipartite graph.

The next m lines must describe the edges of your graph. Each of them must contain two integers a_i and b_i, describing the edge from a_i to b_i ($1 \le a_i, b_i \le n$).

The graph must contain no multiple edges. Additionally, it must have exactly k critical subsets.

If there are several possible solutions, print any one of them. It is guaranteed that the solution always exists under the given input constraints.

Example

standard input	standard output
3 5	2 1 1 2 1