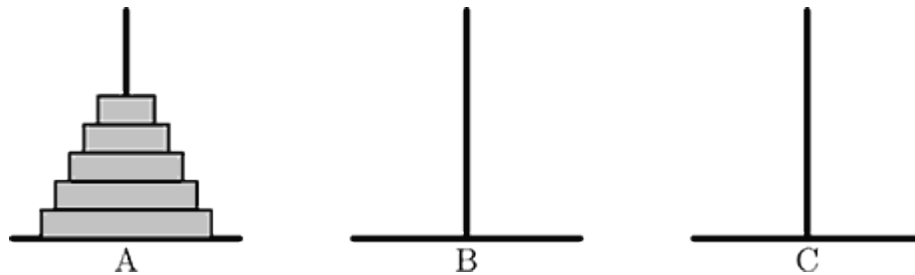# Tower of Hanoi

Description

The "Hanoi Towers" puzzle consists of three pegs (that we will name A, B, and C) with a total of N disks, each with different diameters stacked onto the pegs. Initially all disks are stacked onto peg A with the smallest disk at the top and the largest one at the bottom, so that they form a conical shape on peg A.

A valid move in the puzzle is moving one disk from the top of one (source) peg to the top of the other (destination) peg, with a constraint that a disk can be placed only onto an empty destination peg or onto a disk of a larger diameter. We denote a move with two capital letters — the first letter denotes the location (peg) of disk source, and the second letter denotes the location of disk destination. For example, AB is a move of the top disk at peg A to top of peg B.

The puzzle is considered solved when all the disks are stacked onto peg B (with pegs A and C empty).

Given N, solve the puzzle with minimal move and print the order of moves.

Input

Your program is to read from standard input. The number of disks N is given in the first line of input ($1 \le N \le 12$).

Output

Your program is to write to standard output. On the first line of output, you should print the number of moves. In the following lines, you should print each move on each line, in the order they are executed.

Sample

Input	Output
3	7
	AB
	AC
	BC
	AB
	CA
	CB
	AB