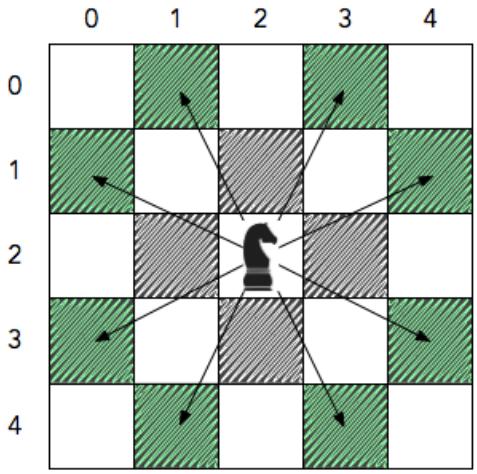
KnightL on a Chessboard

HackerRank

$KnightL$ is a chess piece that moves in an `L` shape. We define the possible moves of $KnightL(a, b)$ as any movement from some position (x_1, y_1) to some (x_2, y_2) satisfying either of the following:

- $x_2 = x_1 \pm a$ and $y_2 = y_1 \pm b$, or
- $x_2 = x_1 \pm b$ and $y_2 = y_1 \pm a$

Note that (a, b) and (b, a) allow for the same exact set of movements. For example, the diagram below depicts the possible locations that $KnightL(1, 2)$ or $KnightL(2, 1)$ can move to from its current location at the center of a 5×5 chessboard:



Observe that for each possible movement, the Knight moves 2 units in one direction (i.e., horizontal or vertical) and 1 unit in the perpendicular direction.

Given the value of n for an $n \times n$ chessboard, answer the following question for each (a, b) pair where $1 \leq a, b < n$:

- What is the minimum number of moves it takes for $KnightL(a, b)$ to get from position $(0, 0)$ to position $(n - 1, n - 1)$? If it's not possible for the Knight to reach that destination, the answer is `-1` instead.

Then print the answer for each $KnightL(a, b)$ according to the *Output Format* specified below.

Input Format

A single integer denoting n.

Constraints

- $5 \leq n \leq 25$

Output Format

Print exactly $n-1$ lines of output in which each line i (where $1 \leq i < n$) contains $n-1$ space-separated integers describing the minimum number of moves $KnightL(i,j)$ must make for each respective j (where $1 \leq j < n$). If some $KnightL(i,j)$ cannot reach position $(n-1, n-1)$, print `-1` instead.

For example, if $n = 3$, we organize the answers for all the (i,j) pairs in our output like this:

```
(1,1) (1,2)
(2,1) (2,2)
```

Sample Input 0

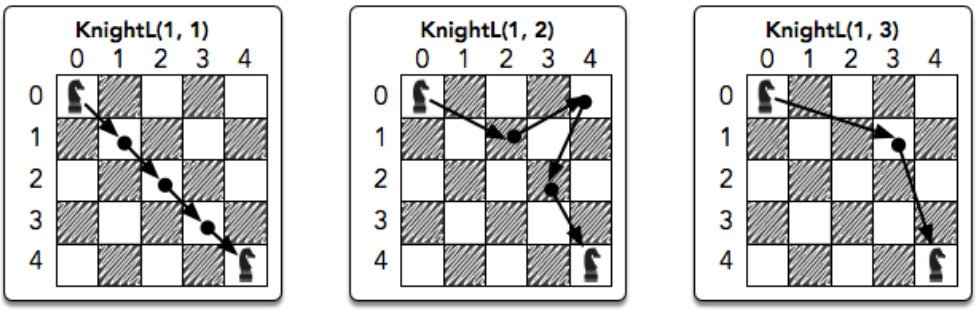
```
5
```

Sample Output 0

```
4 4 2 8
4 2 4 4
2 4 -1 -1
8 4 -1 1
```

Explanation 0

The diagram below depicts possible minimal paths for $KnightL(1,1)$, $KnightL(1,2)$, and $KnightL(1,3)$:



One minimal path for $KnightL(1,4)$ is:

$$(0,0) \to (1,4) \to (2,0) \to (3,4) \to (4,0) \to (0,1) \to (4,2) \to (0,3) \to (4,4)$$

We then print `4 4 2 8` as our first line of output because $KnightL(1,1)$ took 4 moves, $KnightL(1,2)$ took 4 moves, $KnightL(1,3)$ took 2 moves, and $KnightL(1,4)$ took 8 moves.

In some of the later rows of output, it's impossible for $KnightL(i,j)$ to reach position $(4,4)$. For example, $KnightL(3,3)$ can only move back and forth between $(0,0)$ and $(3,3)$ so it will never reach $(4,4)$.