You can see a (4×4) grid below. Can you tell me how many squares and rectangles are hidden there? You can assume that squares are not rectangles. Perhaps one can count it by hand but can you count it for a (100×100) grid or a (10000×10000) grid. Can you do it for higher dimensions? That is can you count how many cubes or boxes of different size are there in a $(10 \times 10 \times 10)$ sized cube or how many hyper-cubes or hyper-boxes of different size are there in a four-dimensional $(5 \times 5 \times 5 \times 5)$ sized hypercube. Remember that your program needs to be very efficient. You can assume that squares are not rectangles, cubes are not boxes and hyper-cubes are not hyper-boxes.

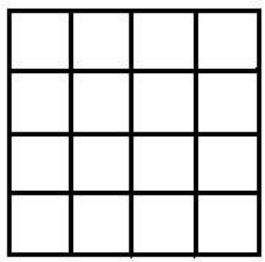

Fig: A 4×4 Grid

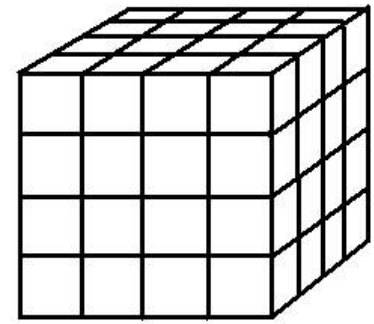

Fig: A $4 \times 4 \times 4$ Cube

Input

The input contains one integer N $(0 \leq N \leq 100)$ in each line, which is the length of one side of the grid or cube or hypercube. As for the example above the value of N is 4. There may be as many as 100 lines of input.

Output

For each line of input, output six integers $S_2, R_2, S_3, R_3, S_4, R_4$ in a single line where S_2 means no of squares of different size in $(N \times N)$ two-dimensional grid, R_2 means no of rectangles of different size in $(N \times N)$ two-dimensional grid. S_3, R_3, S_4, R_4 means similar cases in higher dimensions as described before.

Sample Input

```
1
2
3
```

Sample Output

```
1 0 1 0 1 0
5 4 9 18 17 64
14 22 36 180 98 1198
```