

# List Comprehensions

Let's learn about list comprehensions! You are given three integers  $x, y$  and  $z$  representing the dimensions of a cuboid along with an integer  $n$ . Print a list of all possible coordinates given by  $(i, j, k)$  on a 3D grid where the sum of  $i + j + k$  is not equal to  $n$ . Here,  $0 \leq i \leq x; 0 \leq j \leq y; 0 \leq k \leq z$ . Please use list comprehensions rather than multiple loops, as a learning exercise.

### Example

$x = 1$   
 $y = 1$   
 $z = 2$   
 $n = 3$

All permutations of  $[i, j, k]$  are:  
[[0, 0, 0], [0, 0, 1], [0, 0, 2], [0, 1, 0], [0, 1, 1], [0, 1, 2], [1, 0, 0], [1, 0, 1], [1, 0, 2], [1, 1, 0], [1, 1, 1], [1, 1, 2]].

Print an array of the elements that do not sum to  $n = 3$ .

[[0, 0, 0], [0, 0, 1], [0, 0, 2], [0, 1, 0], [0, 1, 1], [1, 0, 0], [1, 0, 1], [1, 1, 0], [1, 1, 2]]

### Input Format

Four integers  $x, y, z$  and  $n$ , each on a separate line.

### Constraints

Print the list in lexicographic increasing order.

### Sample Input 0

```
1
1
1
2
```

### Sample Output 0

```
[[0, 0, 0], [0, 0, 1], [0, 1, 0], [1, 0, 0], [1, 1, 1]]
```

### Explanation 0

Each variable  $x, y$  and  $z$  will have values of 0 or 1. All permutations of lists in the form  $[i, j, k] = [[0, 0, 0], [0, 0, 1], [0, 1, 0], [0, 1, 1], [1, 0, 0], [1, 0, 1], [1, 1, 0], [1, 1, 1]]$ . Remove all arrays that sum to  $n = 2$  to leave only the valid permutations.

### Sample Input 1

```
2
2
```

2  
2

**Sample Output 1**

```
[[0, 0, 0], [0, 0, 1], [0, 1, 0], [0, 1, 2], [0, 2, 1], [0, 2, 2], [1, 0, 0], [1, 0, 2], [1, 1, 1], [1, 1, 2], [1, 2, 0], [1, 2, 1], [1, 2, 2], [2, 0, 1], [2, 0, 2], [2, 1, 0], [2, 1, 1], [2, 1, 2], [2, 2, 0], [2, 2, 1], [2, 2, 2]]
```