



# List Comprehensions ☆

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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 x=int(input())
2 y=int(input())
3 z=int(input())
4 n=int(input())
5 print([[i,j,k] for i in range(x+1) and j in range(y+1) and k in range(z+1)])
6
```

Line: 6 Col: 1

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