

List Comprehensions

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Tutorial

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]]
```

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Difficulty	Easy
Max Score	10
Submitted By	528605

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Python 3

```
1  if __name__ == '__main__':
2      x = int(input())
3      y = int(input())
4      z = int(input())
5      n = int(input())
6      arr=[]
7      for i in range(x+1):
8          for j in range(y+1):
9              for k in range(z+1):
10                 if i+j+k != n:
11                     arr.append([i,j,k])
12      print(arr)
13
```

Line: 13 Col: 1

Upload Code as File

Test against custom input

Run Code

Submit Code

Congratulations!

You have passed the sample test cases. Click the submit button to run your code against all the test cases.

Sample Test case 0

Sample Test case 1

Input (stdin)

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1 1
2 1
3 1
4 2

Your Output (stdout)

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

Expected Output

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