



# List Comprehensions ☆

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## Problem

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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  $N$ . You have to 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,  $0 \leq i \leq X; 0 \leq j \leq Y; 0 \leq k \leq Z$

### Input Format

Four integers  $X, Y, Z$  and  $N$  each on four separate lines, respectively.

### 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

#### Concept

You have already used lists in previous hacks. List comprehensions are an elegant way to build a list without having to use different for loops to append values one by one. This example might help.

**Example:** You are given two integers  $x$  and  $y$ . You need to find out the ordered pairs  $(i, j)$ , such that  $(i + j)$  is not equal to  $n$  and print them in lexicographic order. ( $0 \leq i \leq x$ ) and ( $0 \leq j \leq y$ ) This is the code if **we dont use list comprehensions in Python**.

```
python x = int ( raw_input() ) y = int ( raw_input() ) n = int ( raw_input() ) ar = [] p = 0
for i in range ( x + 1 ) : for j in range( y + 1): if i+j != n: ar.append([]) ar[p] = [ i , j ] p+=1
print ar
```

Other smaller codes may also exist, but using list comprehensions is always a good option. **Code using list comprehensions:**

```
python x = int ( raw_input() ) y = int ( raw_input() ) n = int ( raw_input() ) print [ [ i, j ] for i in range( x + 1 ) for j in range( y + 1 ) if ( ( i + j ) != n ) ]
```

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

```
1  if __name__ == '__main__':
2      x = int(input())
3      y = int(input())
4      z = int(input())
5      n = int(input())
6
7      print ([[a,b,c] for a in range(0,x+1) for b in range(0,y+1) for c in range(0,z+1) if a + b +
8              c != n ])
```

Line: 7 Col: 107

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