Beautiful 3 Set

HackerRank

You are given an integer n. A set, S, of triples (x_i, y_i, z_i) is *beautiful* if and only if:

- $0 \leq x_i, y_i, z_i$
- $x_i + y_i + z_i = n, \forall i : 1 \leq i \leq |S|$
- Let X be the set of different x_i's in S, Y be the set of different y_i's in S, and Z be the set of different z_i in S. Then $|X| = |Y| = |Z| = |S|$.

The third condition means that all x_i's are pairwise distinct. The same goes for y_i and z_i.

Given n, find any *beautiful* set having a maximum number of elements. Then print the cardinality of S (i.e., $|S|$) on a new line, followed by $|S|$ lines where each line contains 3 space-separated integers describing the respective values of x_i, y_i, and z_i.

Input Format

A single integer, n.

Constraints

- $1 \leq n \leq 300$

Output Format

On the first line, print the cardinality of S (i.e., $|S|$).
For each of the $|S|$ subsequent lines, print three space-separated numbers per line describing the respective values of x_i, y_i, and z_i for triple i in S.

Sample Input

```
3
```

Sample Output

```
3
0 1 2
2 0 1
1 2 0
```

Explanation

In this case, $n = 3$. We need to construct a set, S, of non-negative integer triples (x_i, y_i, z_i) where $x_i + y_i + z_i = n$. S has the following triples:

1. $(x_1, y_1, z_1) = (0, 1, 2)$
2. $(x_2, y_2, z_2) = (2, 0, 1)$

3. $(z_3, y_3, z_3) = (1, 2, 0)$

We then print the cardinality of this set, $|S| = 3$, on a new line, followed by 3 lines where each line contains three space-separated values describing a triple in S.