D. Fox and Minimal path

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Fox Ciel wants to write a task for a programming contest. The task is: "You are given a simple undirected graph with n vertexes. Each its edge has unit length. You should calculate the number of shortest paths between vertex 1 and vertex 2."

Same with some writers, she wants to make an example with some certain output: for example, her birthday or the number of her boyfriend. Can you help her to make a test case with answer equal exactly to k?

Input

The first line contains a single integer k ($1 \le k \le 10^9$).

Output

You should output a graph G with n vertexes ($2 \le n \le 1000$). There must be exactly k shortest paths between vertex 1 and vertex 2 of the graph.

The first line must contain an integer n. Then adjacency matrix G with n rows and n columns must follow. Each element of the matrix must be 'N' or 'Y'. If G_{ij} is 'Y', then graph G has a edge connecting vertex i and vertex j. Consider the graph vertexes are numbered from 1 to n.

The graph must be undirected and simple: G_{ii} = 'N' and $G_{ij} = G_{ji}$ must hold. And there must be at least one path between vertex 1 and vertex 2. It's guaranteed that the answer exists. If there multiple correct answers, you can output any of them.

Examples

input
2

output
4 NNYY NNYY YYNN YYNN

input
9

output
8 NNYYYNNN NNNNNYYY YNNNNYYY YNNNNYYY YNNNNYYY NYYYYNNN NYYYYNNN NYYYYNNN

input
1

output

```
2
NY
YN
```

Note

In first example, there are 2 shortest paths: 1-3-2 and 1-4-2.

In second example, there are 9 shortest paths: 1-3-6-2, 1-3-7-2, 1-3-8-2, 1-4-6-2, 1-4-7-2, 1-4-8-2, 1-5-6-2, 1-5-7-2, 1-5-8-2.