

## Problem C. Oha

Input file:            oha.in  
Output file:           oha.out  
Time limit:            2 seconds  
Memory limit:         256 mebibytes

You're going to launch a new online game that everybody will want to play. However, your servers are not ready to handle so many players. More precisely, your servers can handle  $n$  players. Of course, you want as many players as possible, as that gives you as much income as possible. In other words, your goal is to have exactly  $n$  players.

Acknowledging the state of your servers publicly would mean bad PR for your company. So you've decided the limit the number of players in a different way: by limiting their choice for usernames in such a way that there are exactly  $n$  valid usernames.

The allowed usernames are strings that:

- Have length exactly  $k$ .
- Consist only of letters A and B.
- Do not contain any string from the *forbidden substring list*  $s_1, s_2, \dots, s_m$  as a substring.

You need to choose  $k$ ,  $m$ , and the strings  $s_1, s_2, \dots, s_m$  in such a way that there exist exactly  $n$  valid usernames. See the output format for the restrictions on the values you choose.

### Input

The only line of the input file contains one integer  $n$ ,  $1 \leq n \leq 10^9$ .

### Output

On the first line of the output file, print two integers  $k$  and  $m$ : the length of the usernames, and the number of forbidden substrings. On the next  $m$  lines print the forbidden substrings.

The following conditions must hold:

- $1 \leq k \leq 60$ .
- $0 \leq m \leq 100$ .
- Each forbidden substring  $s_i$  has length between 1 and  $k$ , and consists only of letters A and B.
- There exist exactly  $n$  valid usernames for the values you output.

It is guaranteed that a solution will always exist. You may output any valid solution. Forbidden substrings may coincide or be substrings of one another.

### Examples

oha.in	oha.out
5	3 1 BB
6	3 2 ABB BBB
8	3 0