

Unique Strings

Some people who love strings have decided to call a special group of strings as the “**unique strings.**”

Let's define **a(S)** as the number of characters “a” the string S contains, and **b(S)** as the number of characters “b” the string S contains.

S is a unique string if:

- 1) S only contains the characters “a” and “b”
- 2) For every substring S' of S, $|a(S') - b(S')| \leq 3$

For example, “abbab” is a unique string. However, “abbbba” is not because it includes the substring “bbbb” for which $|a(\text{“bbbb”}) - b(\text{“bbbb”})| = 4 > 3$.

Let's say we sort the unique strings – **first by length and then lexicographically**. The Nth unique string is the string that appears in the position N in the sorted list. The first unique string is assigned the number 1.

The first 12 unique strings in the sorted list are: **a, b, aa, ab,ba, bb, aaa, aab, aba, abb, baa, bab**

Input

A single number N ($1 \leq N \leq 10^{14}$). Your task is to find the Nth unique string in the sorted list.

Output

A single line: the Nth unique string in the sorted list.

Example

Input:

10

Output:

abb

Input:

19

Output:

abab