Compensated words X46137_en

Consider a word s of length n, with only letters '`a`' and '`b`'. For any prefix p of s, let $a(p)$ be the number of '`a`' within p, and let $b(p)$ be the number of '`b`' within p. In this problem, we say that s is compensated if and only if for every of the $n + 1$ prefixes p of s we have $|a(p) - b(p)| \leq 2$.

For instance, "`abbaaabb`" is compensated, but "`abbaaaab`" is not, because "`abbaaaa`" is a prefix with five '`a`' and two '`b`'. As other examples, neither "`bbb`" nor "`bbbbbb`" are compensated.

Given an n, print all compensated words of this length.

Input

Input consists of an n between 1 and 18.

Output

Print in alphabetical order all compensated words with n characters chosen between '`a`' and '`b`'.

Sample input 1

```
1
```

Sample output 1

```
a
b
```

Sample input 2

```
4
```

Sample output 2

```
aaba
aabb
abaa
abab
abba
abbb
baaa
baab
baba
babb
bbaa
bbab
```

Problem information

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