



Problem G. Guan’s Cat

TimeLimit: 0.5 seconds
MemoryLimit: 256 megabytes

Mr. Guan’s cat loves eating carrots, so he planted a field of them for his cat. However, because his cat is extremely fat, Mr. Guan wanted to make sure it could get some exercise while eating. To achieve this, he made the field very long so that the cat would have to run along it, but also very narrow to prevent it from growing wider, that is, the field can be represented as a sequence A of length n , $A_i = 1$ means there is a carrot planted at position i , and $A_i = 0$ means there isn’t one, where $i \in [0, n)$.



Mr. Guan’s cat

The cat, being lazy yet wanting to eat all the carrots, secretly ate a special “rubber fruit” from a mystery land, which allows it to stretch and shrink at it’s own will. As a result, it gains ability to move at a large step on the field (from position i to position $j + 1$) and eat all carrots within this step — that is, when it stands at position i ($i < n$), it can select any j ($j < n$) such that $i < j$, and eat all the carrots in the interval $[i, j]$. After eating, the cat will move to position $j + 1$, and continue eating with above rule until it standing at position n ; Due to the laziness of the cat, that it can only use this ability while starting in position 0. So the intervals selected by cat will partition sequence A into several (possibly one) non-overlapping contiguous intervals.

According to the “INTRINSIC TWO CARROT PRINCIPLE” aka I2CP, the number of carrots in each interval selected using cat’s ability must be **even**; otherwise, the cat will destroy the fabrication of spacetime because the “violations against I2CP”, which is not good.

Mr. Guan wants to know how many possible ways can Mr. Guan plant his field (i.e., how many valid sequences A) such that the cat can eat all the carrots, by using it’s ability without violate I2CP.

Input

The first line contains an integer n ($1 \leq n \leq 10^{18}$) — the length of the field.

Output

The number of different field with length n that Mr. Guan’s cat can finish all carrots by using it’s ability without violate I2CP modulo 998244353.

Examples

standard input	standard output
1	1
99824435	93885596