6704 Golden Radio Base

Golden ratio base (GRB) is a non-integer positional numeral system that uses the golden ratio (the irrational number $(1+\sqrt{5})/2 \approx 1.61803399$ symbolized by the Greek letter ϕ) as its base. It is sometimes referred to as base-ϕ, golden mean base, phi-base, or, phi-nary.

Any non-negative real number can be represented as a base-ϕ numeral using only the digits 0 and 1, and avoiding the digit sequence "11" — this is called a standard form. A base-ϕ numeral that includes the digit sequence "11" can always be rewritten in standard form, using the algebraic properties of the base ϕ — most notably that $\phi + 1 = \phi^2$. For instance, $11(\phi) = 100(\phi)$. Despite using an irrational number base, when using standard form, all on-negative integers have a unique representation as a terminating (finite) base-ϕ expansion. The set of numbers which possess a finite base-ϕ representation is the ring $\mathtt{Z}[1 + \sqrt{5}/2]$; it plays the same role in this numeral systems as dyadic rationals play in binary numbers, providing a possibility to multiply.

Other numbers have standard representations in base-ϕ, with rational numbers having recurring representations. These representations are unique, except that numbers (mentioned above) with a terminating expansion also have a non-terminating expansion, as they do in base-10; for example, 1=0.99999.

Coach MMM, an Computer Science Professor who is also addicted to Mathematics, is extremely interested in GRB and now ask you for help to write a converter which, given an integer N in base-10, outputs its corresponding form in base-ϕ.

Input

There are multiple test cases. Each line of the input consists of one positive integer which is not larger than 10^9. The number of test cases is less than 10000. Input is terminated by end-of-file.

Output

For each test case, output the required answer in a single line. Note that trailing `0`s after the decimal point should be wiped. Please see the samples for more details.

Hint: Besides $\phi + 1 = \phi^2$, we have another useful property of GRB, i.e., $2 * \phi^2 = \phi^3 + 1$.

Sample Input

```
1
2
3
6
10
```

Sample Output

```
1
10.01
100.01
1010.0001
10100.0101
```