E. The most beautiful equation in mathematics

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Akash Datta is learning about the most beautiful concept in mathematics. The most beautiful equation in mathematics is widely considered to be:

$$e^{i\pi} + 1 = 0$$

This is called **Euler's Identity**, and it's celebrated because it connects five of the most fundamental constants in all of mathematics:

1. e — the base of natural logarithms
2. i — the imaginary unit, where $i^2 = -1$
3. π — the ratio of a circle's circumference to its diameter
4. 1 — the multiplicative identity
5. 0 — the additive identity

To prove the equation:

$$e^{ix} = cos(x) + isin(x)$$

we can plug in $x = \pi$:

$$e^{i\pi} = cos(\pi) + isin(\pi)$$
$$e^{i\pi} = cos(\pi) + isin(\pi)$$
$$e^{i\pi} = (-1)^1 + i * 0$$
$$e^{i\pi} = -1 + 0$$
$$e^{i\pi} = -1$$

So the **Euler's Identity** becomes:

$$e^{i\pi} + 1 = 0$$

But now **Akash Datta** is curious about the generalized form:

$$e^{ni\pi} + 1 = ?$$

She knows that for any non-negative integer n ($n = 0, 1, 2, 3, \dots$):

$$e^{nix} = cos(nx) + isin(nx)$$

Help her find the value of the expression $e^{ni\pi} + 1$ for different values of n.

Input

The input contains multiple test cases.
The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases.
Each of the next t lines contains a single integer n ($0 \le n \le 10^9$).

Output

For each test case, output the value of the expression $e^{ni\pi} + 1$ on a new line.

Example

standard input	standard output
2 0 1	2 0

Note

1. $\cos(n\pi) = (-1)^n$
2. $\sin(n\pi) = 0$
3. $i = \sqrt{-1}$
4. $\pi \approx 3.1415$
5. $e \approx 2.718$