

Unlock it !

Vaibhav loves playing with numbers. To enjoy his summer holidays he decides to join the group "number players" of his school. He decides to visit the group hall. At the gate he finds a lock and a paper. The gate can only be unlocked by solving the puzzle written on the paper. Vaibhav is stuck with his puzzle, help him in solving it.

Here is the puzzle description:

Given a sequence $F(N)$

$$F(0)=1$$

$$F(1)=1$$

$$F(2)=1$$

$$F(n) = \text{product of all odd primes less than or equal to } n \text{ (for } n \leq 10)$$

$$F(n) = (2^{\lceil n/4 \rceil}) * F(\lceil n/5 \rceil) * F(\lceil n/10 \rceil) \quad (\text{for } n > 10)$$

For every fraction, a ceil value is taken for evaluation.

$$\text{For eg. } F(11) = 2^{\lceil 11/4 \rceil} * F(\lceil 11/5 \rceil) * F(\lceil 11/10 \rceil) = 2^3 * F(3) * F(2) = 24$$

Given N . Find the max value of $(a^b) \% \text{mod}$ such that a and b satisfies the relation $\text{gcd}(a,b) = F(N)$.

Gcd : Greatest common divisor

Input

First line gives T , total number of testcases.

Next T line gives number N

Output

For each test case, print the desired value on a new line

Constraints

$$T \leq 10$$

$$N \leq 10^6$$

$$\text{mod} = 10^9.$$

NOTE: a must be $\leq 5 * F(n)$ and b must be $\leq 5 * F(n)$, a can be equal to b and $\text{mod} = 10^9$

Example

Input:

1
2

Output:
1024