Ada and CAPTCHA

Ada the Ladybug just got an inovative idea (which might be a rival of captcha): She made following function - **F(a)=least significant 1-bit of a** (indexed from 1). She also made following recursive function **$T(N)=F(N*(N-1))^3+T(N-2)$**, where **T(0)=0,T(1)=0**.

Her idea is following- Instead of asking for captcha, she uses an opposite method: She gives you even **N** and you have to answer **T(N)** - if your answer is correct, then you are definetly robot and you won't be let in.

As her good friend she asked you to program a checker for her.

Input

The input begins with an integer **$1 \leq Q \leq 10^6$** , number of queries.

The next **Q** lines contains an even integer: **$2 \leq N \leq 2*10^8$**

Output

For each query, print **T(N)**

Example Input

```
5
8
4
2
20
1000
```

Example Output

```
107
35
8
310
23988
```

Little explanation

```
F(2)=2
F(12)=3
F(30)=2
F(56)=4
F(90)=2
F(132)=3
F(182)=2
F(240)=5
F(306)=2
F(380)=3
```