

Problem QUICKHACK: Quick Hack The Slot Machine

Rea invested lot of time in analyzing slot machines. He realized that the weak point is the random number generator. He knew that the manufacturer uses the ansic pseudo number generation algorithm. After years of examinations he can read in the seed in the animation and knows what happen at certain following pseudo numbers. So he can play the winning games. But he was to greedy and the operator of the slot machines realized that there is something going wrong and informed the manufacturer that there is a problem. So they updated the software.

After further three years of investigation Rea realized that the update is quite weak. They just calculate 9,999,999 random numbers with the old algorithm and take the median of them. All other software is the same. So Rea ask you to write a program that can select the median of a pseudo random sequence quick.

The ansic pseudo random number generator uses the following formula:

$$a_{i+1} = (a_i * 1103515245 + 12345) \% 2^{31}$$

where a_0 is the seed and a_i is the i th random number.

Input

The input consists of at most 10 test cases. In the first line the number of test cases is given. Each test case consists of a line with two numbers $a_0 < 2^{31}$ the seed of the sequence and an odd $n < 10,000,000$ the number of ansic pseudo numbers generated.

Output

Output for every test case a line with the median of the sequence $a_1..a_n$.

Sample Input 1

```
5
1 3
10 3
1 1
1 5
12345 67889
```

Sample Output 1

```
662824084
736986865
1103527590
1103527590
1073323985
```