Simple Recurrence

We define $T(n,\ d)$ as:

$$T(n,\ d) = \begin{cases} \frac{1}{d} & n = 0 \\ \frac{n+1}{T(n-1,\ d)+1} & n > 0 \end{cases}$$

You must answer two kinds of queries:

- `1 l r d`: Compute the value of P_1:

$$P_1 = \left(\prod_{n=l}^{r} T(n,\ d)\right) \bmod (10^9 + 7)$$

- `2 n m d`: Compute the value of P_2:

$$P_2 = \left(\prod_{k=0}^{m} T(n,\ d+k)\right) \bmod (10^9 + 7)$$

Notes:

- It is guaranteed that the values of P_1 and P_2 can be written as $\frac{a}{b}$, where a and b are positive integers, such that b is not a multiple of $(10^9 + 7)$.
- We define $\left(\left(\frac{a}{b}\right) \bmod c\right)$ as $\left(\left(a \times \left(b^{-1} \bmod c\right)\right) \bmod c\right)$.

Input Format

The first line contains an integer, q, denoting the total number of queries.
Each of the q subsequent lines contains four space-separated integers describing a query in one of the two formats defined above.

Constraints

- $1 \le q \le 10^5$
- $1 \le n \le 10^6$
- $1 \le l \le r \le 10^6$
- $1 \le m \le 100$
- $1 \le d \le 10^{18}$
- In all the test cases, the first $\lfloor \frac{3q}{4} \rfloor$ queries are first kind of query and the rest are second kind of query.

Output Format

For each query, print the answer on a new line (i.e., the value of P_1 for the first type of query or the value of P_2 for the second type of query).

Sample Input

```
5
1 1 4 2
```

```
1 2 4 2
1 3 4 2
2 1 1 1
2 1 1 2
```

Sample Output

```
90909097
818181828
636363644
333333337
2
```

Explanation

As $q = 5$, the first $\lfloor \frac{15}{4} \rfloor = 3$ queries are first kind of query and the remaining 2 queries are second kind of query. To answer them, we must compute the following six values:

- $T\left(1,\ 1\right) = \frac{1}{1}$
- $T\left(1,\ 2\right) = \frac{4}{3}$
- $T\left(2,\ 2\right) = \frac{9}{7}$
- $T\left(3,\ 2\right) = \frac{7}{4}$
- $T\left(4,\ 2\right) = \frac{20}{11}$
- $T\left(1,\ 3\right) = \frac{3}{2}$

Now we can answer the following queries:

1. `1 1 4 2`

$$P_1 = \prod_{n=1}^{4} T(n,\ d=2) = T(1,\ 2) \times T(2,\ 2) \times T(3,\ 2) \times T(4,\ 2) = \frac{4}{3} \times \frac{9}{7} \times \frac{7}{4} \times \frac{20}{11} = \frac{60}{11}$$

2. `1 2 4 2`

$$P_1 = \prod_{n=2}^{4} T(n,\ d=2) = T(2,\ 2) \times T(3,\ 2) \times T(4,\ 2) = \frac{9}{7} \times \frac{7}{4} \times \frac{20}{11} = \frac{45}{11}$$

3. `1 3 4 2`

$$P_1 = \prod_{n=3}^{4} T(n,\ d=2) = T(3,\ 2) \times T(4,\ 2) = \frac{7}{4} \times \frac{20}{11} = \frac{35}{11}$$

4. `2 1 1 1`

$$P_2 = \prod_{k=0}^{1} T(n=1,\ 1+k) = T(1,\ 1) \times T(1,\ 2) = \frac{1}{1} \times \frac{4}{3} = \frac{4}{3}$$

5. `2 1 1 2`

$$P_2 = \prod_{k=0}^{1} T(n=1,\ 2+k) = T(1,\ 2) \times T(1,\ 3) = \frac{4}{3} \times \frac{3}{2} = \frac{2}{1}$$