1010 □□□□□

Problem Description

n, m, k n $a_1, a_2, a_3, \cdots, a_n$

- $0 \le a_1 \le a_2 \le a_3 \le \cdots \le a_n < 2^m$
- $\oplus_{i=1}^{n} a_i = 0$ $\oplus$
- i $1 \le i \le n-k$ $a_i \ne a_{i+k}$

$f(n, m, k)$ n, m, k □ 1000000007 □□□□
□

f /

Input

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T $1 \le T \le 100$

n_1, m_1, k_1 $1 \le n_1 \le 10^7$ $1 \le \sum n_1 \le 6 \times 10^7$ $1 \le m_1 \le 23$ $1 \le k_1 \le n_1$

n_2, m_2 $1 \le n_2 \le 10^6$ $1 \le \sum n_2 \le 10^7$ $1 \le m_2 \le 23$

Output

$f\ (n_1, m_1, k_1)$

xor, sum $f\ (n_2, m_2, i)\ \ 1 \le i \le n_2$
$f\ (n_2, m_2, i)^2\ \ 1 \le i \le n_2$ 1000000007

xor, sum

$$xor = \oplus_{i=1}^{n_2} f\ (n_2, m_2, i)$$

$$sum = (\sum_{i=1}^{n_2} f\ (n_2, m_2, i)^2) \bmod 1000000007$$

$\oplus$ $\bmod$ $3 \bmod 2 = 1, (-7) \bmod 3 = 2$

Sample Input

```
4
2 2 1
3 2
3 4 2
2 3
4 3 2
1 1
99999 23 10000
100000 22
```

Sample Output

```
0
0 42
50
8 64
42
1 1
```

```
125954947
904110746 926732671
```

Hint

$$f\left(2,2,1\right)=0$$

- $f\left(3,2,1\right)=1$ $a_1=1,a_2=2,a_3=3$
- $f\left(3,2,2\right)=f\left(3,2,1\right)+3$ $i\ \ 1\leq i\leq 3$ $a_1=0,a_2=a_3=i$
- $f\left(3,2,3\right)=f\left(3,2,2\right)+1$ $a_1=a_2=a_3=0$