Counting Multisets

Input file:	`standard input`
Output file:	`standard output`
Time limit:	10 seconds
Memory limit:	256 megabytes

For a multiset S consisting of non-negative integers, let $p(S)$ denote the number of distinct sequences obtained by permuting the elements of S.

For example, if $S = \{1, 1, 2\}$, then there are three distinct sequences: $\{1, 1, 2\}$, $\{1, 2, 1\}$, and $\{2, 1, 1\}$, so $p(S) = 3$.

For non-negative integers n, x, y, let $f(n, x, y)$ be the number of multisets S satisfying the following conditions: $|S| = n$, $\sum_{i \in S} i = x$, $\mathrm{OR}_{i \in S} i = y$, and $p(S)$ is odd.

Now, given non-negative integers $n, x, y_{\max}$, calculate $f(n, x, y)$ for any subset y of the binary representation of $y_{\max}$, modulo $10^9 + 7$.

Input

The first line contains a positive integer T ($1 \le T \le 100$), representing the number of test cases.

For the next T lines, each line contains three non-negative integers $n, x, y_{\max}$ ($1 \le n < 2^{30}$, $0 \le x < 2^{45}$, $0 \le y_{\max} < 2^{15}$), denoting each test case.

Let $\mathrm{pcnt}(x)$ represent the number of 1s in the binary representation of x. It is guaranteed that:

- the number of test cases with $\mathrm{pcnt}(y_{\max}) > 5$ does not exceed 30.
- the number of test cases with $\mathrm{pcnt}(y_{\max}) > 10$ does not exceed 4.

Output

For each test case, output one line with several integers. Specifically, for all subsets y of $y_{\max}$ in binary representation, output $f(n, x, y)$ in ascending order of y, separated by spaces.

Example

standard input	standard output
2 7 10 7 9 16 7	0 0 1 3 0 2 2 2 0 0 1 0 0 0 0 0