

Sorted bit sequence

Let's consider the 32 bit representation of all integers i from m up to n inclusive ($m \leq i \leq n$; $m \times n \geq 0$, $-2^{31} \leq m \leq n \leq 2^{31}-1$). Note that a negative number is represented in 32 bit Additional Code. That is the 32 bit sequence, the binary sum of which and the 32 bit representation of the corresponding positive number is 2^{32} (1 0000 0000 0000 0000 0000 0000 0000 in binary).

For example, the 32 bit representation of 6 is 0000 0000 0000 0000 0000 0000 0000 0110

and the 32 bit representation of -6 is 1111 1111 1111 1111 1111 1111 1111 1010

because

$$\begin{array}{r}
 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 0110\ (6) \\
 + \\
 1111\ 1111\ 1111\ 1111\ 1111\ 1111\ 1111\ 1010\ (-6) \\
 \hline
 = 1\ 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ (2^{32})
 \end{array}$$

Let's sort the 32 bit representations of these numbers in increasing order of the number of bit 1. If two 32 bit representations that have the same number of bit 1, they are sorted in lexicographical order.

For example, with $m = 0$ and $n = 5$, the result of the sorting will be

| No. | Decimal number | Binary 32 bit representation |
|-----|----------------|---|
| 1 | 0 | 0000 0000 0000 0000 0000 0000 0000 0000 |
| 2 | 1 | 0000 0000 0000 0000 0000 0000 0000 0001 |
| 3 | 2 | 0000 0000 0000 0000 0000 0000 0000 0010 |
| 4 | 4 | 0000 0000 0000 0000 0000 0000 0000 0100 |
| 5 | 3 | 0000 0000 0000 0000 0000 0000 0000 0011 |
| 6 | 5 | 0000 0000 0000 0000 0000 0000 0000 0101 |

with $m = -5$ and $n = -2$, the result of the sorting will be

| No. | Decimal number | Binary 32 bit representation |
|-----|----------------|---|
| 1 | -4 | 1111 1111 1111 1111 1111 1111 1111 1100 |
| 2 | -5 | 1111 1111 1111 1111 1111 1111 1111 1011 |
| 3 | -3 | 1111 1111 1111 1111 1111 1111 1111 1101 |
| 4 | -2 | 1111 1111 1111 1111 1111 1111 1111 1110 |

Given m , n and k ($1 \leq k \leq \min\{n - m + 1, 2\ 147\ 473\ 547\}$), your task is to write a program to find a number corresponding to k -th representation in the sorted sequence.

Input

The input consists of several data sets. The first line of the input file contains the number of data sets which is a positive integer and is not bigger than 1000. The following lines describe the data

sets.

For each data set, the only line contains 3 integers m, n and k separated by space.

Output

For each data set, write in one line the k-th number of the sorted numbers.

Example

Sample input:

```
2
0 5 3
-5 -2 2
```

Sample output:

```
2
-5
```