I Dig It!

Given n, k and a subset s of $\{1, 2, \ldots, 9\}$, construct a positive integer x of n digits, using only digits in s, such that the remainder after dividing x by 2^n is k. Each digit in s can be used any number of times.

If it's not possible, you must also say so.

Answer q such problems.

Input format

The first line of input contains a single integer q, the number of problems.

Each problem begins with three integers, n, k and $|s|$, the number of digits x needs to have, the required remainder and the number of elements in s, respectively.

The next line contains $|s|$ integers, $d_1, d_2, \ldots, d_{|s|}$, the elements in s.

Output format

For each problem, output a single integer on a line by itself, a valid x, or -1 if no such x exists.

If there are multiple correct answers, you can output any of them.

Subtasks

In all subtasks $1 \leq q \leq 10\,000$, $1 \leq n, |s|$, $0 \leq k < 2^n$, $1 \leq d_i \leq 9$ and all d_i are distinct.

Subtask	Points	n	$\lvert s\rvert$
1	3	$n \leq 60$	$\lvert s\rvert = 1$
2	14	$n \leq 10$	$\lvert s\rvert \leq 2$
3	15	$n \leq 25$	$\lvert s\rvert \leq 2$
4	9	$n \leq 10$	$\lvert s\rvert \leq 9$
5	26	$n \leq 25$	$\lvert s\rvert \leq 9$
6	33	$n \leq 60$	$\lvert s\rvert \leq 9$

Example

Consider the following input:

```
3
2 0 1
8
3 7 2
1 5
60 1234567890 5
1 3 5 7 9
```

The following is a possible valid output:

```
88
111
-1
```

In the first problem we need to find a number x with $n = 2$ digits, which when divided by $2^n = 2^2 = 4$ gives a remainder of $k = 0$. We are allowed to use only the digit 8.

Clearly $x = 88$ is the only number that we can form, and this works.

In the second problem we need to find a number x with $n = 3$ digits, which when divided by $2^n = 2^3 = 8$ gives a remainder of $k = 7$. We are allowed to use only the digits 1 and 5.

We can form the numbers $x = 111$, $x = 115$, $x = 151$, $x = 155$, $x = 511$, $x = 515$, $x = 551$ and $x = 555$.

Of these, only $x = 111$, $x = 151$, $x = 511$, $x = 551$ work. We can report any of them.

In the third problem we need to find a number x with $n = 60$ digits, which when divided by $2^n = 2^{60}$ gives a remainder of $k = 1234567890$. We are allowed to use only the digits 1, 3, 5, 7 and 9.

It is easy to see that no x will work, because any such x we form must be odd and therefore its remainder after dividing by 2^{60} will still be odd, and cannot be an even number as required.