Bad Digits

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	1024 megabytes

As the end of the year approaches, the dwarf magistrate decides that their village should switch to a positional number system with a new base of N. For bases greater than 10, the dwarfs use digits `0` through `9`, followed by the uppercase English letters from `A` through `Z`. But the cause of all the problems is not the magistrate, but the dwarf elders, who, after consulting ancient tomes, decided that some of these digits are forbidden. Notably, the digit `0` is not on the list – after all, the dwarfs consider it a sacred symbol of balance.

The numbering system is a cornerstone of dwarf orderly society: the houses in each village are numbered with smallest distinct positive numbers (using the correct base N and not using forbidden digits). The magistrate wants to know what is the largest house number that will be used in the village.

Input

The first line of the input contains an integer T, the number of test cases (the number of villages). The following lines contains the description of the test cases.

The first line of test case contains three integers N, K, and M separated by single spaces, where N is the base for positional notation, K is the number of houses in a village and M is the number of forbidden digits. The second line contains the list of M distinct forbidden digits (in base N), separated by single spaces. If $M = 0$, the second line is empty.

Limits $1 \leq T \leq 10\,000$, $2 \leq N \leq 36$, $0 \leq M \leq N - 2$, $1 \leq K \leq 10^{18}$.

Output

For each test case, print one line containing the largest house number in the village (in the positional system with base N).

Example

standard input	standard output
6 3 5 1 1 9 7 1 7 2 100 0 7 123456789 3 3 6 1 16 123456789 3 1 A F 36 123456789 5 A X Z 2 4	202 8 1100100 25224550520222 2E878582 6C0503