Infinite String

Time limit: *1000 ms*
Memory limit: *256 MB*

Ivan Likes playing with strings. Today he decided to make the biggest string ever.

Using the first B characters of the Latin alphabet, he wants to write a string that first consists all the words of length 1, in lexicographical order, then all the words of length 2, in lexicographical order, etc.

For example, using the first 4 characters (a, b, c, d), the string will be the following (without spaces):

a b c d aa ab ac ad ba bb bc bd ca cb cc cd da db dc dd aaa aab aac aad aba ...

Because the string is infinite and Ivan has to go to the University in the morning, he is interested what character is at index X.

Standard input

The first line contains one integer, T, the number of queries.

The next T lines contain two integers, B and X, that correspond to the number of characters used in the alphabet and the 0-based index of the character Ivan wants to know.

Standard output

Output T lines. The ith line has the character for the ith query.

Constraints and notes

- $1 \leq T \leq 100$
- $1 \leq B \leq 26$
- $0 \leq X \leq 10^{18}$

Input	Output	Explanation
6 4 5 4 3 2 32 26 24 26 50 4 27	a d b y a d	For cases where $B = 2$, the 32th character is the following: abaaabbabbaaaaabaabbbaabaabbbab **b** baaaaaaabaabaaabbabaaabab ... For Cases where $B = 4$, the 3rd, 5th and 27th characters are the following: abc **d** a **a** abacadbabbbcbdcacbccc **d** dadbdcddaaaaabaacaadaba ... For cases where $B = 26$, the 24th and 50th characters are the following: abcdefghijklmnopqrstuvwx **y** zaaabacadaeafagahaiajakal **a** manaoapaqar ... Note that all indices are 0-based.