2021 PIGEON WHISPERER

The cutthroat world of pigeon racing is a progressive science and, in order to attract a younger crowd, has recently introduced showjumping. Progressive if not pragmatic.

There are fixed posts evenly spaced around a circle (labelled A, B, …), with one pigeon perching on each. When a signal is given they all make a single jump — the inexperienced spectator might think they fly — simultaneously clockwise around the circle. All pigeons move the same number of posts along, thus finishing with one pigeon per perch.

At least, that's the theory.

Whilst waiting for the signal, disinterested pigeons have been swapping positions with adjacent birds. Progressive if not patient. The pigeons have an innate counter for how far they need to jump to reach their finishing post, so a pigeon that moves anticlockwise in a swap knows it now has to jump one additional post; similarly for the clockwise moving pigeon. Pigeons do not understand negative numbers or modular arithmetic. A swap cannot take place that would reduce a pigeon's internal counter below 0 and if they lap the circle their counter continues to increase.

A *pigeon whisperer* is able to look deep into the mind of a pigeon and determine the value of their innate counter. The pigeons can then be encouraged to make swaps so that, when the signal is given, they will all be ready to move along the same number of posts. Regressive if not progressive.

A swap between two pigeons will be labelled with the anticlockwise post's label.

For example, suppose the pigeons (going clockwise from A) have counters 3–5–5–2–0–3:

- Swap C (the pigeons on posts C and D) leads to 3–5–3–4–0–3;
- The sequence CDCBC is 3–5–5–2–0–3 → 3–5–3–4–0–3 → 3–5–3–1–3–3 → 3–5–2–2–3–3 → 3–3–4–2–3–3 → 3–3–3–3–3–3;
- The minimum sequence of swaps required is 5;
- The alphabetically ordered 5 swap sequences are: CBDCB, CDBCB, CDCBC, DCBDC, DCDBC.

Spectators are impatient so the swap sequences must always be of minimum length.

SAMPLE INPUT

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6 4
3
5
5
2
0
3
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The first line of input will consist of two integers, p ($4 \le p \le 10$) then n ($1 \le n \le 2^{40}$), indicating that there are p pigeons and we require the n^{th} alphabetical minimum length sequence. This will be followed by p lines, the i^{th} of which contains the i^{th} pigeon's counter, each between 0 and p-1 inclusive.

Test input will always request a valid n requiring at least one swap.

You should output a line containing the n^{th} alphabetical minimum length sequence.

SAMPLE OUTPUT

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DCBDC
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