2018 DÉTENTE

An uneasy truce exists between the spies of *Alpha Complex* and *Beta Complex* but some fundamental differences exist on core pillars of ideology. These differences are so deep-seated that arranging the seating in shared complex space is, quite frankly, complex.

A large warehouse has just been acquired from a local company and power-points have been installed in a square grid. Desks have been placed at some of these points and the spies need to be allocated desks. To avoid a cold war over this hot issue, in any row or column the number of spies from *Alpha Complex* must be no more than one different from the number of *Beta Complex* spies.

For example, if desks had been placed at (0,0), (0,10), (10,0) and (0,20), and (0,0) contained an *Alpha Complex* spy:

- The spy at (10,0) would have to be from *Beta Complex*, hence the row (x,0) contains one of each spy;
- At least one of the spies in (0,10) and (0,20) would have to be from *Beta Complex*, so the row (0,y) would have one spy from one complex and two from the other.

For any set of desks there is always a solution.

The first line of input will consist of a single integer, n ($1 \le n < 2^{13}$), indicating the number of desks. Each of the next n lines will contain two integers, x_i and y_i ($0 \le x_i, y_i < 2^{16}$), indicating the co-ordinates of the i^{th} desk. No two desks will be at the same position.

You should output n lines, each containing an *A* or a *B*, the i^{th} line indicating the complex of the spy occupying the i^{th} desk. You may output any valid solution.

SAMPLE INPUT

```
4
0 0
0 10
10 0
0 20
```

SAMPLE OUTPUT

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A
A
B
B
```