7985 Bumper-to-Bumper Traffic

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It's the slow crawl of rush hour. At any point of time, each vehicle is either stopped or is moving at the extremely slow speed of 1 meter per second. Lately, vehicles come equipped with a simple "black box" that records all changes in a vehicle's speed. In this problem, speeds change instantaneously.

The road is modelled as the real line (units in meters). So a car is identified by its position on the line. Also, cars are 4.4 meters long.

Given initial positions of two cars that are driving along the real line in the positive direction and a transcript of their speed changes, do these cars ever collide? While such a collision would be very slow speed (a "bumper tap"), any collision could result in erroneous readings from the black box in the future, so the portions of the transcripts after a collision might not make sense. Both cars continue indefinitely after their last recorded speed change.

Input

Input may consist of multiple cases. Each case is described on three lines.

The first line contains two integers $0 \leq X_1, X_2 \leq 10^6$ indicating the initial positions of the rears of the two vehicles in meters. You are guaranteed either $X_1 + 5 \leq X_2$ or $X_2 + 5 \leq X_1$. Initially (at time 0), the two cars are stopped.

The second line begins with a number $0 \leq N_1 \leq 10^5$ indicating the number of times the speed of the first car changed. The rest of the line contains N_1 integers $0 < T_1 < T_2 < \ldots < T_{n_1} \leq 10^6$ indicating the times (in seconds) the first vehicle changed speeds. So at time T_1 it begins driving at 1 m/s, at time T_2 it stops, at time T_3 it begins driving at 1 m/s, and so on.

The last line begins with a number $0 \leq N_2 \leq 10^5$ and is followed by N_2 integers $0 < T'_1 < T'_2 < \ldots < T'_{n_2} \leq 10^6$ that describe the times the second vehicle starts and stops.

Output

For each test case, on a line by itself, the output must follow the description below.

If the vehicles collide, output the message '`bumper tap at time` S' on a single line where S is the number of seconds from time 0 that the vehicles first collide, rounded up to the nearest second. If the vehicles do not collide, output the message '`safe and sound`' on a single line.

Sample Input

```
0 5
3 1 4 5
3 1 4 6
10 0
2 1 2
1 1
0 5
3 1 4 5
3 1 4 5
```

```
2 13
1 1
3 4 7 10
```

Sample Output

```
bumper tap at time 6
bumper tap at time 8
safe and sound
safe and sound
```