A: Bumper-to-Bumper Traffic
Light Blue

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. Spacing of the data is arbitrary. The first line contains two integers $0 <= x_1, x_2 <= 20$ indicating the initial positions of the rears of the two vehicles in meters. You are guaranteed that either $x_1 + 5 <= x_2$ or $x_2 + 5 <= x_1$. Initially (at time 0), the two cars are stopped.

The second line begins with a number $0 <= n_1 <= 10$ indicating the number of times the speed of the first car changes. The rest of the line contains n_1 integers $0 < t_1 < t_2 < ... < t_{n_1} <= 10$ indicating the times (in seconds) at which the first vehicle changes speeds. So at time t_1 it begins driving 1 m/s, at time t_2 it stops, at time t_3 it begins driving 1 m/s, and so on. The third line is laid out the same way, but for the second car. The number of starts and stops may be different. Following the final case is a line containing two 0's.

Output

For each case, display the case number followed by the answer, formatted as in the sample. 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".

Sample Input

```
0 5
3 1 4 5
3 1 4 6
0 5
3 1 4 5
3 1 4 5
2 13
1 1
3   4   7   10
0 0
```

Sample Output

```
Case 1: bumper tap at time 6
Case 2: safe and sound
Case 3: safe and sound
```