Problem H
Jet Lag
Time limit: 2 seconds

The ICPC World Finals are here and they are packed full of activities you want to attend — speeches, presentations, fun events, not to mention the contest itself. There is only one problem: when are you going to sleep?

When you fall asleep, you always set a timer because otherwise you would be able to sleep forever. Using the timer, you can choose to sleep for any positive integer amount of minutes. After sleeping for k minutes, you will be rested for another k minutes (and so you will not be able to fall asleep again); and then you will be able to function for a third k minutes (so you can stay awake, but you can also go to sleep if you want to).

You know the times of all the activities at the Finals; you should plan your sleep schedule to not miss any part of any event. Just before the Finals start (at minute 0), you will arrive in your hotel room after a long journey and you will need to sleep immediately.

Input

The first line of input contains a positive integer n ($1 \leq n \leq 200\,000$), the number of activities planned for the Finals.

The i^{th} of the remaining n lines contains two positive integers b_i and e_i ($b_i < e_i$, $e_i \leq b_{i+1}$, $0 \leq b_1$, $e_n \leq 10^{10}$), the beginning and end time of the activity, counted in minutes from the beginning of the Finals.

Output

If it is possible to find a sleep schedule that allows you to participate in all planned activities in their entirety, then output such a schedule in the format described below. Otherwise, output `impossible`.

A sleep schedule is specified by a line containing the number p ($1 \leq p \leq 10^6$) of sleep periods, followed by p lines. The i^{th} of these lines contains two integers s_i and t_i — the beginning and end time of the i^{th} sleep period, counted in minutes from the beginning of the Finals. Note that you should not output any sleep period after the last activity.

The sleep periods must satisfy $0 = s_1 < t_1 < s_2 < t_2 < \ldots < t_p \leq b_n$ as well as the condition described in the statement that does not allow you to fall asleep for some time after a sleep period. You may fall asleep immediately after an activity (so it may be that $s_i = e_j$) and you may wake up just before an activity (so it may be that $t_i = b_j$).

If there are multiple valid sleep schedules, any one will be accepted. It can be shown that if there is a valid sleep schedule, then there is also one with at most 10^6 sleep periods.

Sample Input 1	Sample Output 1
3 30 45 60 90 120 180	2 0 30 90 120

Sample Input 2	Sample Output 2
1 0 60	impossible

Sample Input 3	Sample Output 3
7 31 32 35 41 48 55 69 91 1000 2022 2022 2023 2994 4096	5 0 5 10 28 56 68 92 900 2025 2900