Problem I
Shuffle
Input: Standard Input
Output: Standard Output

My office is quite far from my home. Every day, I go there by bus. That takes a lot of time. More over, due to traffic jams, the time to reach my office is not fixed. To make the best use of this time, I carry my music player all the time.

My music player has a 'shuffle' mode. In that mode, the music player selects a track randomly that has not been played in that session, and starts playing. It will continue doing so, until, I have stopped playing, or it has played all tracks in that session. For the purpose of this problem, you can assume that all tracks are of equal duration. To select randomly, the player keeps list of the tracks already played. That is, if I listen to one track now, from next shuffle session, that track will be marked as played. To select a random track, the player always use such strategy that, selecting an old track (Already listened) is twice more probable than a new track (Not listened).

I go to my office in the morning and return home at night. It takes at least p minutes and at most q minutes to reach my office. The time required will always be an integer. You can assume that all travel times are equiprobable (that is, if p = 2 and q = 4, and if P(t) is the probability to reach office in t minutes, then P(2) = P(3) = P(4)). If all tracks are of 1 minute, how many days on average are required to listen to all the songs?

Input

First line of input contains an integer $T(\leq 10053)$, the number of test cases.
Each test case contains 5 integers, N $(1 \leq N \leq 75)$, p_1, q_1, p_2, q_2 $(0 \leq p_1, q_1, p_2, q_2 \leq 30, p_1 \leq q_1, p_2 \leq q_2)$, where N is the number of songs, p_1, q_1 are the minimum and maximum number of songs listened during day, and p_2, q_2 are the minimum and maximum number of songs during night.

Output

For each test case, output the test case, followed by the expected number of days required to listen all songs. If it's not possible to listen to all songs, output "IMPOSSIBLE". Errors less than 10^{-6} will be tolerated.

Sample Input	Output for Sample Input
5 1 0 1 0 1 1 0 1 0 0 1 0 0 0 1 2 1 1 0 0 3 0 1 0 2	Case 1: 1.3333 Case 2: 2.0000 Case 3: 2.0000 Case 4: 4.0000 Case 5: 4.9630

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Description of sample case 1:

Each day, I will listen to either 1 song, or no song. Probability of listening to 1 song is

Probability of not listening to any song is $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

So, probability of listening the song on the first day = $\frac{3}{4}$

Probability of listening the song on the second day = $\frac{1}{4} \times \frac{3}{4}$

Probability of listening the song on the second day = $\frac{1}{4^2} \times \frac{3}{4}$

And so on. So, the expected number of days will be:

$$= \frac{3}{4} \times \left(1 + \frac{2}{4} + \frac{3}{4^2} + \ldots \infty \right)$$

The infinite sum evaluates to $\frac{16}{9}$, and thus, expected days = $\frac{3}{4} \times \frac{16}{9} = \frac{4}{3} = 1.33333333\ldots.$