Crocodile Logistics

HackerRank

TL: 2s

[Photo Credit: Wikimedia Commons]

You live in the Australian outback. Your job involves fairly typical Australian activities like proactively ensuring that your neighbours and colleagues aren't eaten by saltwater crocodiles.

You are responsible for the logistics of relocating large, wild, and hungry crocodiles away from a human habitation in the town of (**A**)ntimony. Your goal is to get all of the crocodiles secured at your (**C**)orporate HQ, for later reintroduction into more remote areas. Between A and C, there is a (**B**)arge harbour. A and B are separated by a river, and B and C are separated by a road. You have at your disposal one boat on the river and one truck on the road. Your company has some number of workers, initially distributed across these sites.

Each vehicle can carry at most two entities (e.g. one person and one crocodile), and given that the crocodiles are unable or unwilling to operate motor vehicles, each mode of transport requires a human operator when in use. The time taken to complete each leg of the trip is approximately equal, so you've decided that it would be best to schedule all trips relative to a periodic time interval. (You may assume that in a given cycle, all departures are simultaneous and all arrivals are simultaneous, with the two being separated by a short coordinated loading/unloading period.)

At site C, crocodiles are secured in holding cells, so no danger can come to humans there (even if they are sorely outnumbered). However, at any given point in time, at each of sites A and B, it is unsafe for crocodiles to strictly outnumber humans (provided that there are people present; leaving unattended crocodiles is permitted if there aren't also potential snacks around).

Given the initial locations of crocodiles, workers, and vehicles your task is to determine the minimum number of trip-cycles necessary to get ***all of the crocodiles and all of the workers*** to site C.

Input Format

The first line of the input consists of a single integer T, the number of test cases. The next T lines each consist of six integers (HA, HB, HC, CA, CB, CC) and two characters (Boat, Truck).

These represent the configuration of the problem at time zero.

HA, HB, and HC are the number of humans at A, B, and C, respectively. Similarly for CA, CB, CC and crocodiles.

Boat is either the character 'A' or 'B', and Truck is either the character 'B' or 'C'. These represent the starting position of the vehicles.

Constraints

$$1 < T \leq 1000$$

HA + HB + HC <= 20, CA + CB + CC <= 20. Inputs are always safe.

Output Format

The output consists of T lines.

For each case, if it is possible to get all of the people and crocodiles to site C, then output a line consisting of a single integer representing the earliest time at which this may be achieved.

Otherwise, output a line consisting of the string “IMPOSSIBLE” (without quotation marks).

Sample Input

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1
1 0 1 0 2 0 A C
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Sample Output

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6
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