Advanced Problem

Measuring Water

14 March 2009

Source File	`water.{java,c,cc}`
Input File	`water.in`
Output File	`water.out`

You have three unmarked jars of different sizes, containing some amount of water. Your wish is to move the amount of water among the jars to end with a certain amount of water in each jar, using nothing but the jars themselves.

You may move water around by pouring from a *source* jar into a *destination* jar. But, without marks, you can't measure how much you've moved. Therefore, you can only stop when either the destination jar is full (possibly leaving some water in the source jar), or when the source jar is empty. Under no circumstances can you use additional water or discard water. Your task is to determine the minimum number of pours required to obtain the desired amount of water in each jar.

The input file will begin with a line containing a number, N, telling you the number of problems to solve. Then, each problem is given as one input line containing six positive integers:

- the three capacities: c_1, c_2, c_3;
- the three initial contents: i_1, i_2, i_3; and
- the desired three final contents: f_1, f_2, f_3;

all separated by at least one blank space.

For each problem, you must output one line containing the minimum number of pours required to obtain the desired final contents. If there is no possible solution, you must output a line saying `IMPOSSIBLE`.

Example

An example of an input file is:

```
5
5␣4␣1␣␣1␣0␣1␣␣0␣2␣0
5␣4␣1␣␣1␣0␣1␣␣0␣3␣0
5␣4␣1␣␣1␣0␣1␣␣0␣0␣2
5␣4␣1␣␣1␣0␣1␣␣1␣0␣1
5␣4␣1␣␣0␣4␣0␣␣3␣0␣1
```

Correct output is:

```
2
IMPOSSIBLE
IMPOSSIBLE
0
2
```