

## 12346 Water Gate Management

A dam has  $n$  water gates to let out water when necessary. Each water gate has its own capacity, water path and affected areas in the downstream. The affected areas may have a risk of flood when the water gate is open. The cost of potential damage caused by a water gate is measured in number calculated from the number of people and areas estimated to get affected.

Suppose a water gate  $G_i$  has the volumetric flow rate of  $F_i$  m<sup>3</sup>/hour and the damage cost of  $C_i$ . In a certain situation, the dam has the volume  $V$  m<sup>3</sup> of water to flush out within  $T$  hours. Your task is to manage the opening of the water gates in order to get rid of *at least* the specified volume of water within a limited time in condition that the damage cost is minimized.

For example, a dam has 4 water gates and their properties are shown in the following table.

Water Gate	$G_1$	$G_2$	$G_3$	$G_4$
Flow rate (m <sup>3</sup> /hour)	720,000	50,000	130,000	1,200,000
Cost	120,000	60,000	50,000	150,000

**Case 1:** You have to flush out the water 5 million m<sup>3</sup> within 7 hours. The minimum cost will be 120,000 by letting the water gate  $G_1$  open for 7 hours.

**Case 2:** You have to flush out the water 5 million m<sup>3</sup> within 30 hours. The minimum cost will be 110,000 by letting the water gates  $G_2$  and  $G_3$  open, for example,  $G_2$  is open for 29 hours and  $G_3$  is open for 28 hours.

Note that each water gate is independent and it can be open only in a unit of whole hour (no fraction of hour).

### Input

The first line includes an integer  $n$  indicating number of water gates ( $1 \leq n \leq 20$ ). Then the next  $n$  lines contain, in each line, two integers:  $F_i$  and  $C_i$  corresponding to the flow rate (m<sup>3</sup>/hour) and the damage cost of the water gate  $G_i$  respectively. The next line contains the number  $m$  which is the number of test cases ( $1 \leq m \leq 50$ ). The following  $m$  lines contain, in each line, two integers:  $V$  and  $T$  corresponding to the volume (m<sup>3</sup>) of water to let out within  $T$  hours. ( $1 \leq F_i, V, C_i \leq 10^9$ ,  $1 \leq T \leq 1000$ )

### Output

For each test case, print out the minimum cost in the exact format shown in the sample output below. If it is **not** possible to let out the water of volume  $V$  in  $T$  hours from the dam, print out 'IMPOSSIBLE' (without quotation marks).

### Sample Input

```
4
720000 120000
50000 60000
130000 50000
1200000 150000
3
5000000 7
5000000 30
63000000 24
```

**Sample Output**

Case 1: 120000

Case 2: 110000

Case 3: IMPOSSIBLE