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Algorithms Lab

Exercise – *Moving books*

Simone owns *many* books, and now she is moving to a new apartment! Luckily her books are already neatly packed away in cardboard boxes and ready to move. However, each box must still be moved from her second-floor apartment to the moving van parked in the street.

For this purpose, n friends have volunteered their service. Each friend is of a certain *strength*, expressed by a number s_i corresponding to the weight of the heaviest box that he can lift. The boxes are designed in such a way that each friend can lift only one box at a time; additionally it is impossible for two friends to lift a box together.

Given that the time to move a box from the apartment to the van is exactly two minutes (regardless of the strength of the friend), and that the time to get back upstairs after moving a box is one minute, what is the least amount of time in which all the boxes can be moved to the van? Initially all friends are upstairs, but it is not necessary for all friends to be back upstairs at the end.

You can assume that an unlimited number of friends can use the stairs at the same time without bumping into each other. You can also assume that Simone is busy carrying other things and does not help with the boxes.

Input The first line of the input contains the number $1 \le t \le 20$ of test cases. Each test case starts with a line containing two integers n and m, the numbers of friends and of boxes, respectively, where $1 \le n, m \le 300\,000$. This is followed by two additional lines. The first line contains the strengths $s_0, \ldots, s_{n-1}$ of the friends. The second line contains the weights $w_0, \ldots, w_{m-1}$ of the boxes. Both the strengths and the weights are integers between 1 and $500\,000$.

Output For every test case, your program should output, on a separate line, the minimal time needed to move all the boxes from the apartment to the van.

If the friends are not sufficiently strong to move the boxes, you should output the string `impossible` instead.

Points and constraints There are three test sets, worth 100 points in total.

1. For the first test set, worth 20 points, you may assume that $1 \le n, m \le 5000$ and that $w_i, s_i \le 100$ for all i.

2. For the second test set, worth 40 points, you may assume that $w_i, s_i \le 100$ for all i.

3. For the third test set, worth 40 points, there are no additional restrictions.

Hint: Please add the command `std::ios_base::sync_with_stdio(false)` as the first line of your main function. It will make reading the input and writing the output much faster.

Sample Input

```
2
3 6
2 1 2
1 2 1 2 2 2
2 4
1 4
1 2 3 4
```

Sample Output

```
5
8
```