Split Wise*ly*

Our story begins with a tight group of friends. Together they went on a trip to the picturesque beaches of Goa. During their stay, various events which are too horrible to mention occurred. The result was that the last evening of the trip ended with a momentous exchange of *"I never want to see you again!"*s.

Back home in Bengaluru, the now ex-friends realize that they haven't split the costs incurred during the trip evenly. Some people may be out several thousand rupees. Settling the debts turns out to be a bit more problematic than it ought to be, as many in the group no longer wish to speak to one another, and even less to give each other money.

Naturally, you want to help out, so you ask each person to tell you how much money she owes or is owed, and whom she is still friends with. Given this information, you're sure you can figure out if it's possible (*houdu*) or not (*illa*) for everyone to get even, and with money only being given between persons who are still friends.

Input

The first line of the input file contains an integer N ($N \leq 20$) which denotes the total number of test cases. The description of each test case is given below:

The first line contains two integers, n ($2 \leq n \leq 10000$), and m ($0 \leq m \leq 50000$), the number of friends and the number of remaining friendships.

Then n lines follow, each containing an integer o ($-10000 \leq o \leq 10000$) indicating how much each person owes (or is owed if $o < 0$). The sum of these values is zero.

After this comes m lines giving the remaining friendships, each line containing two integers x, y ($0 \leq x < y \leq n - 1$) indicating that persons x and y are still friends.

Output

For each test case your output should consist of a single line saying "HOUDU" or "ILLA".

Sample Input

```
2
5 3
100
-75
-25
-42
42
```

```
0  1
1  2
3  4
4  2
15
20
-10
-25
0  2
1  3
```

Sample Output

```
HOUDU
ILLA
```