



1stNorth African Olympiad in Informatics 2025

Target Rotation

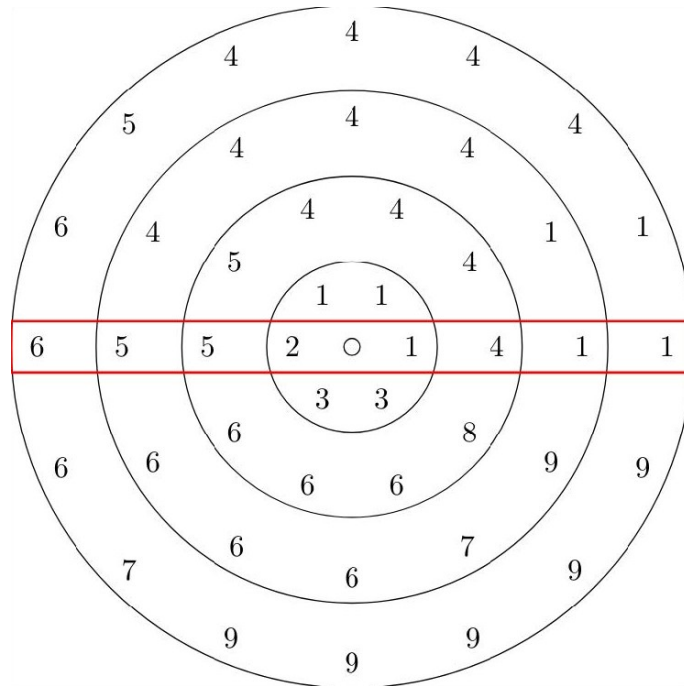
Time limit: 1.5 seconds

Memory limit: 256 MB

Mumugi wa **Djelfa**, abakinnyi **Ahmad Karawita** na **Hamoud Habibi Hamoud** bakunda gukina puzzle igizwe **n'**amadiski y'ibiziga ahuje center. Hari amadiski n , yitwa d_1, d_2, \dots, d_n , aho d_i isobanuye diski ya radius i . Buri diski d_i ishobora kugira imibare $0, 1, \dots, 9$ itondekanije kandi yanditse muburyo buri **counterclockwise** (uburyo bubusanye n'uko urushinge rwisaha rugenda uherye iburyo kuri diski. Inshuro buri mubare j uboneka kuri diski d_i zitangwa na $a_{j,i}$, byongeyeho umubare w'imibare iboneka kuri diski iyo ariyo yose uzahora ugabanyika na kabiri.

Amadiski aragerekeraniye imwe hejuru y'indi, uherye kuri d_1 iri hejuru na d_n iri hasi. Abakinnyi bashobora gukaraga buri diski ukwayo (andi madiski atikaraze) kuburyo buri mubare ugenda inshuro imwe mucyerekezo icyo aricyo cyose, **clockwise** cyangwa **counterclockwise**. Iki gikorwa cyo gukaraga ushobora kugikora inshuro ushaka zose.

Intego ni uko imibare iri kumurongo utambitse wo hagati iba iringaniye, nkuko bigaragara mugishushanyo kiri hepfo gato. Umurongo utambitse wo hagati ufite imibare $2n$ neza neza: umubare umwe kuva k'uruhande rw'iburyo rwa diski, n'undi kuva k'urw'ibumoso.



Task

Uhawe amagambo q dushaka gukora, ariyo x_1, x_2, \dots, x_q , buri jambo rifite uburebure bungana na $2n$, shaka **inshuro nke zishoboka zo gukaraga** zikenewe kugirango imibare iringaniye kumurongo

wo hagati ibe ikoze ryajambo dushaka gukora. Niba kuringaniza imibare k'umurongo wo hagati kugirango bikore ijambo dushaka **bidashoboka**, uprintinge -1 . Buri jambo dushaka gukora ririgenga, muyandi magambo, buri jambo dushaka gukora dutangirana amadiski apanze neza nkuko yari ameze mbere y'uko dukaraga diski n'imwe.

Input

1. Integer n ($1 \leq n \leq 10^5$): umubare w'amadiski.
 2. $10 \times n$ grid y'ama integers, aho buri kazu $a_{j,i} \leq 10^9$ ($0 \leq j \leq 9, 1 \leq i \leq n$) kavuga inshuro umubare j ugaragara kuri diski d_i . Birizewe ko umubare w'imibare izaba iri kuri buri diski uzaba ugabanyika na kabiri.
 3. Integer q ($1 \leq q \leq 2 \times 10^6$): umubare w'amagambo dushaka gukora.
 4. Amagambo q , ariyo x_1, x_2, \dots, x_q , buri jambo rifite uburebure $2n$: amagambo dushaka gukora.
- Birizewe ko $nq \leq 7 \times 10^6$

Output

Kuri buri jambo dushaka gukora x_k ($1 \leq k \leq q$), printinga ibi bikurikira:

- Kumurongo wambere, uprintinge **POSSIBLE** niba bishoboka kuba waringaniza imibare iri kumurongo utambitse wo hagati igakora ryajambo x_k .
- Kumurongo wakabiri, uvuge **inshuro nke zishoboka zo gukaraga** zikenewe kugirango imibare iringaniye kumurongo wo hagati ibe ikoze ryajambo x_k , cyangwa uvuge -1 niba bidashoboka.

Niba ibyo waprintinze ku murongo wambere aribyo naho ku murongo wakabiri ugaprintinga ibitaribyoye, urabona icyakabiri cy'amanota wagombaga kubona.

Constraints

- $1 \leq n \leq 10^5$
- $0 \leq a_{j,i} \leq 10^9$
- $1 \leq q \leq 2 \times 10^6$
- $nq \leq 7 \times 10^6$

Subtasks

Subtask	Score	Constraints
1	6	$n = q = 1$
2	6	Buri diski ifite umubare umwe wonyine
3	10	For all $i, \sum_{j=0}^9 a_{j,i} \leq 2$
4	8	$n = 1$
5	20	For all $i, j, x, y : a_{i,j} = a_{x,y}$
6	30	$nq \leq 10^5$
7	20	Ntazindi conditions ziyongereyeho

Ingero

Input

```
4
0 3 1 2 0 0 0 0 0 0
0 0 0 0 4 2 3 0 1 0
0 2 0 0 4 1 3 1 0 1
0 2 0 0 4 1 3 1 0 5
4
65521411
65521419
75521414
75521410
```

Note : Uru rugero ni urw'igishushanyo mwabonye kuri paji yambere.

Output

```
POSSIBLE
0
POSSIBLE
1
POSSIBLE
2
IMPOSSIBLE
-1
```

Input

```
1
4 3 2 3 1 1 4 3 9 2
1
71
```

Output

```
POSSIBLE
4
```