Matrix Median

Problem Description

Given a matrix of integers **A** of size N x M in which each row is sorted.

Find and return the overall median of matrix A.

NOTE: No extra memory is allowed.

NOTE: Rows are numbered from top to bottom and columns are numbered from left to right.

Problem Constraints

1 <= N, M <= 10^5

1 <= N*M <= 10^6

1 <= A[i] <= 10^9

N*M is odd

Input Format

The first and only argument given is the integer matrix A.

Output Format

Return the overall median of matrix A.

Example Input

Input 1:

```
A = [    [1, 3, 5],
         [2, 6, 9],
         [3, 6, 9]    ]
```

Input 2:

```
A = [    [5, 17, 100]     ]
```

Example Output

Output 1:

```
 5
```

Output 2:

```
 17
```

Example Explanation

Explanation 1:

```
A = [1, 2, 3, 3, 5, 6, 6, 9, 9]
Median is 5. So, we return 5.
```

Explanation 2:

```
Median is 17.
```