852. Peak Index in a Mountain Array

Description

An array `arr` is a **mountain** if the following properties hold:

- `arr.length >= 3`
- There exists some `i` with `0 < i < arr.length - 1` such that:
  - `arr[0] < arr[1] < ... < arr[i - 1] < arr[i]`
  - `arr[i] > arr[i + 1] > ... > arr[arr.length - 1]`

Given a mountain array `arr`, return the index `i` such that `arr[0] < arr[1] < ... < arr[i - 1] < arr[i] > arr[i + 1] > ... > arr[arr.length - 1]`.

You must solve it in `O(log(arr.length))` time complexity.

Example 1:

```
Input: arr = [0,1,0]
Output: 1
```

Example 2:

```
Input: arr = [0,2,1,0]
Output: 1
```

Example 3:

```
Input: arr = [0,10,5,2]
Output: 1
```

Constraints:

- `3 <= arr.length <= 10^5`
- `0 <= arr[i] <= 10^6`
- `arr` is **guaranteed** to be a mountain array.