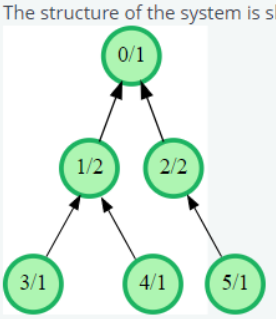
2. Balanced System Files Partition

The directory structure of a system disk partition is represented as a tree. Its *n* directories are numbered from *0* to *n-1*, where the root directory has the number *0*. The structure of the tree is defined by a *parent* array, where *parent[i] = j* means that the directory *i* is a direct subdirectory of *j*. Since the root directory does not have a parent, it will be represented as *parent[0] = -1*. The value in *files_size[i]* denotes the sum of the sizes in kilobytes of the files located in directory *i*, but excluding its subdirectories. The size of the content of a directory is defined as the size of all files contained in this directory, plus the sum of the sizes of all of its subdirectories. Partition the tree into two smaller ones by cutting one branch so that the sizes of the resulting subtrees are as close as possible.

Example
parent = [-1, 0, 0, 1, 1, 2]
files_size = [1, 2, 2, 1, 1, 1]

The structure of the system is shown in the diagram below. The nodes are labeled as *<directory>/<file_size>*.



Cut the branch between directories 1 and 0.
The partition {0, 2, 5} has size *files_size[0] + files_size[2] + files_size[5] = 1 + 2 + 1 = 4*.
The partition {1, 3, 4} has size *files_size[1] + files_size[3] + files_size[4] = 2 + 1 + 1 = 4*.
The absolute difference between the sizes of the two new trees is *4 - 4 = 0*.
Since no other partition can have a smaller absolute difference, the final answer is *0*.

Function Description
Complete the function *mostBalancedPartition* in the editor below.

The function has the following parameter(s):
int parent[n]: each *parent[i]* is the parent directory of directory *i*
int files_size[n]: each *file_sizes[i]* is the sum of file sizes in directory *i*

Returns
int: the minimum absolute difference in the size of content between two subtrees

Constraints

- $2 \le n \le 10^5$
- $1 \le files\_size[i] \le 10^4$
- *parent[0] = -1*
- *parent[i] < i* for $1 \le i < n$
- The depth of each directory tree is at most 500.

▼ Input Format Format for Custom Testing

The first line contains an integer, *n*.
Each *i* line of the *n* subsequent lines (where $0 \le i < n$) contains an integer that describes *parent[i]*.
The next line contains an integer, *n*.
Each *i* line of the *n* subsequent lines (where $0 \le i < n$) contains an integer that describes *files_size[i]*.

▼ Sample Case 0

Sample Input

```
STDIN       Function
-----       --------
4     →     parent[] size n = 4
-1    →     parent[] = [ -1, 0, 1, 2 ]
0
1
2
4     →     files_size[] size n = 4
1     →     files_size[] = [ 1, 4, 3, 4 ]
4
3
4
```

Sample Output

```
2
```

Explanation

The structure of the system is shown in the diagram below.

Cut the branch between directories *1* and 2. This will result in partitions *{0, 1}* with size *1 + 4 = 5* and *{2, 3}* with size *3 + 4 = 7*. The absolute difference between their sizes is *|5 - 7| = 2*.

▼ Sample Case 1

Sample Input

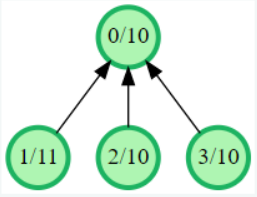
```
STDIN       Function
-----       --------
4     →     parent[] size n = 4
-1    →     parent[] = [ -1, 0, 0, 0 ]
0
0
0
4     →     files_size[] size n = 4
10    →     files_size[] = [ 10, 11, 10, 10 ]
11
10
10
```

Sample Output

```
19
```

Explanation

The structure of the system is shown in the diagram below.



Cut the branch between directories *0* and *1*. This will result in partitions *{0, 2, 3}* with size *10 + 10 + 10 = 30* and *{1}* with size *11*. The absolute difference between their sizes is *|30 - 11| = 19*.