Fall 2021

ECE30017 Problem Solving through Computational Thinking

Week 3

- C2. Ski Trail

  Deadline: 11:59 PM, 17 Septeber (Fri)

- P3. Carriers

  Deadline: 11:59 PM, 24 Septeber (Fri)

C2. Ski Trail

KOC (Korea Olympic Committee) plans to build a ski resort on the mountains of Pyeongchang. To design ski trails, the KOC engineers modeled the shape of the mountain as a $n \times n$ grid of cells where each cell represents a region of the mountain and the value at the cell represents the altitude of the region.

In this model, a ski trail is represented as a sequence of cells, $(s_1, s_2, \ldots, s_n)$, where the following two conditions hold:

1. s_i and s_{i+1} are adjacent cells in the mountain model.

2. The altitude of s_i is higher than that of s_{i+1}.

To challenge ski players, KOC wants to build a ski trail of which the difficulty is as high as possible. The difficulty of the ski trail is determined as the sum of the altitude differences between two adjacent cells.

Write a program that finds the highest value of difficulty among all possible trails for a given mountain model.
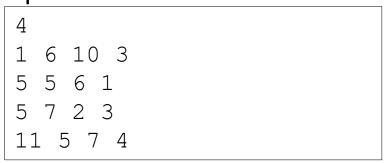
Requirements

- **Input data**

  – The first line from the standard input has one integer n, which represents that the size of the model is $n \times n$ for $1 \le n \le 500$.

  – From the second to the $n + 1$-th lines, the model of the mountain is given. Each line has n positive integers. The j-th value of the $i + 1$-th line is the altitude at the (i, j) cell. An altitude is an integer between 0 to 10^8.

- **Output data**

  – Print out one integer, that is, the highest value of ski trail difficulty to the standard output within 0.5 second.

- **Example**

  input
  ```
  4
  1  6  10  3
  5  5  6  1
  5  7  2  3
  11  5  7  4
  ```

  output
  ```
  9
  ```

P3. Carriers

You have N shopping bags from a shopping mall, whose weights are $w_1, w_2, \ldots, w_N$. The weight of a shopping bag is no more than M.

To bring these home, you are hiring carriers. A carrier can carry one shopping bag by default. And a carrier can carry one more shopping bag if the sum of the weights of the two shopping bags is no more than M.

Write a program that finds the minimal number of carriers that can carry all given shopping bags

Requirements

Input

The input data is given to the standard input. The first line has a positive integer M, the maximum weight of a shopping bag. M is no more than 100000. After that, an arbitrary number of lines follow, each of which contains a weight of a shopping bag. A weight of a bug is no more than 100000.

Output

Print out the minimum number of carriers to the standard output.

Example

Input file

```
5
1
3
2
3
5
```

Output file

```
3
```