Fall 2021
Problem Solving through Computational Thinking, ECE30017

Week 9

- **C6. Card Game**
  Deadline: 11:59 PM, 30 October (Sat)

- **P6. Underwater Cable**
  Deadline: 11:59 PM, 2 November (Tue)

C6. Card Game

There is a single-player card game with n cards for $1 \leq n \leq 50{,}000$. Each card has an integer between 1 and 10^9 on its face. In a game, the dealer shows the n cards to the player one by one in sequence. Each time a card C is shown by the dealer, the player can take the card if one of the following conditions holds:

- The player has never taken any card yet.

- The cards taken by the player are in strictly ascending order, and the number on the current card C is greater than that on the last card that the player has taken.

- Once the player takes a card whose number is lower than the last card taken, the number on each card to be taken in the future should be lower than that of the latest card taken by the player.

The player can skip a card even though it satisfies the conditions shown above. The score that the player earns is the number of cards he/she had taken at the end.

Write a program that finds the maximum score that a player can achieve in a game, given a sequence of n cards.

Requirements

Input data

- – The input data is given from the standard input.

- – The first line contains an integer n that represents the number of cards in the game for $1 \leq n \leq 50{,}000$.

- – The second to $(n+1)$-th lines contains the numbers on a sequence of n cards. The i-th line has one integer between 1 and 10^9 that represents the number on $(i\text{-}1)$-th card.

Output data

- – Print an integer to the standard output. The integer should be the maximum number of the cards that a player can take in the game.

- – Your program should return the answer within 1.0 second.

(continued)

Example of test data

Input data

```
11
0
1
0
2
3
1
8
3
3
6
6
```

Output data

```
6
```

C6 Team

601	이인석	안제현
602	정성목	이수아
603	박건희	최시령
604	이혜림	강석운
605	박은찬	강동인
606	전영우	이찬효
607	김영표	권혁찬
608	남진우	홍순규
609	김해린	차경민

P7. Underwater Cable

Due to an earthquake, an underwater network cable was broken into N pieces such that the length of the i-th piece is s_i kilometers. They are lying in sequence on the underwater surface.

You want to reconnect all pieces into one by using an underwater robot that can perform electric welding in water. The robot reconnects two adjacent pieces of the cable at a time. After each joining, the robot has to check along the whole joined piece whether or not the it has no defects because of high voltage electric shock during the welding operation. The time required for the electric welding to join the i-th and $(i + 1)$-th pieces is neglectibe, yet the defect-checking process requires $(s_i + s_{i+1})$ hours.

Write a program that finds the minimum time in hours for the robot to reconnect the whole pieces together into one.

P7. Underwater Cable

Input

The input data is given to the standard input. The first line has a positive integer N for $3 \leq N \leq 500$, which indicates the number of pieces. The following line contains N positive integers, each separated by a blank, indicating the lengths of pieces from piece 1 to piece N in sequence. The length of a peice does not exceed 10000.

Output

Print out the solution to the standard output.

Example 1

Input file

```
4
3 4 4 2
```

Output file

```
26
```

Example 2

Input file

```
12
1 20 35 5 4 3 5 92 23 14 32 18
```

Ouput file

```
771
```