Educational DP Contest AtCoder L - Deque

Time limit: 1.0s **Memory limit:** 1G

Taro and Jiro will play the following game against each other.

Initially, they are given a sequence $a = (a_1, a_2, \ldots, a_N)$. Until a becomes empty, the two players perform the following operation alternately, starting from Taro:

- Remove the element at the beginning or the end of a. The player earns x points, where x is the removed element.

Let X and Y be Taro's and Jiro's total score at the end of the game, respectively. Taro tries to maximize $X - Y$, while Jiro tries to minimize $X - Y$.

Assuming that the two players play optimally, find the resulting value of $X - Y$.

Constraints

- All values in input are integers.
- $1 \leq N \leq 3000$
- $1 \leq a_i \leq 10^9$

Input Specification

The first line will contain the integer N.

The next line will contain N integers, $a_1, a_2, \ldots, a_N$.

Output Specification

Print the resulting value of $X - Y$, assuming that the two players play optimally.

Sample Input 1

```
4
10 80 90 30
```

Sample Output 1

```
10
```

Explanation For Sample 1

The game proceeds as follows when the two players play optimally (the element being removed is written bold):

- Taro: (10, 80, 90, **30**) → (10, 80, 90)
- Jiro: (10, 80, **90**) → (10, 80)
- Taro: (10, **80**) → (10)
- Jiro: (**10**) → ()

Here, $X = 30 + 80 = 110$ and $Y = 90 + 10 = 100$.

Sample Input 2

```
3
10 100 10
```

Sample Output 2

```
-80
```

Explanation For Sample 2

The game proceeds, for example, as follows when the two players play optimally:

- Taro: (**10**, 100, 10) → (100, 10)
- Jiro: (**100**, 10) → (10)
- Taro: (**10**) → ()

Here, $X = 10 + 10 = 20$ and $Y = 100$.

Sample Input 3

```
1
10
```

Sample Output 3

```
10
```

Sample Input 4

```
10
1000000000 1 1000000000 1 1000000000 1 1000000000 1 1000000000 1
```

Sample Output 4

```
4999999995
```

Explanation For Sample 4

The answer may not fit into a 32-bit integer type.

Sample Input 5

```
6
4 2 9 7 1 5
```

Sample Output 5

```
2
```

Explanation For Sample 5

The game proceeds, for example, as follows when the two players play optimally:

- Taro: (4, 2, 9, 7, 1, **5**) → (4, 2, 9, 7, 1)
- Jiro: (**4**, 2, 9, 7, 1) → (2, 9, 7, 1)
- Taro: (2, 9, 7, **1**) → (2, 9, 7)
- Jiro: (2, 9, **7**) → (2, 9)
- Taro: (2, **9**) → (2)
- Jiro: (**2**) → ()

Here, $X = 5 + 1 + 9 = 15$, and $Y = 4 + 7 + 2 = 13$.