UNSW ICPC Workshop T3W2
Easy Problem Set
Source: AtCoder

Discuss the problems in this document and try to solve them with your group. You can code them now if you want, but this is optional. Make sure everyone is comfortable with the solution before moving on.
Ask us if you need help, or want to check your solution.

We recommend doing the problems in the given order (roughly difficulty order), but if you don't like a problem feel free to skip it.

You can submit to the problems by creating an account on atcoder (the links are at the top of the problems).

If you finish these, move onto the hard problem set

Frog 1

Submit here: https://atcoder.jp/contests/dp/tasks/dp_a

Problem Statement

There are N stones, numbered $1, 2, \ldots, N$. For each i ($1 \leq i \leq N$), the height of Stone i is h_i.

There is a frog who is initially on Stone 1. He will repeat the following action some number of times to reach Stone N:

- If the frog is currently on Stone i, jump to Stone $i+1$ or Stone $i+2$. Here, a cost of $|h_i - h_j|$ is incurred, where j is the stone to land on.

Find the minimum possible total cost incurred before the frog reaches Stone N.

Constraints

- All values in input are integers.
- $2 \leq N \leq 10^5$
- $1 \leq h_i \leq 10^4$

Input

Input is given from Standard Input in the following format:

$$
\begin{array}{l}
N \\
h_1 \quad h_2 \quad \ldots \quad h_N
\end{array}
$$

Output

Print the minimum possible total cost incurred.

Sample Input 1

Copy

```
4
10 30 40 20
```

Sample Output 1

Copy

```
30
```

If we follow the path $1 \rightarrow 2 \rightarrow 4$, the total cost incurred would be $|10-30| + |30-20| = 30$.

Sample Input 2

Copy

```
2
10 10
```

Sample Output 2

Copy

```
0
```

If we follow the path $1 \rightarrow 2$, the total cost incurred would be $|10 - 10| = 0$.

Sample Input 3

Copy

```
6
30 10 60 10 60 50
```

Sample Output 3

Copy

```
40
```

If we follow the path $1 \rightarrow 3 \rightarrow 5 \rightarrow 6$, the total cost incurred would be $|30 - 60| + |60 - 60| + |60 - 50| = 40$.

Vacation

Submit: https://atcoder.jp/contests/dp/tasks/dp_c

Problem Statement

Taro's summer vacation starts tomorrow, and he has decided to make plans for it now.

The vacation consists of N days. For each i ($1 \leq i \leq N$), Taro will choose one of the following activities and do it on the i-th day:

- A: Swim in the sea. Gain a_i points of happiness.
- B: Catch bugs in the mountains. Gain b_i points of happiness.
- C: Do homework at home. Gain c_i points of happiness.

As Taro gets bored easily, he cannot do the same activities for two or more consecutive days.

Find the maximum possible total points of happiness that Taro gains.

Constraints

- All values in input are integers.
- $1 \leq N \leq 10^5$
- $1 \leq a_i, b_i, c_i \leq 10^4$

Input

Input is given from Standard Input in the following format:

$$
\begin{array}{lll}
N & & \\
a_1 & b_1 & c_1 \\
a_2 & b_2 & c_2 \\
: & & \\
a_N & b_N & c_N
\end{array}
$$

Output

Print the maximum possible total points of happiness that Taro gains.

Sample Input 1

Copy

```
3
10 40 70
20 50 80
30 60 90
```

Sample Output 1

Copy

```
210
```

If Taro does activities in the order C, B, C, he will gain $70 + 50 + 90 = 210$ points of happiness.

Sample Input 2

Copy

```
1
100 10 1
```

Sample Output 2

Copy

```
100
```

Sample Input 3

Copy

```
7
6 7 8
8 8 3
2 5 2
7 8 6
4 6 8
2 3 4
7 5 1
```

Sample Output 3

Copy

```
46
```

Taro should do activities in the order C, A, B, A, C, B, A.