# [CS 11] Prac 8f – Extinction Event

## Problem Statement

You are a scientist looking for signs of extinction events in geological data.

You are given a sequence of $n$ integers representing the amount of species over time. Each integer corresponds to a period of one million years.

Your first step is to find periods where the number of species declines and then rise back up again. In other words, we're looking for valley-like periods.

We say a sequence of numbers is **valley-like** if it goes down then up. (It is okay for numbers to stay the same.) For example, the following sequences are valley-like:

- 9, 5, 3, 4, 9
- 10, 5, 5, 2, 1, 1, 3, 4, 4
- 3, 4, 4, 5
- 7, 7, 7, 2
- 5, 5, 5, 5, 5, 5
- 5

On the other hand, the following are not valley-like:

- 2, 4, 2
- 1, 1, 5, 5, 1, 1
- 3, 1, 4, 1, 5, 9

Given the sequence of $n$ integers, how many of its nonempty *contiguous* subsequences are valley-like?

## Task Details

Your task is to implement a function called `dips`. This function has a single parameter, a `tuple` of `int`s representing the species count data over time, per million years.

The function must return an `int` denoting the number of nonempty contiguous valley-like subsequences of the input.

## Restrictions

(See 8a for more restrictions)

For this problem:

- Loops and lists are allowed.
- Up to 8 function definitions are allowed.
- Recursion is **disallowed**. (The recursion limit has been greatly reduced.)
- Sets and dictionaries are allowed.
- Generators and comprehensions are allowed.
- The source code limit is 800.

## Example Calls

### Example 1 Function Call

```
dips((3, 1, 4, 1, 5, 9))
```

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### Example 1 Return Value

```
15
```

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## Constraints

- The function `dips` will be called at most $60{,}000$ times.
- The total lengths of all arguments will be at most $200{,}000$.
- The length of each argument will be at most $200{,}000$.
- Each element of the argument is a positive integer at most $10^{10}$.

## Scoring

- You get $50$ ❤️ points if you solve all test cases where:
  - the length of each argument is $\leq 50$.
  - the total lengths of all arguments is at most $500$.
- You get $50$ ❤️ points if you solve all test cases where:
  - the length of each argument is $\leq 4{,}000$.
  - the total lengths of all arguments is at most $8{,}000$.
- You get $100$ 💔 points if you solve all test cases.

Submit solution [CS 11] Practice 8 ❤️

My submissions ❤️

**Points:** 200 (partial)
**Time limit:** 4.0s
**Memory limit:** 1G

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**Problem type**

**Allowed languages**
~~NONE~~, py3

## Clarifications

Report an issue

No clarifications have been made at this time.