

Problem A: It's Hot! It's Cold!

A meteorologist is curious to see how temperature changes from one day to another in Chicago. Does it mostly go down or up? Or does it mostly stay the same? For this problem, you will write a function to help answer those questions. To help us find this out, the University of Chicago Weather Service has been dutifully taking a daily temperature measurement from the top of Ryerson Physical Laboratory. So, suppose we were given the following temperature measurements:

Day	1	2	3	4	5
Temperature	10	15	15	20	5
Change	–	Up	Same	Up	Down

We are concerned with how temperature changes relative to the previous day and wish to count the number of days when the temperature goes down, the number of days it stays the same, and the number of days it goes up. So, in this case, there is one day when it went down (from 20 to 5 in day 5), one day where it stayed the same (day 3's temperature is the same as the previous day's), and two days where the temperature went up (from 10 to 15 in day 2, and from 15 to 20 in day 4). Notice how we can't compute a change for day 1, since we have no data about the previous day's temperature.

Here are some sample inputs and outputs:

Sample Input	Sample Output
10 15 15 20 -5	1 1 2
-1 -10 -1 -10 -10	2 1 1
10 9 8 8 8 20 25	2 2 2

The output is listed in the following order:

- the number of times the temperature went down,
- the number of times it stayed the same, and
- the number of times it went up.

Your task is to complete the function `itshotitscold`. Here is the header file for this task:

```

#ifndef _Problem1_
#define _Problem1_

#include <vector>

class Problem1 {
public:
    /**
        This function takes a vector of temperatures. It returns a vector
        of three integers: the number of times the temperature went
        down, the number of times the temperature remained the same,
        and the number of times the temperature went up.

        @param temperatures a vector of temperatures represented as integers

        @return A vector of three integers representing the number of
        times the temperature went down, the number of times the
        temperature remained the same, and the number of times the
        temperature went up.
    */
    static std::vector<int> itshotitscold(std::vector<int> temperatures);
};

#endif

```

And here is the skeleton code for this task:

```

#include "Problem1.h"
#include <vector>

/**
    This function takes a list of temperatures. It returns a list
    of three integers: the number of times the temperature went
    down, the number of times the temperature remained the same,
    and the number of times the temperature went up.

    @param temperatures a list of temperatures represented as integers

    @return A list of three integers representing the number of
    times the temperature went down, the number of times the
    temperature remained the same, and the number of times the
    temperature went up.
*/
std::vector<int> Problem1::itshotitscold(std::vector<int> temperatures) {
    // YOUR CODE HERE
    return std::vector<int>();
};

```

When you take the placement exam, you will be expected to copy the code for the header file and the skeleton code into specific files and then complete the function. For the practice problems, we have provided files `Problem1.h` and `Problem1.cpp` for your convenience.