Programming challenges in C++

4. Arrays in C++

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1. Array management

1.1. Array declaration and initialization

We declare and use arrays in C++ indicating the array size in the declaration, without any "new" operator (this operator is required in other languages, such as C# or Java). We can have two types of array:

- Unidimensional arrays: they are declared placing the square brackets after the variable name, and indicating the array size inside these brackets:

  ```
  int data[10];
  data[0] = 3;
  ```

- Bidimensional and N-dimensional arrays: in this case, we use as many square brackets as dimensions of our array, indicating the size of each dimension inside the corresponding brackets:

  ```
  int data2[5][3];
  data2[0][0] = 1;
  data2[1][2] = 6;
  ```

  Note that, in this case, we can't have any multi-dimensional array (i.e. arrays with a different size in each row). Every row of a bidimensional array has the size indicated in the second pair of square brackets.

1.1.1. Declaring an array with initial values

If we want to declare an array and set its initial values, we can do it specifying these values between brackets in the declaration. The total number of values between brackets must be the same than the size indicated for the array, although we can leave this size empty, and then the array will get the size from the list of values

```
int data[5] = {1, 2, 3, 4, 5};      // We must specify 5 values
int anotherData[] = {10, 11, 12};   // Array size is 3
```

1.2. Exploring arrays. Constants for array lengths

In C++ there is no *length* property or method to determine the size of an array, so we may need to have a variable or constant with the corresponding size, and then we can explore it:

```
const int LENGTH = 10;
for (int i = 0; i < LENGTH; i++)
    cout << data[i] << endl;
```

1.3. Try yourself: La pieza perdida

To practise with C++ arrays, you can try this challenge.

1.4. Try yourself: Matrices triangulares

You can also practise with multi-dimensional arrays with this challenge.