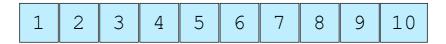
Arrays

The array type is perhaps the most popular sequential container. This lesson will cover its properties in detail.

This is what an array looks like:



std::array is a homogeneous container of fixed length. It requires the header
<array>. An instance of std::array combines the memory and runtime
characteristic of a C array with the interface of an std::vector .In particular,
an std::array knows its size. We can use STL algorithms on instances of
std::array.

Keep a few special rules in mind for initializing an std::array.

- std::array<int, 10> arr: The 10 elements are not initialized.
- std::array<int, 10> arr{}: The 10 elements initialized to 0 by default.
- std::array<int, 10> arr{1, 2, 3, 4, 5}: The unspecified elements are initialized to 0 by default.

std::array supports three types of index access.

```
- arr[n];
- arr.at(n);
- std::get<n>(arr);
```

The most commonly used first type of index access using angle brackets does not check the boundaries of the <code>arr</code>. This is in contrast to <code>arr.at(n)</code>. We will eventually get an <code>std::range-error</code> exception. The last form in the above snippet shows the relationship of <code>std::array</code> with the <code>std::tuple</code>, because both are containers of fixed length.

Here is a little bit of arithmetic using std::array:

```
// array.cpp
                                                                                          G
#include <iostream>
#include <array>
#include <numeric>
using namespace std;
int main(){
  std::array<int, 10> arr{1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
 for (auto a: arr) std::cout << a << " "; // 1 2 3 4 5 6 7 8 9 10
  cout << "\n";</pre>
  double sum= accumulate(arr.begin(), arr.end(), 0);
  std::cout << sum << std::endl;</pre>
  double mean= sum / arr.size();
  std::cout << mean << std::endl;</pre>
                                               // 5.5
  std::cout << (arr[0] == std::get<0>(arr)); // 1 (1 represents true)
  return 0;
                                                                             std::array
```

To get a stronger grip on this topic, let's solve an example in the next lesson.