## **Useful Functions**

C++ offers several tools to make the iteration process simpler and safer.

The global functions std::begin, std::end, std::prev, std::next, std::distance, and std::advance make handling of the iterators a lot easier. Only the function std::prev requires a bidirectional iterator. All functions need the header <iterator>. The table gives an overview:

Global function	Description
<pre>std::begin(cont)</pre>	Returns a begin iterator to the container cont.
<pre>std::end(cont)</pre>	Returns an end iterator to the container cont.
<pre>std::rbegin(cont)</pre>	Returns a reverse begin iterator to the container cont.
<pre>std::rend(cont)</pre>	Returns a reverse end iterator to the container cont.
<pre>std::cbegin(cont)</pre>	Returns a constant begin iterator to the container cont.
<pre>std::cend(cont)</pre>	Returns a constant end iterator to the container cont.
<pre>std::crbegin(cont)</pre>	Returns a reverse constant begin iterator to the container cont.

```
Returns a reverse constant end iterator to the container cont.

Returns an iterator, which points to a position before it

Returns an iterator, which points to a position after it.

Returns the number of elements between fir and sec.

Puts the iterator it n positions further.
```

## **Useful functions for iterators**

Now, the application of useful functions.

```
#include <array>
                                                                                             G
#include <iostream>
#include <iterator>
#include <string>
#include <unordered_map>
int main(){
  std::cout << std::endl;</pre>
  std::unordered_map<std::string, int> myMap{ {"Rainer", 1966}, {"Beatrix", 1966}, {"Juliette
  for ( auto m: myMap) std::cout << "{" << m.first << ", " << m.second << "} ";</pre>
  std::cout << std::endl;</pre>
  auto mapItBegin= std::begin(myMap);
  std::cout << "{" << mapItBegin->first << ", " << mapItBegin->second << "}" << std::endl;</pre>
  auto mapIt= std::next(mapItBegin);
  std::cout << "{" << mapIt->first << ", " << mapIt->second << "}" << std::endl;</pre>
  auto dist= std::distance(mapItBegin, mapIt);
  std::cout << "std::distance(mapItBegin, mapIt): " << dist << std::endl;</pre>
  std::cout << std::endl;</pre>
  std::array<int, 10> myArr{0, 1, 2, 3, 4, 5, 6, 7, 8, 9};
  for ( auto a: myArr ) std::cout << a << " ";
```

```
std::cout << std::endl;
auto arrItEnd= std::end(myArr);
auto arrIt= std::prev(arrItEnd);
std::cout << *arrIt << std::endl;

std::advance(arrIt, -5);
std::cout << *arrIt << std::endl;

std::cout << std::endl;
}</pre>
```



In the next lesson, we'll discuss how iterators can be used for searching as well as inserting values.