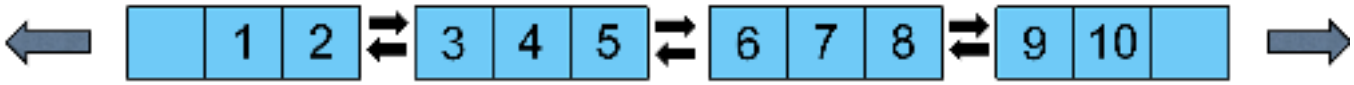
Deques

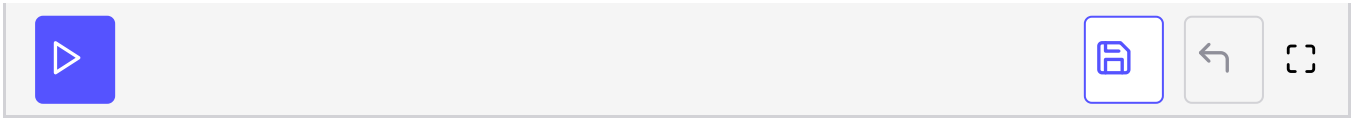
Let's take a look at deques and their similarity to vectors.



std::deque(**d**ouble **e**nded **que**ue), which consist of a sequence of arrays, is quite similar to `std::vector`. `std::deque` needs the header `<deque>`. The `std::deque` has three additional methods `deq.push_front(elem)`, `deq.pop_front()`, and `deq.emplace_front(args... )` to add or remove elements at the beginning.

```
// deque.cpp
#include <iostream>
#include <deque>
using namespace std;

class MyInt{
  private:
  int myInt;
  public:
  MyInt(int i): myInt(i){};
  friend ostream& operator << (ostream& os, const MyInt& m)
  {
    os << m.myInt <<" ";
    return os ;
  }
};

int main(){
  std::deque<MyInt> myIntDeq;

  myIntDeq.push_back(MyInt(5));
  myIntDeq.emplace_back(1);
  std::cout << myIntDeq.size() << std::endl;      // 2

  std::deque<MyInt> intDeq;

  intDeq.assign({1, 2, 3});
  for (auto v: intDeq) cout << v << " ";   // 1 2 3
  cout<<endl;

  intDeq.insert(intDeq.begin(), 0);
  for (auto v: intDeq) cout << v << " ";   // 0 1 2 3
  cout<<endl;
```

```
  intDeq.insert(intDeq.begin()+4, 4);
  for (auto v: intDeq) cout << v << " ";   // 0 1 2 3 4

  cout<<endl;

  intDeq.insert(intDeq.end(), {5, 6, 7, 8, 9, 10, 11});
  for (auto v: intDeq) cout << v << " ";   // 0 1 2 3 4 5 6 7 8 9 10 11
  cout<<endl;

  for (auto revIt= intDeq.rbegin(); revIt != intDeq.rend(); ++revIt)
     std::cout << *revIt << " ";                    // 11 10 9 8 7 6 5 4 3 2 1 0
  cout<<endl;

  intDeq.pop_back();
  for (auto v: intDeq) cout << v << " ";   // 0 1 2 3 4 5 6 7 8 9 10
  cout<<endl;

  intDeq.push_front(-1);
  for (auto v: intDeq) cout << v << " ";   // -1 0 1 2 3 4 5 6 7 8 9 10
  cout<<endl;

  return 0;
}
```



In the next lesson, we'll discuss lists.