

C++ Programming

STL Deque

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Deque

- This one is almost like one we implemented before
 - Add front = push_front()
 - Add end = push_back()
 - Get front = front()
 - Remove front = pop_front()
 - Get back = back()
 - Remove back = pop_back()
 - size() = How many elements?
 - empty() = any more elements
- Logic and printing
 - Decide where to add elements
 - You can print in the 2 directions

Deque

```
23 int main() {
24     deque<int> q;
25     q.push_back(20);    // q: 20
26     q.push_back(30);    // q: 20 30
27     q.push_back(40);    // q: 20 30 40
28     q.push_front(10);   // q: 10 20 30 40
29     q.push_back(50);    // q: 10 20 30 40 50
30     q.push_front(0);    // q: 0 10 20 30 40 50
31
32     deque<int> copy = q;
33
34     print_back(q);      // 50 40 30 20 10 0
35     print_front(q);     // 0 10 20 30 40 50
36     print_front(q);     // NONE
37
38     cout<<copy.size() <<"\n";    // 6
39     cout<<copy[1]<<"\n";         // 10
40     cout<<copy.at(1)<<"\n";       // 10
41     //cout<<copy.at(1000)<<"\n";   // throws std::out_of_range exception
42
43     copy.clear();
44     cout<<copy.size() <<"\n";    // 0
45     return 0;
46 }
47
```

```
2  #include<deque>
3  using namespace std;
4
5  void print_back(deque<int> q) {
6      cout << "Queue elements (back): ";
7      while (!q.empty()) {
8          cout << q.back() << " ";
9          q.pop_back();
10     }
11     cout << "\n";
12 }
13
14 void print_front(deque<int> &q) {
15     cout << "Queue elements (front): ";
16     while (!q.empty()) {
17         cout << q.front() << " ";
18         q.pop_front();
19     }
20     cout << "\n";
21 }
22
```

Is Palindrome

```
23 bool is_palindrome(string str = "abba") {  
24     deque<char> dq;  
25     for (char c : str)        // Add chars  
26         dq.push_back(c);  
27  
28     while (dq.size() > 1) {  
29         char f = dq.front();  
30         dq.pop_front();  
31  
32         char b = dq.back();  
33         dq.pop_back();  
34  
35         if (f != b)  
36             return false;  
37     }  
38     return true;  
39 }  
40  
41 int main() {  
42     cout << boolalpha;    // print true as true  
43     cout << is_palindrome("abba") << "\n";    // true  
44     cout << is_palindrome("abcba") << "\n";    // true  
45     cout << is_palindrome("xyy") << "\n";    // false  
46 }
```

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”