CS 225

#3: *Lists and List ADT*

August 26, 2022 · *G Carl Evans*

Abstract Data Types (ADT):

List ADT - Purpose	Function Definition

List Implementation

What types of List do we want?

C++ Templates:

1.

2.

3.

Templated Functions:

functionTemplate1.cpp

```
1
2
3  T maximum(T a, T b) {
4    T result;
5    result = (a > b) ? a : b;
6    return result;
7  }
```

Where to put templated code?

Templated Classes:

List.h

```
1  #pragma once
2
3
4  class List {
5    public:
6
7
8
9
10
11
12   private:
13
14
15 };
```

List.hpp

```
1
2
3
4
5
```

Two Basic Implementations of List:

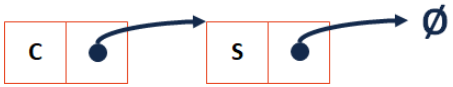
1.

2.

Linked Memory:

List.h

```
28  class ListNode {
29    T & data;
30    ListNode * next;
31    ListNode(T & data) : data(data), next(NULL) { }
32  };
```



Coding with Linked Lists: Examples

List.h

```
 1  #pragma once
 2
 3  template <typename T>
 4  class List {
 5    public:
 6       /* ... */
 …  private:
28      class ListNode {
29        T & data;
30        ListNode * next;
31        ListNode(T & data) : data(data), next(NULL) { }
32      };
33
34
35
36
37
38
39  };
```

List.hpp

```
 9  #include "List.h"
10
11  template <typename T>
12  void List<T>::insertAtFront(T & t) {
13
14
15
16
17
18
19
20  }
25  template <typename T>
26  void List<T>::printReverse() const {
27
28
29  }
30
31
32
33
34
35
39  template <typename T>
40  T List<T>::operator[](unsigned index) {
41
42
43
44  }
 …
48  template <typename T>
49  typename List<T>::ListNode *
    List<T>::_index(unsigned index) {
50
51
52
53
54
55
56  }
```

CS 225 – Things To Be Doing:

1. Setup Laptop
2. Register for Exam 0
3. Try POTDs