

**Why Polymorphism?** Suppose you're managing an animal shelter that adopts cats and dogs:

**Option 1 – No Inheritance**

```

animalShelter.cpp
1 Cat & AnimalShelter::adopt() { ... }
2 Dog & AnimalShelter::adopt() { ... }
3 ...

```

**Option 2 – Inheritance**

```

animalShelter.cpp
1 Animal & AnimalShelter::adopt() { ... }

```

**Abstract Class:**

1. [Requirement]:
2. [Syntax]:
3. [As a result]:

**Note about destructors:**

**Abstract Data Types (ADT):**

List ADT - Purpose	Function Definition

**List Implementation**

What types of List do we want?

**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 }

```

**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

```

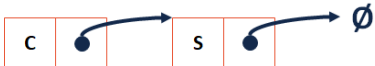
**Two Basic Implementations of List:**

- 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         /* ... */
7     private:
8         ...
9         class ListNode {
10             T & data;
11             ListNode * next;
12             ListNode(T & data) : data(data), next(NULL) { }
13         };
14
15
16
17
18
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27
28
29
30
31
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
26 template <typename T>
27 void List<T>::printReverse() const {
28
29 }
30
31
32
33
34
35
39 template <typename T>
40 T List<T>::operator[](unsigned index) {
41
42
43 }
44
45 ...
48 template <typename T>
49 typename List<T>::ListNode *
50 List<T>::_index(unsigned index) {
51
52
53
54
55
56 }
```

## CS 225 – Things To Be Doing:

1. Programming Exam A starts Sept. 26 (10 days from now)
2. MP2 due Sept. 23 (7 days), EC deadline is tonight!
3. Lab Extra Credit → Attendance in your registered lab section!
4. Daily POTDs