CS 225

#10: List Implementations

September 18, 2019 · *G Carl Evans*

A Linked List implementation of a List:

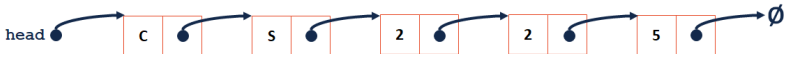
List.cpp

```
1   #pragma once
2
3   template <typename T>
4   class List {
5     public:
…       /* ... */
19
20    private:
21      class ListNode {
22        public:
23          const T data;
24          ListNode * next;
25          ListNode(T & data) :
                data(data), next(nullptr) { }
26      };
27
28      ListNode *head_;
…       /* ... */
…   };
```

Implementing a basic List operation:

List.hpp

```
9   #include "List.h"
…
14  template <typename T>
15  void List<T>::insertAtFront(const T & data) {
16
17
18
19
20
21
22  }
```



Finding in a list:

List.hpp

```
57  template <typename T>
58  typename List<T>::ListNode *&
       List<T>::_index(unsigned index) {
59
60
61  }
62
63
64
65
```

What is the return type of **`_index`**?

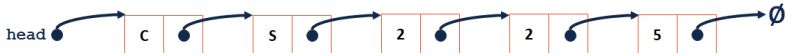
Building functionality with _index():

List.hpp

```
48  template <typename T>
49  T & List<T>::operator[](unsigned index) {
50
51
52
53
54  }
```

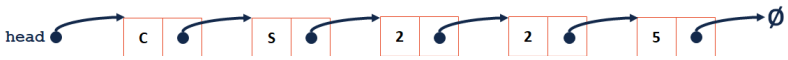
List.hpp

```
90  template <typename T>
91  T & List<T>::insert(const T & t, unsigned index) {
92
93
94
95
96  }
```



List.hpp

```
103  template <typename T>
104  T & List<T>::remove(unsigned index) {
105
106
107
108
109  }
```

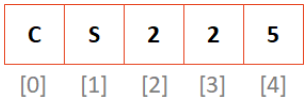


List Implementation #2: _____

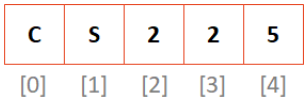
Alternate List.h

```
 1  #pragma once
 2
 3  template <typename T>
 4  class List {
 5    public:
...       /* ... */
28    private:
29
30
31
32  };
```

Array - Implementation Details:

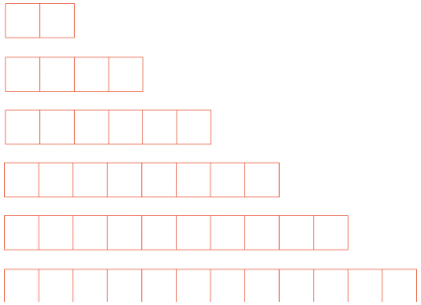


1. What is the running time of `insertFront()`?

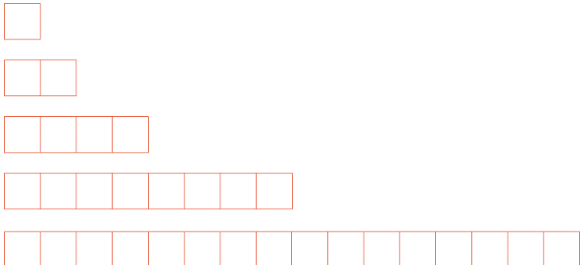


2. What is our resize strategy?

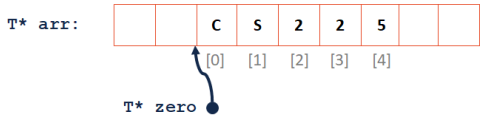
Resize Strategy #1:



Resize Strategy #2:



3. What is the running time of get()?



CS 225 – Things To Be Doing:

1. Programming Exam A starts Sept. 26 *(8 days from today)*
2. MP2 due Sept. 23 *(5 days from now)*; EC worth +5 tonight!
3. Lab Extra Credit → Attendance in your registered lab section!
4. Daily POTDs