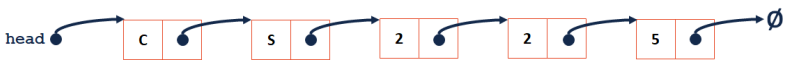
CS 225

#11: List: Array Implementation

September 21, 2020 · *G Carl Evans*

List.hpp

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



List Implementation #2: _____

List.h

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

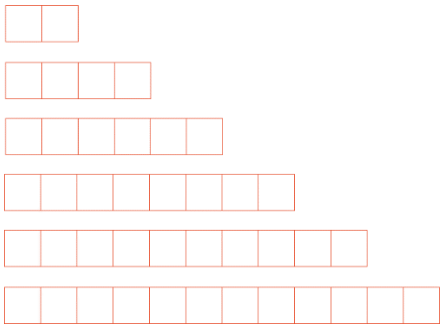
Implementation Details and Analysis:

What is the running time of **`insertFront()`**?

C	S	2	2	5
[0]	[1]	[2]	[3]	[4]

➔ What is our resize strategy?

Array Resize Strategy #1:



…total copies across all resizes: _____

…total number of insert operations: _____

…average (amortized) cost of copies per insert: _____

Array Resize Strategy #2:

…total copies across all resizes: _____

…total number of insert operations: _____

…average (amortized) cost of copies per insert: _____

Running Time:

	Singly Linked List	Array
Insert/Remove at **front**		
Insert after a **given** element		
Remove after a **given** element		
Insert at **arbitrary** location		
Remove at **arbitrary** location		

A List implementation in std

- `std::vector` implements a list with dynamic growth
- `#include <vector>` to use it!
- Documentation widely available, including on CBTF exams
-

Stack ADT

Function Name	Purpose

Queue ADT

Function Name	Purpose

Stack and Queue Implementations

Stack.h

```
 1  #pragma once
 2
 3  #include <vector>
 4
 5  template <typename T>
 6  class Stack {
 7    public:
 8      void push(const T & d);
 9      T pop();
10      bool isEmpty();
11
12    private:
13      std::vector<T> list_;
14  };
15
16  #include "Stack.hpp"
```

Stack.hpp

```
 3  template <typename T>
 4  void Stack<T>::push(const T & d) {
 5    list_.push_back(d);
 6  }
 7
 8  template <typename T>
 9  T Stack<T>::pop() {
10    T data = list_.back();
11    list_.pop_back();
12    return data;
13  }
```

CS 225 – Things To Be Doing:

1. mp_stickers due Today; MP3 released Tuesday
2. Daily POTDs