Data Structures
Lecture 7

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Tuesday, March 5, 2024

Attendance

- Let's take a quick attendance!

Assignment #1 is out in CodeForces

- **https://codeforces.com/group/hOL2WBd8PX/contest/504098**

- Starting this week (yesterday), it will be assigned **every Monday**, due the following Monday.

Now, let's review

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- C++ Essentials: "Hello World"
- Static Typing
- Compilation
- Fundamental Types
- Declaring a Variable
- Pointers
- Dynamic Memory
- References

Now, let's review

- Objective Relationships
  - Composition
  - Aggregation
  - Association
  - Dependencies
  - Inheritance

Now, let's review

- Class
- IntList
- Recursive Data Structures
- Recursive Functions

Now, let's review

- SLList (Singly Linked List)
- Restricting access using private
- Sentinel
- Invariant

Now, let's review

- Doubly Linked Lists
- Templates
- Generic SLLists
- C++ Standard Template Library (STL)
- Arrays

Now, let's review

- Naive Array Lists
- AList using Dynamic Memory
- Resizing Array
- Generic ALists
- Obscurantism
- How Does a Programmer Know That Their Code Works?
- Sorting
- Ad-Hoc Testing is Less Maintainable
- doctest: A Library for Making Testing Easier
- Testing Philosophy: Autograder vs Unit Tests

Now, let's review

- Function Overloading in C++
- Hypernym and Hyponym
- Method Overriding vs. Overloading
- Inheritance
- Default Methods
- The Dangers of Inheritance
- Analysis Framework: Big O, Big Omega, and Big Theta
- Recurrence Relation: Iterative vs Recursive

Now, let's review

- Sorted Lists
- Binary Search
- Ternary Search

Now, let's review

- Stacks
- Queues
- Shortest Path
  - Breadth First Search
  - Depth First Search
- Sets
- Maps
- Disjoint Set Union
  - path compression
  - union by size

THANK YOU