University of Washington
CSE 326: Data Structures
Martin Dickey
Summer Quarter 2000

Slides based on those of Steve Wolfman, Winter 2000

CSE 326: Data Structures
Lecture #1
June 19, 2000

Introduction

C++ Templates (beginning)

Today’s Outline

- Administrative Cruft
- Overview of the Course
- Some C++ topics

Course Information

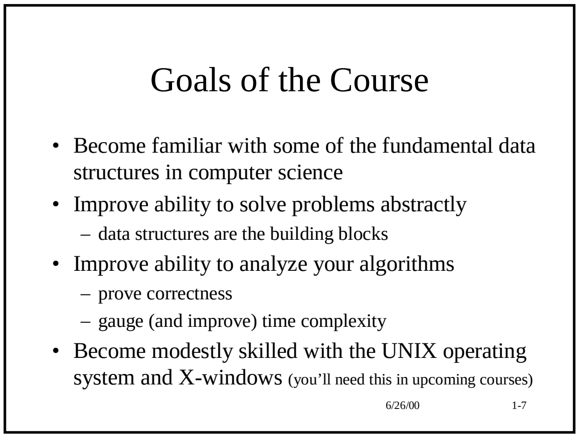
- Instructor: Martin Dickey
  Office hours TBD
- TA Gerome Miklau
  Office hours: TBA
- Text: *Data Structures & Algorithm Analysis in C++*, 2nd edition, by Mark Allen Weiss
  - Please read before coming to class
- Probably there will be no course packet!

What is the Course About?

- Data structures – ways of organizing data in a program
  - Different applications call for different structures
- Each data structure is associated with a set of algorithms
- Each algorithm has properties (like speed) that can be investigated
- Many data structures are “classical”
  - Every programmer needs to know them. Why??
- Eventually you may need to invent your own

Observation

- All programs manipulate data
  - programs *process, store, display, gather*
  - data can be *information, numbers, images, sound*
- Each program must decide how to store data
- Choice influences program at every level
  - execution speed
  - memory requirements
  - maintenance (debugging, extending, etc.)



Goals of the Course

- Become familiar with some of the fundamental data structures in computer science
- Improve ability to solve problems abstractly
  - data structures are the building blocks
- Improve ability to analyze your algorithms
  - prove correctness
  - gauge (and improve) time complexity
- Become modestly skilled with the UNIX operating system and X-windows (you’ll need this in upcoming courses)

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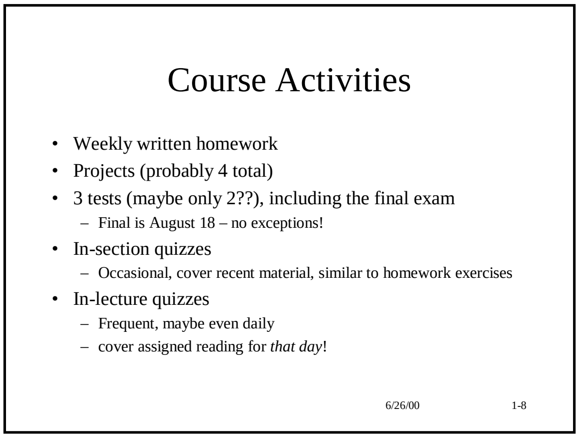

Course Activities

- Weekly written homework
- Projects (probably 4 total)
- 3 tests (maybe only 2??), including the final exam
  - Final is August 18 – no exceptions!
- In-section quizzes
  - Occasional, cover recent material, similar to homework exercises
- In-lecture quizzes
  - Frequent, maybe even daily
  - cover assigned reading for *that day*!

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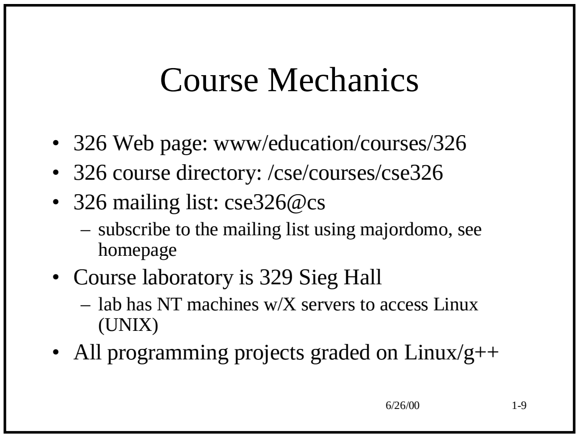

Course Mechanics

- 326 Web page: www/education/courses/326
- 326 course directory: /cse/courses/cse326
- 326 mailing list: cse326@cs
  - subscribe to the mailing list using majordomo, see homepage
- Course laboratory is 329 Sieg Hall
  - lab has NT machines w/X servers to access Linux (UNIX)
- All programming projects graded on Linux/g++

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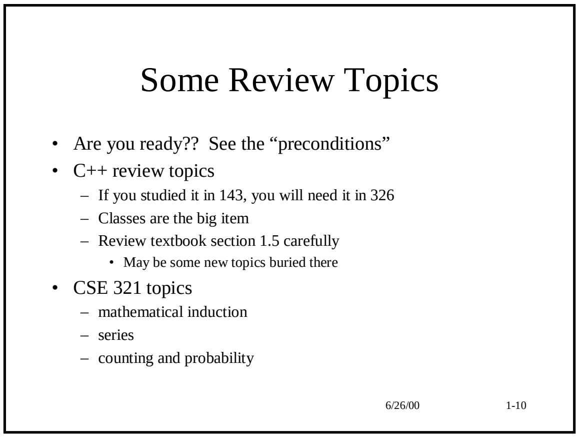

Some Review Topics

- Are you ready?? See the “preconditions”
- C++ review topics
  - If you studied it in 143, you will need it in 326
  - Classes are the big item
  - Review textbook section 1.5 carefully
    - May be some new topics buried there
- CSE 321 topics
  - mathematical induction
  - series
  - counting and probability

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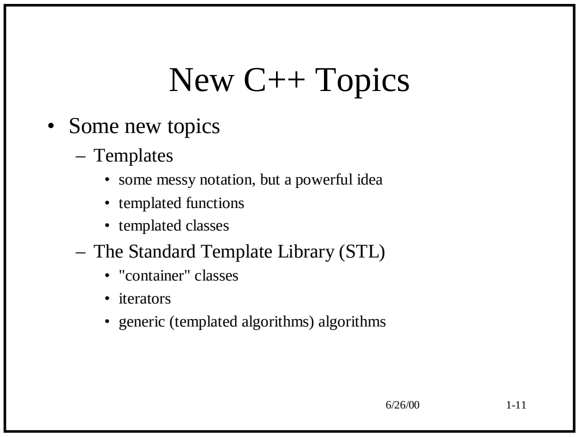

New C++ Topics

- Some new topics
  - Templates
    - some messy notation, but a powerful idea
    - templated functions
    - templated classes
  - The Standard Template Library (STL)
    - "container" classes
    - iterators
    - generic (templated algorithms) algorithms

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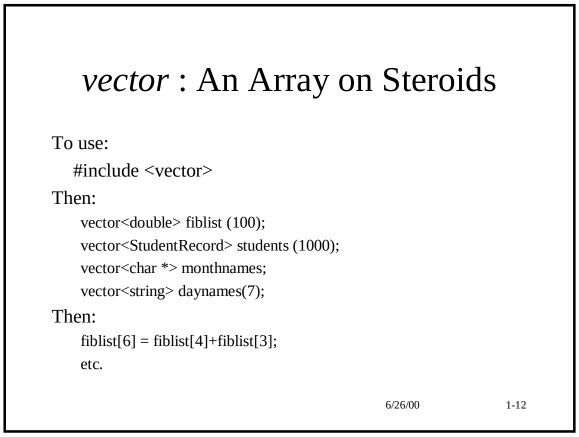

vector : An Array on Steroids

To use:

```
#include <vector>
```

Then:

```
vector<double> fiblist (100);
vector<StudentRecord> students (1000);
vector<char *> monthnames;
vector<string> daynames(7);
```

Then:

```
fiblist[6] = fiblist[4]+fiblist[3];
etc.
```

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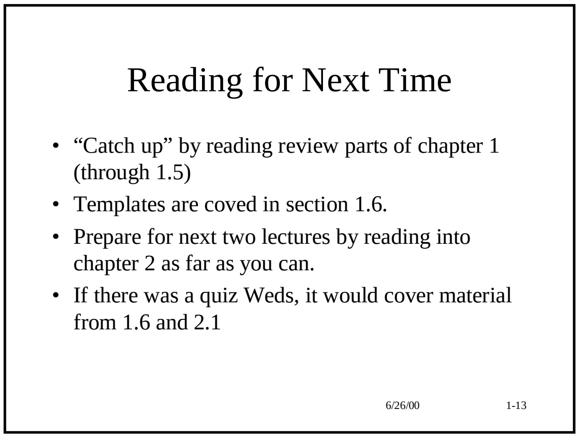

Reading for Next Time

- “Catch up” by reading review parts of chapter 1 (through 1.5)
- Templates are coved in section 1.6.
- Prepare for next two lectures by reading into chapter 2 as far as you can.
- If there was a quiz Weds, it would cover material from 1.6 and 2.1