Data Structures on the Web

NGI PROJECT PRESENTATION for SUMMER 2002

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Agenda

- Data Structures today
- What is WISE?
- Data Structures in WISE
- Why WISE?
- Long-term objectives
Data Structures today

- 3 hours of lecture - They listen
- 2 hours of lab - They start to experiment...
- 1 hour of discussion - They listen
- Hours of homework - They struggle
What they don’t do enough

- Learn by experimenting
- Test their learning
- Recognize gaps in their knowledge
What is WISE?

- Web-Inquiry Science Environment
- Collection of activities for students
- Online database of learning material
Activities in WISE

- Online reading
- Assessment exercises
- Quizzes
- Online discussions
- Brainstorming sessions
The WISE CS3 Course Portal

CS 3: Introduction to Symbolic Programming
Department of Electrical Engineering and Computer Science

Announcement Lists

2002-08-07 Slides and links relating to this week's CS culture lectures and other topics of interest are accessible here.

Monday, 07-08
Starting to think recursively
- Reviewing material in chapter 11
- Design individual procedures to make this common pattern fit today
- Produce recursive procedures from the individual procedures
- How do I know 8 weeks?
- Design come more recursive procedures
- Homework for Tuesday

“Difference between Dates” miniproject

Tuesday, 07-09
Working with more complicated recursive procedures
- Here are important things to note for today
- Reviewing “Starting to think recursively”
- Design a recursion using simple case and base cases
- Design recursive procedures with two arguments
- Design recursive procedures that examine more than one condition in a problem
- Try more accumulating recursions
- Homework for Wednesday

Wednesday, 07-10
Exam 1
- Exam questions are here
- Working with even more complicated recursions!
- Do some coding
- Analyze a complicated recursion
- Think about base cases
- Here’s a procedure to do through several
- Homework for Thursday

Thursday, 07-11
Working with the “Roman Numerals” case study
- Reviewing recursion and the “Roman numerals” case study
- More information about the Moduler class
- More on the case study
- Have a bit more experience with it
- Homework for tomorrow

Friday, 07-12
“Number spelling” miniproject
- July 12 quiz
- Quiz questions are here.
The Learning Environment
Data Structures in WISE

- Course divided into topics called “Projects”
- Each “Project” has its set of “Activities”
- Each “Activity” is divided into “Steps”
WISE Projects for 61B

- Java Programming
- Activation Records
- Inheritance
- Exceptions
- Testing
- Linked Lists & Arrays
- Game-tree Search
- Asymptotic Analysis
- Hash Tables
- Trees
- Binary Heaps
- Binary Trees
- 2-3-4 Trees
- Graphs
- Sorting Algorithms
- Randomized Analysis
Close-up on Graphs

- Project: Graphs
  - Introduction
  - Terms to Know
  - Representation: Adjacency Matrices and Lists
  - Traversal: DFS and BFS
  - Homework: Modeling a Map of Berkeley
Creating a project in WISE
WISE and 61B: how they fit

- Activities proceed in small steps
- WISE activities enable thorough learning
- Progress is easy to monitor
- Weaker students get individual attention
- Students benefit from group discussions

- They learn by doing!
Why WISE?

Studies done over the summer show

- Students find WISE more enjoyable
- They perform better overall

“I like the way lectures are combined with problems online. I am learning more about CS than I ever did before. This method of teaching is very practical and works a lot better than regular lecture/lab/discussion sections...”

- Summer CS3 Student
Long-term Objectives

- Adapt WISE to all lower-division CS courses
- Export curriculum to UC Merced