Arrays of Objects
Arrays in Objects
Lecture 22

Readings
This Week: Ch 7 (Ch 8 in old 2nd ed).
(Reminder: Readings are absolutely vital for learning this stuff!)

Labs and Tutorials
This week is Lab #7.
No labs/tutorials next week, during week of midterm.

Midterms – Save the Dates!
■ Midterm #2 is 6-7pm on March 11 (Wednesday) in Woodward IRC 2
■ Midterm coverage is through Ch 7.

Programming Assignment 2
■ Assignment 2 is up on WebCT!
  ■ Click on the “Assignments” icon.
  ■ Due at NOON, March 10 (Tuesday), via electronic hand in.
  ■ Start early! (I really mean it!)
  ■ There is some Eclipse setup.

Learning Goals
By the end of class today you will be able to...
■ Write programs with multi-dimensional arrays, arrays of objects, and arrays inside objects.
Last Time: Exercise

- Declare 2D array labMarks with NUM_STUDENTS rows and NUM_LABS columns to hold marks for each of your labs.

Last Time: Exercise

- Declare an array labTotals, which will store, for each student, that student's total lab score.
- Write the code to compute those totals.

Exercise

- Write code to find the highest total lab score.

Exercise

- Write code to print the names of all students with the highest total lab score.
- (You'll need to add an array of student names.)

Organizing Data

- Is there a better way to store this data?

Parallel Arrays

- "Parallel arrays" are common, but usually not the best way to do things.
Arrays of Objects

- Usually, it’s better to create an array of objects instead.

Organizing Data

- Create a CPSC111Student class!
  - Constructors
  - Methods to get and set name
  - Methods to get and set lab scores.
  - Method to compute total lab score.
  - Etc.

  - For simplicity, let’s just worry about the student’s name and lab scores…
Organizing Data

- Create a CPSC111Student class!
  - Constructors
  - Methods to get and set name
  - Methods to get and set lab scores.
  - **Method to compute total lab score.**
    - User probably wants a getTotalLabScore() method:
      - What parameters does this take? What's the return value? Let's implement this…

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**getTotalLabScore() Version 1**

- We can add up the lab scores each time called.
- This can be wasteful if getTotalLabScore is called often – the same work gets re-done repeatedly.

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**getTotalLabScore() Version 2**

- We can put the result in a variable totalLabScore.
- getTotalLabScore() just returns that value.
- No wasted computation when getTotalLabScore() called.

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**getTotalLabScore() Version 3**

- We can put the result in a variable totalLabScore.
- getTotalLabScore() just returns that value.
- We add a new method computeTotalLabScore() that computes totalLabScore.
- Gives correct results, but only if user always remembers to call computeTotalLabScore(). Bad Design: Violates data protection!
**getTotalLabScore() Version 4**

- We can put the result in a variable `totalLabScore`.
- `getTotalLabScore()` just returns that value.
- The object keeps track of whether `totalLabScore` is up-to-date. When `getTotalLabScore()` is called, it calls `computeTotalLabScore()` only if needed.