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CS 106A

Section #4
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Section #4: Lesson Plan

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This section is all about strings, and it's the last section before the midterm exam. You may get a lot of questions about logistics, ways to prepare, etc. Remind students that practice exams will be/have been released (depending on when your section is), and that they should check the website for those and for the slides from the review session (which is Thursday at 7:30 in Hewlett 201). Direct them toward unfinished section problems if they want more practice on specific topics. Remind them that the exams are open-book, open-notes, closed-computer except the testing software itself, so they have to bring any reference materials printed out on actual paper, and they should bring a charged laptop to the exam or get in touch with us if they don't have access to one.
(Also, please recommend to us any students you feel fall into the 'high-grit' group: putting in a lot of work but not getting the functionality we're hoping to see in their assignments.)

Key Concepts

- Primitives vs. class objects
  - Object variables store addresses of objects! (passing by reference)
- **`new`** keyword (and the idea that it allocates a new spot in memory for an object)
- **`Strings`** as zero-indexed lists of **`char`**s
  - **`char`**s can have math operations on them – they're primitives
- **`charAt(index)`** method, **`length()`** method, etc.
- Iterating over strings
- **`Character`** methods (like **`toUpperCase()`**)
- String immutability
- *Scanners and try/catch – less emphasis this section*
- *Arrays as ordered lists that store one particular type of variable – less emphasis*

Lecture Recap

Here's quick summaries of the relevant lectures for this week's section. Please check out the slides in full if you haven't been in lecture.

4. Memory
   Object variables store addresses, which are like "links" to the memory where the actual object is stored.
5. Strings
   Iterating, characters, concatenating, string to int & vice versa, etc.
6. Files
   Scanners and files (we're steering people away from BufferedReaders, even though they're in the book)
7. Arrays
   Ordered lists that store one type; indexing; iterating; accessing & modifying

String Problems

Strings are the last big thing that ~~could~~ *will* come up on the midterm, so hopefully this section hammers home the main things to know about them. Encourage students to look at any section problems you don't get through, the practice midterms, and the beginning of the Hangman assignment if they want more practice.

Warmup

Hopefully this will iron out some of the conceptual questions around strings and what "immutability" means. Of particular note: 3 is almost right except an off-by-one error in the bounds, but the approach of constructing a string from substrings should be emphasized as correct.

Deleting Characters and Separating Digits & Letters

These problems both review similar material: the basic patterns of iterating over a string and building up new strings character-by-character. Ideally pick one to go over (we will be posting a walkthrough video of Separating Digits and Letters on Friday evening, so maybe go through Deleting Characters, but it's up to you).

Adding Commas

This teaches iterating backwards through a string, giving an extra twist to the coding idiom they'll have just seen.

Pig Latin

We give multiple possible solutions to this one, so you have a good amount of liberty in teaching this as you like. It has some good practice with substrings, indexing in strings, manipulating characters, etc. Enjoy!

Trace Problems

If there's extra time, it's always worth practicing tracing. Yay debugging skills – especially with passing by reference.