CS1007: Object Oriented Design and Programming in Java

Lecture #13

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Shlomo Hershkop

shlomo@cs.columbia.edu

Midterm

- Hope you had some fun taking it
- Will review it in class (if you couldn't make it to class, please grab someone's notes…if you are in class, please take notes)
- Will try to review fundamental concepts in each question.

midterm

- Try to balance your time, and topics
- No reason to ask about random stuff we havent touched
- No reason to ask stuff you will get wrong
- No power rush from tricking students
- These exams are a lesson for everyone

Review Midterm

- Question 1
- General definitions
- Looking for specific point, hopefully your answer
  - Legible
  - Correct
  - You understand what you wrote ☺

Question 2

- Understanding packages
- Understanding directory relationships to packages
- Picking up on final keyword in method defintion

Q3

- == vs. .equals
- One compares address of referenced objects
- One compares contents of specific object
- Challenge: Can 2 different classes get a true for the == operation ?

Interfaces question

- Interface definition
- Use of interface
- Different between the two compare interfaces
- Why both?

Question 5

- Understanding method chaining
- Will walk/talk through the code

Copy question

- Related to references
- Pretty much covered in the course

Recursion question

- Very open ended
- What ideas did you use ?

idea

- Base case:
- 1) a==b
  - Return a
- 2) Need to check a<b
  - Return 0

- Else
- Return a + sum(a+1,b-1) + b

How to do it better?

Call helper method

- Can use more args ☺
- Would carry around the sum in third arg
- Help(a, b, 0)
- Recursion: Help(a+1,b-1,a+b)

Random issues: Return values

- Java will in some case make believe there are parenthesis around something

Example:

```
public boolean Something(int a,int b){
  return 5 + a == b;
  }
```

Problem:

```
public boolean Something(int a,int b){
  return 5 + a * 10  == b;
  }
```

Random II: return live iterator

- Most of the time, when you consider Iterator, think of implimented class
- Can also return an anonymous inline Iterator:

- Code:
  - Represent a group of items (will use an array)
  - Give back an iterator on request

Random III: Public/Private classes

- Each .java file must contain one public/abstract class
- But can contain many private classes

- NOTE: if you got the private class marked wrong….please see me, I thought more people were aware of this fact.

Bottom line

- Will be returning the exams next class
- Will post grades on to courseworks
- Please stop by OH to discuss any concerns etc you might have
- Make sure to get started early on the next homework (released by next class)

Post midterm

- Will be covering:
  - Start chapter 5
    - Patterns of programming
    - Object design and considerations
    - Many examples
    - Application to homework: writing Othello game

Patterns

- Many times when programming large projects:
  - Notice certain underlying patterns
  - Example: email file

    many different ways of representing email messages

    but: end user will want to treat them the same way!
  - Haha! A pattern

Patterns

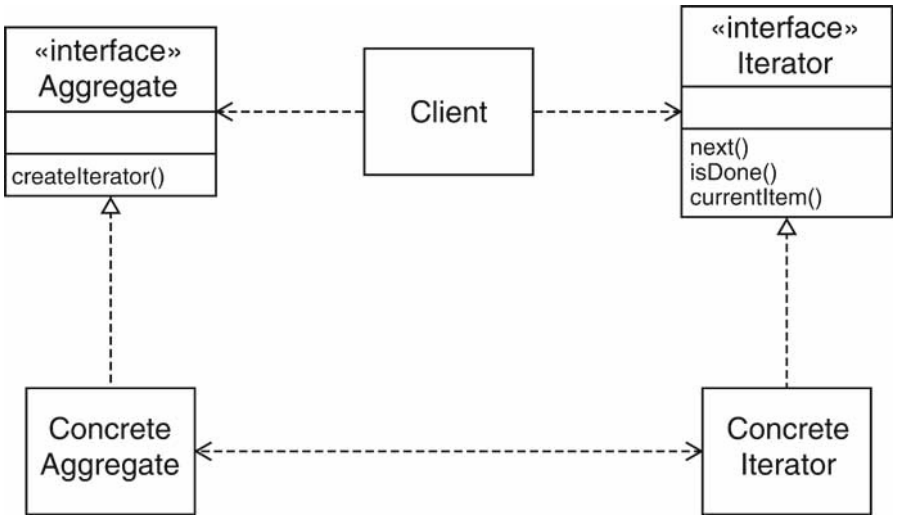
- Advantage:
  - If can group what you are doing as a specific pattern
    - Can reuse related patterns (code)
    - Can study for optimization purposes…one discovery can be easily applied to many different types of stuff, if we've grouped them into patterns
    - Easier to think about huge projects if we have a few patterns to talk about
    - Seemed to have worked in architecture

Iterator Pattern

- Covered before midterm
- Collection of elements
- Users want to examine elements
- We don’t want to expose the underlying implementation
- Ability to allow multiple independent access

Iterators pattern

- Define a general iterator that fetches one element at a time
- Each iterator object keeps track of the position of the next element
- If there are several collection/iterator variations, it is best if the collection and Iterator classes realize common interface types.



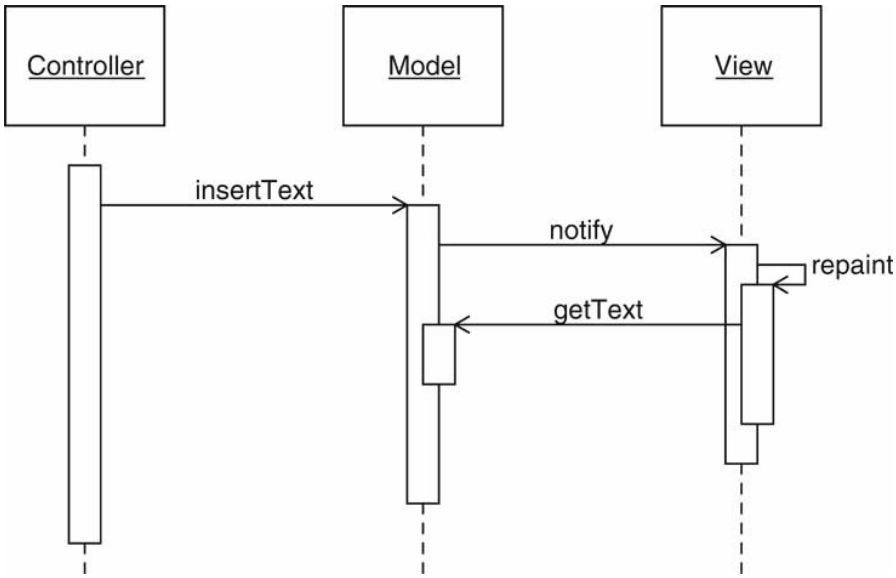
Observer Patterns

- In many applications will have multiple views of the same data
- When you edit one part, affects other parts of the view
- Eclipse

Division of Labor

- Model: data structure, no visual representation
- Views: visual representations
- Controllers: user interaction

- Views/controllers update model
- Model tells views that data has changed
- Views redraw themselves



Observer Pattern II

- Model notifies views when something interesting happens
- Button notifies action listeners when something interesting happens
- Views attach themselves to model in order to be notified
- Action listeners attach themselves to button in order to be notified
- Generalize: Observers attach themselves to subject

For Next time

- Will cover more examples with catch/finally
- Will cover more coded examples with iterators
- Will cover observer examples/code

- Read chapter 5.1-5.6