CS 520
Theory and Practice of Software Engineering
Fall 2017

OO design and Java 8 features

October 03, 2017

Today
- MAP postmortem.
- Another MVC (source code) example.
- A primer on lambdas and method references (Java 8).
- A first paper/poster review.

Course overview: the big picture
- Software architecture and design
  - Software modelling and UML crash course.
  - Best practices and OO design principles.
  - Architecture and Design patterns.
- Empirical Software Engineering
  - Reasoning about experimental designs and studies.
  - Understanding and reasoning about threats to validity.
- Software testing, debugging, and repair
  - Learning about cutting-edge research.
  - Hands-on experience, using testing and debugging techniques.
- Class project
  - Design, development, and testing of a research prototype, etc.
MAP: Postmortem

Overview
- Organization and logistics
- Material
- Grading and workload

MVC revisited

Design patterns in an MVC architecture

Client sees
uses

Model manipulates
updates

Controller

View

Composite

Strategy

Observer

Recall our Median implementation (strategy pattern)

A primer on Java 8 features:
Lambdas and method references

Is this a reasonable solution, given the simplicity of the problem?
A lot of code and new classes for just calling sort

// The Sorter interface.
public interface Sorter {
    public void sort(double[] numbers);
}

// A concrete Sorter implementation.
public class QuickSort implements Sorter {
    public void sort(double[] numbers) {
        java.util.Arrays.sort(numbers);
    }
}

@Test
public void testQuickSort() {
    Median m = new Median();
    m.setSorter(new QuickSort());
    double actual = m.median(1, 2, 3, 4);
    assertEquals(2.5, actual, EPS);
}

What are alternatives to creating a new class to wrap QuickSort?

Live coding: lambdas and method references
See code example (online)
- lambda
  - Test class AllTests provides four test cases.
  - Four possibilities to test the same behavior of StrategyMedian.
    - Using a concrete class QuickSort.
    - Using an anonymous inner class.
    - Using a lambda expression.
    - Using a method reference (Method references simplify lambda expressions that call a single method).

Use ant to compile and test the code:
$ant -p => list all targets
$ant compile => compile the code
$ant test => run all four tests, which test the same behavior

Key concepts: target typing and type inference.
Studying brain activity using fMRI scans

Now, what's this?
There is an obvious experiment to conduct...


A first paper/poster review

Important questions to answer:

- What is the **motivation** of the paper?
- What are the **main objectives** of the paper?
- What are **strengths** and **weaknesses** of the paper?
- Is the **methodology** and **presentation** convincing and adequate?
- What are **open questions** or **controversial statements**?


Generally, when interpreting results and statistics, check for red herrings and dead salmons :)

A first paper/poster review

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