Waukesha County Technical Institute
152-135 Advanced Java

Class 8 Lesson Plan

Discussion Activities:

- **Due Today**
  1. You have continued to study inheritance and have fixed any problems in your coded classes for the abstractions you worked on.
  2. You have read the "dip.pdf" paper.

- **General Q&A**

- **Continue discussion of Inheritance and Abstraction**
  - Review key definitions, techniques and value propositions from last class
  - Do lab work (see below)

- **Introducing the Dependency Inversion Principle (DIP)**
  - Reference article: dip.pdf on Blackboard
  - Closely related to the Strategy Pattern (see Chapter 1 in your text book). The Strategy Pattern is based on the DIP.
  - See sample projects "IndependentCopy" and "DependentCopy" where the "independent" version is the DIP-compliant version (good) and the "dependent" version is the bad version (not DIP)
  - The goal of DIP is flexibility – low-level objects become interchangeable components ("has a" relationship), via polymorphic abstractions in the high-level class.
  - Motivation: the only widely agreed upon definition of code quality are the following guiding principles:
  - Three guiding principles for quality:
    1. **Code must not be rigid**
       (able to plug in different modules without much change)
    2. **Code must not be fragile**
       (an edit in one place shouldn't cause code to break in other places
    3. **Code must be flexible and portable**
       (easily adapts to change, easily used in new projects)
  - How to test for DIP compliance:
    a. HIGH LEVEL MODULES SHOULD NOT DEPEND UPON LOW LEVEL MODULES. BOTH SHOULD DEPEND UPON ABSTRACTIONS.
    b. ABSTRACTIONS SHOULD NOT DEPEND UPON DETAILS. DETAILS SHOULD DEPEND UPON ABSTRACTIONS.

Lab Activities:

- Download a copy of the sample project "InterfaceAbstractLab.zip" on Blackboard and load into Netbeans (remember you can directly use File > Import Project > From Zip… to do this)
- There are two lab packages. Each has a "readme.txt" file with instructions. Read the instructions carefully and complete as much of the work in class today as possible.

Resources:

- Previous Class Plan notes
- Dip.pdf
- Using Git in Netbeans: http://netbeans.org/kb/docs/ide/git.html
- Netbeans IDE web site: http://www.netbeans.org
- Netbeans Help Menu in the program; plus, Netbeans tutorials on their web site
- Java SE API: http://docs.oracle.com/javase/8/docs/api/

Preparation Work for Next Class: Independent Research and Practice

- Complete any unfinished lab work.

- **Continue study of "dip.pdf" and write a paper (minimum 500 words):**

  You will use the attached "Critical Thinking" rubric as a grading guide. Research and Analyze the uses of Interfaces vs. Abstract Classes as the best type of super class to use. There is no real winner here because it depends on the application and on the requirements, however, you must choose a winner anyway.

  The goal of this assignment is to exercise your critical thinking skills. It is NOT the goal of this assignment to have you pick a correct winner. So what is critical thinking?

  Critical thinking starts with research … the more the better. Learn all you can about Java Interfaces and Abstract classes, starting with the handouts provided and lectures given. Then go to your favorite Internet Search Engine and research the topic further. Take notes and organize what you learned so you can contemplate about advantages and disadvantages of both options.

  Now really think hard and long about this … this is not the time for quick reactions. Pretend you are presenting this to your boss and your job is on the line! Make this an important task that you want to get right.

  Now make a choice – analyze what you've learned and based on that bank of knowledge, make a case for whether you think Interfaces or Abstract classes are the BEST choice for super classes. Then back up your choice with facts. This part is crucial. Without facts to back up your choice, it's just opinion. Your boss wouldn't want that – no body would. Tell us why you think this is the best choice.

And follow the grading rubric for ideas about how to optimize your paper for the best possible grade. In other words, read the criteria.

Your paper should be double-spaced with 1-1/2 inch margins on all sides. A minimum of 500 words is required. This is a 25-point assessment of your Critical Thinking Skills and points will be earned as indicated on the rubric. Note that while spelling and grammar are not part of the rubric, you are expected to be professional and avoid these problems. An automatic deduction of 5 points will be assessed for excessive spelling and grammar errors. The paper is due at the start of next class, printed on paper.