Homework 7
Testing your code

CS 5060 Intensive Programming, Fall 2012

105 points

Due: 3:59 pm November 12, 2012

Assignment description

In this assignment we will implement a simple stack-based data structure and write unit tests to make sure that the implementation is correct. The assignment is simple, but you have to use some new concepts: Exceptions, Comparable, Generics, and unit tests with JUnit.[1]

Comparable class (20 points)

Create a `PersonName` class that stores the first name and last name of a person. The class should implement the `Comparable` interface and it should have:

- a constructor that accepts the first name and last name (2 points),
- a `getFirstName()` method (1 point),
- a `getLastName()` method (1 point),
- a `toString()` method (3 points),
- an `equals(Object o)` method (5 points), and
- a `compareTo(PersonName n)` method that sorts by first name and then last name (8 points).

Notes:

- If the first name (or last name) is `null` in the constructor, set the value to an empty string. Also, remove leading and trailing spaces.
- `toString()` should return the first name, then a single space, and then the last name, and it should remove leading and trailing spaces.
- `equals(Object o)` should return `false` if the object is not of type `PersonName`.

Stack with min operation (40 points).

Implement the `MinStack` interface available in the Files section on Canvas. The class implementing the interface should be named `MyMinStack`.

[1] `http://www.junit.org/`

Grading:

- constructor (1 point),
- `isEmpty()` method (1 point),
- `getSize()` method (1 point),
- `push()` method (2 points),
- `pop()` method (2 points),
- `getMin()` method (5 points),
- `toString()` method (3 points),
- `EmptyStackException` (5 points)
- using Generic data type (10 points),
- implementing `getMin()` to run in constant time (10 points).

Unit tests (45 points)

Write JUnit tests to test your classes. Create a `PersonNameTest` class to test your `PersonName` class and create a `MyMinStackTest` class to test your `MyMinStack` class. You should test every method of your classes, and each class method should be tested in a different test method. The tests for the `MyMinStack` class should use a stack that holds `PersonName`s.

Grading for `PersonNameTest` (20 points): The tests for each method are worth the same as their implementations.

Grading for `MyMinStackTest` (25 points):

- constructor (1 point),
- `getSize()` method (1 point),
- `isEmpty()` method (1 point),
- `push()` method (5 points),
- `pop()` method (5 points),
- `getMin()` method (7 points),
- `toString()` method (5 points),

Submission.

Submit a `zip` file with the following files:

1. Code files PersonName.java, EmptyStackException.java, and MyMinStack.java with your class implementations; and code files PersonNameTest.java and MyMinStackTest with the unit tests (do not submit the interface files).

Include your name and A number at the top of each source file. Name the zip file hw07_firstName_lastName.zip. For example, if your name is John Smith, name the file hw07_John_Smith.zip.