1005ICT Object Oriented Programming 2015-2
Laboratory 3

School of Information and Communication Technology
Griffith University
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<th>Teaching week 4</th>
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<td>Goals</td>
<td>In this laboratory you will use the <strong>String</strong> API and create a class with a constructor, fields and methods.</td>
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<td>Marks</td>
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## 1 Preparation

Before your lab class:

- Print these lab notes. You need to refer to them *a lot* before the lab class and during it.
- Review the lecture notes on up to section 7.
- You can experiment and create the programs before your class.

## 2 Pre-laboratory questions (0.5 marks)

Complete the following sentences in the space provided, **before your laboratory class**.

1. What method in class `java.lang.String` removes the whitespace from both ends of a string?

2. What method in class `java.lang.Object` returns a string representation of the object?

3. Read the description of `java.lang.Object.finalize()`. When would a programmer (like you) write a call to this method?

4. What is the type of `java.lang.System.in`?

5. What `class` is `java.lang.System.out.println()` a method of?

## 3 Activities

### 3.1 Program 1 (1 mark)

- Write a program that accepts two command line string arguments and prints the lesser of them, if case is ignored. (Use MaSH Online Judge problem-id: 0503-lesserString to check your answer.)
- The program should look like this when it runs:

```
$ java Main Zoophyte aardvark
aardvark

$  
```
3.2 Program 2 (1.5 marks)

- Create a class that represents a rectangle. A rectangle is specified by the coordinates \((x, y)\) of its top-left corner and its width and height.

This class will be used to create many rectangle objects, and it must feature:

- dynamic fields (variables) to store \(x, y\), the width and the height as fractional numbers;
- a constructor with parameters that provide \(x, y\), the width and the height;
- a function that returns the area of the rectangle;
- a function that returns the length of the perimeter of the rectangle; and
- a function that returns a string representation of the rectangle, the four numbers, within a pair of parentheses, separated by commas. *This function must be named `toString()`.*

- Write, in a separate `Main` class, a main method that accepts the four numbers as command line arguments, instantiates a rectangle object, and prints the string representation of the rectangle, the area and the perimeter. It should look like the example below. (Use MaSH Online Judge problem-id: 0505-rect to check your answer.)

```java
$ java Main 1 2 3 4
rectangle = (1.0, 2.0, 3.0, 4.0)
area = 12.0
perimeter = 14.0
$
```

3.3 Program 3 (no marks, just kudos)

Extend program 1 so that it accepts any number of command line arguments and prints the least of them. (Use MaSH Online Judge problem-id: 0504-leastString to check your answer.)

3.4 Program 4 (no marks, just kudos)

Extend the classes for program 2 to implement these functions and test them:

- combine the rectangle with another rectangle and return a new rectangle that just encloses both original rectangles.

- combine the rectangle with another rectangle and return a new rectangle that just encloses the intersection of the rectangles. If the rectangles don’t actually overlap at all, return `null` instead of a new rectangle object.

(Use MaSH Online Judge problem-id: 0506-rectUnion to check your answer.)
4 After the Laboratory

- Organise the work you have done into folders on your network drive.

- Please answer these feedback questions.
  - What was the most difficult aspect of this laboratory?
  - Did you find an error in these lab notes?