FIT9131 Programming Foundations

Week 9 Exercises

A. Homework checklist

To be up to date you should have completed the following:

- Lab exercises from weeks 1– 8.
- Read Chapters 1–4, sections 6.3-6.5, 6.12-6.15 from Chapter 6, sections 7.1-7.4 from Chapter 7, sections 9.1-9.2, 9.3.2, 9.4.1, 9.6, 9.8, 9.9 from Chapter 9, and sections 15.1-15.3 from Chapter 15 of the text book, *Objects First with Java*, Barnes & Kölling.

The Assignment 2 specification has been available on the FIT9131 Moodle site since Week 8. You are expected to have downloaded and read the specification and have started on designing and implementing a solution.

Important: Each week, your tutor will check assignments randomly in the lab session.

Implement your program progressively, starting with things which you have already learnt. For instance, one of the requirements in the assignment is to read/write data from/to text files; you will not learn this technique until next week - but *do not wait until next week to start working on the code*! You have already learnt enough to work on other parts of the program - for instance the repeating menu, the collections of objects, etc. So, start with those now, and add in the code for file input/output later.

B. Exercises for Week 9

1. What is the main difference between an ***instance*** variable and a ***class*** variable?

2. Write the code for the following:

    a. definition of a ***class (static)*** *variable* of type **`int`** called **`booksOnShelf`** that keeps a count of the books in a library.

    b. a ***class (static)*** *method* that will return the value of **`booksOnShelf.`**

    Note that these could be part of a **`Library`** class; however, there is no need to write the full class which contains this class variables and method.

3. Write the definition of a ***class constant*** **`SHELF_SIZE`** with the value 30.

4. Have a look at the documentation in the Java API for the **`Math`** class. Notice that the methods are defined as static methods. Why do you think this is the case?

5. Read the Assignment 2 specification. Consider the main classes suggested in the ***Program Design*** section (**`Student`**, **`Subject`**, **`StudentDatabase`**, **`SubjectDatabase`**). Working in groups, draw up a ***Class Diagram*** for each of the classes. What attributes and behaviours would you put in each class? See the week 8 lecture for an example of a Class Diagram.

    a. Are there any other classes that you could include in your design?

    b. Discuss your design with your tutor. This is also a good time to ask questions about the assignment specification.

C. Homework

1. Finish any exercises not completed in the lab.

2. Read sections 14.1 – 14.5, 14.8 – 14.9 from chapter 14 of the text book, *Objects First with Java*, Barnes & Kölling.

3. Work on Assignment 2.

D. Pre-lab task to be assessed in Week 10

Write the complete code for the **`Student`** and **`Subject`** classes for Assignment 2. The classes should include constructors, accessor and mutator methods for each field and any other methods you think are appropriate. The mutator methods should include ***simple*** validations for their parameters. You should also consider including a **`toString()`** (and a **`display()`**) method

Include the **`Student`** and **`Subject`** ***Class Diagrams*** (the one you designed in **Q.5** above) in your submission.