Soft 7004 – OOP1 - Labs

## LAB 4: Completion Date: 27th November 2015

## On completion please zip up your files including any documents used for drawing the class diagram. Upload to BlackBoard.

**Q1**

Part a) Create a UML diagram for the Employee class. This class has name and number. We would like the number to be unique for each employee object. To create the Employee object we need the name only. Included in this class is an abstract method getStatus() that returns a string. What will this abstract method mean for the class?

Part b) Now add two more classes to your diagram called FulltimeEmployee and PartTimeEmployee which inherit from the Employee class above. FulltimeEmployee contains an annualSalary and a method to calculate the monthly pay. PartTimeEmployee contains an hourlyPay and a method that takes in an int (number of hours) and calculates the weekly pay for the hours worked. Include all sets, gets, toString and print methods. **Remember the** rules for inheritance.

Part c) Now create these classes and once completed write an **application class** called TestEmployee. In this set up an array of Employees, then add four employees (mixed FT + PT) and print out the details in the array. Fulltime employees show details plus annual salary. Part-time employees show details but also show an example weekly wage.

**Q2**

1. Create a class called RationalNumber to perform arithmetic with fractions. It encapsulates the concept of one rational number. Use integer attributes to represent the fraction’s numerator and denominator. Write two constructors one no argument constructor which sets the numerator and denominator to one. The other constructor takes two integers used to set the denominator and numerator. Provide public methods to perform the following operations:

Add two rational numbers

Subtract two rational numbers

Multiply two rational numbers

Divide

toString “a / b”

Print output the string and floating point (double) value.

Add ,subtract multiply and divide methods return a rational number object.

1. Write a test program that uses your class. Show a test call for each of the four arithmetic methods.

Note:

\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}.

\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}.

\frac{a}{b} \div \frac{c}{d} = \frac{ad}{bc}.