THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING
BACHELOR OF SOFTWARE ENGINEERING
ECI4262 - OBJECT ORIENTED DESIGN AND PROGRAMMING
FINAL EXAMINATION – 2015/2016

CLOSE BOOK TEST

Date: 10th of December 2016 **Time: 09:30 – 12:30 hrs**

Answer **Question 1** and any **four** questions from **Question 2** to **Question 6**.

[Q1]

A take-out pizza restaurant wants to set up an online ordering system. A customer must have a login account to use the system. When the customer creates his or her account, the following information is stored: Email address (which becomes the user id), contact phone number, password, name, address, preferred credit card number, and credit card expiry date. When the customer creates an order the following information is stored: The time the order was placed, the address for delivery, the contact phone number, the total price, the credit card number charged, the expiry date of the credit card, the items ordered and the total price. An item can be pizza or drinks. For each pizza item, the information stored will include the kind of pizza (thin crust, thick crust or gluten-free crust), the size (small, medium, large), the list of toppings (e.g. cheeze, bacon, vegetables, etc.), the number of items like this (e.g. 10 would mean 10 identical pizzas) and the total price for this pizza item. For each drink item, the information stored is type, size, number, and total price. The system also records each delivery: Associated with each delivery is the name of the delivery driver; the time the driver picked up the order(s) and the time each order was delivered. A driver may take more than one order on a delivery run.

a) Draw a use case diagram for describing the functional requirements of the above system.
(8 marks)

b) Create a class diagram for the above system. Show classes, associations and generalizations.
(12 marks)

[Q2]

a) What is JVM in java?
(5 Marks)

b) Why is Java called as a 'Platform Independent Programming Language'?
(5 Marks)

c) Write Java program to print the largest number of an array of integers.
(10 Marks)

[Q3]

a) Name and briefly describe the three main categories of design patterns
(6 marks)

b) Name 3 design patterns belonging to each of the above categories.
(6 marks)

c) Write a java code to illustrate the implementation of Singleton design pattern.
(8 marks)

[Q4]

a) What is a Java Interface?

(4 Marks)

b) Give an example of how you might use an Interface using java code.

(6 Marks)

c) Briefly explain the following concepts

(10 Marks)

- finally
- String
- Instance Variable
- Constructor
- final

[Q5]

a) Explain the access modifiers 'public', 'private' and 'protected' in Java.

(6 marks)

b) Explain the following terms with respect to exception handling.

(6 marks)

- try/catch
- throw
- throws

c) Explain what is meant by the scope and lifetime of a variable with examples.

(8 marks)

[Q6]

a) Name and explain the types of polymorphism with sample java code for each type.

(10 marks)

b) Write a Java program that will perform the following operations

1. Create a class named 'Student'
2. Add two private instance variables 'name' and 'age' inside class Student.
3. Add public getters and setters for the two instance variables inside the Student Class.
4. Create class named Main with a main method inside it, and create an instance of Student class inside the main method with following values.
   age = 25
   name = BOB
5. Use the getter method of name variable to print the name of the student instance created inside main method.

(10 marks)