THE OPEN UNIVERSITY OF SRI LANKA
Faculty of Engineering Technology
Department of Electrical & Computer Engineering

Bachelor of Technology Honours in Engineering

Final Examination (2016/2017)
ECX4262: Object Oriented Design and Programming

Date: 04th December2017 (Monday) **Time: 9:30 am – 12:30 pm**

Answer **Question 1, Question 2** and any **three** questions from **Question 3** to **Question 6**

Q1. Compulsory Question

a) A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players and one player captains the team. A team has a name and a record. A player has a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses.

Draw a class diagram for the above scenario and label all associations with appropriate multiplicities.

(15 marks)

a) Briefly describe the following concepts using an example from above scenario

i. Actor
ii. Object
iii. Use case
iv. Behavior
v. Attribute

(5 marks)

Q2. Compulsory Question

a) Name and briefly explain the use of any two access modifiers in java.

(5 Marks)

a) Suppose we want to develop software for an alarm clock. The clock shows the time of day. Using buttons, the user can set the hours and minutes fields individually, and choose between 12 and 24-hour display. It is possible to set one or two alarms. When an alarm fires, it will sound some noise. The user can turn it off, or choose to 'snooze'. If the user does not respond at all, the alarm will turn off itself after 2 minutes. 'Snoozing' means to turn off the sound, but the alarm will fire again after some minutes of delay. This 'snoozing time' is pre-adjustable.

Identify the top-level functional requirement for the clock and model it with a use case diagram.

(15 Marks)

Answer any three questions from Question 3 to Question 6

Q3.

a) Briefly explain what is meant by "implements" using a sample java code. (8 Marks)

b) Write java code to explain how a child class can override its super class method.

(5 Marks)

c) Explain the importance of garbage collection.

(3marks)

d) Explain the following terms.

i. final
ii. finally

(4 marks)

Q4.

a) Identify three advantages of using design patterns in software development.

(6 marks)

b) Write down any six design patterns

(6 marks)

c) Explain the use of one of the above mentioned design patterns with sample Java code to support your answer.

(8 marks)

Q5.

a) Why is Java called as a 'Platform Independent Programming Language'?

(2 Marks)

b) Explain the difference between a **Primitive Variable** and a **Reference Variable**

(5Marks)

c) Explain the difference of "String" with other data types.

(3 Marks)

d) Write a java program that creates an array of five String Objects, then print the second value.

(10 Marks)

Q6.

a) What is an abstract class in java? Explain with a suitable example.

(4 Marks)

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

1. Create a class named 'Rabbit'
2. Create a class named 'Zoo' which includes an instance level "Rabbit" Object reference.
3. Add an overloaded constructor to "Zoo" with an argument "Rabbit"
4. Use the "Rabbit" constructor argument to instantiate the instance level "Rabbit" Object reference.
5. Create a class named "Application" and create an object of "Zoo" inside the main method.

(15 marks)