UNIVERSITY OF RUHUNA
BACHELOR OF COMPUTER SCIENCE (BCS) (GENERAL) DEGREE
LEVEL II (SEMESTER I) EXAMINATION – JULY 2016

COURSE UNIT: CSC 2123 - Object Oriented Programming **Duration: 2 Hours**

*Answer **all** four (04) questions.*

1.

a. Give the difference between following concepts with respect to Java.

i. Interface and an abstract class.

ii. Public and Private access modifiers.

b. Explain the following concepts using sample java programs.

i. Method overloading

ii. Method overriding

c. Answer the following questions.

i. Write a static java method called ***findSum*** that take integer array as a parameter and returns the sum of the array elements.

ii. Write a java method called ***sumOfDigits*** that takes two digit integer value as a parameter and returns the sum of the two digits.

d.

i. Define the following object oriented concepts.

a). Class

b) Instantiation

c) Constructor

ii. Write a Java source code to perform the tasks ((d.ii.a), (d.ii.b) and (d.ii.c)) according to the class description given below.

Class Description:

- A University wishes to keep information on its students. The proposed Student class has the following instance variables that can be accessed within the class:

  studentNo: String
  studentName: String
  ratePoints: Integer

- Student class required to have a class variable named noOfStudents, which will be incremented each time when a Student instance is created.

a) Show the declaration of the Student class, including a setter and a getter method for **studentName** property.
b) Declare overloaded constructor that takes three parameters.
Note: parameters should contain value for each of the above mentioned instance variables.
c) Show how above constructor could be used to instantiate an object.

2.

a. Briefly explain the following object oriented concepts by using suitable method.

i. Inheritance

ii. Polymorphism

iii. Abstraction

b. Briefly explain the concept ***Encapsulation*** with respect to Java programming language.

c.

i. Most of the exceptions are caused because of the following reasons,
   1. User errors
   2. Programmer errors
   3. Unavailability or failure of physical resources.

   Justify the above statement by providing suitable examples.

ii. What is the similarity between ***NullPointerException*** and ***ArrayIndexOutOfBoundException*** in Java?

iii. What is the purpose of using "***finally block***" of try catch statement? What is the appropriate place to insert "***finally block***" with try catch statement?

d. University authority has decided to offer a scholarship for the students to do their Master degree for those who have their final GPA value above 3.5. If GPA value of a student is less than 3.5, program need to throw an exception displaying the message "***You are not eligible for the scholarship***". For this case, write a suitable Java custom exception to throw an exception if the GPA value of a student is not in the eligible criteria.

3.

a.

i. Write three advantages of using Multithreading capability in Java programming?

ii. Consider the following code segment and replace the ***Missing code segment*** with appropriate lines of code to start a thread.

```
class X implements Runnable
{
public static void main(String args[])
  {
    Missing code segment
  }
public void run() {}
}
```

b.

i. Why is Thread Synchronization important for accuracy of the resulting output? Explain with an example.

ii. What are the tasks of the methods ***wait()*** and ***notify()*** in inter-thread communication?

c.

i. Define a thread class called ***PrintThread*** that prints a given string for a given number of times.

ii. By using the ***PrintThread*** class defined above, write a ***MultiThreadDemo*** class that simultaneously prints the string ***"CSC2123"*** for 40 times and the string ***"OOP"*** for 50 times.

d.

i. Describe three main advantages of Distributed computing.

ii. Write two separate java classes **Client.java** and **Server.java** to ***send a message from Client to Server*** and ***receive the message by server*** respectively using TCP (Transmission Control protocol) socket programming.

4.

a. Consider the following incomplete definition of the class Employee and write separate Java code segments for each of the operations described in sections a(i), a(ii), a(iii), a(iv) and a(v).

```
class Employee{
privateintEmployeeID;
private String EmployeeName;
private char Category;
.....
}
```

i. To establish a JDBC connection to the MySQL database **(EmployeeDB)** in the localhost with the port number 3300. You can use ***jdbc:mysql://localhost:3300/*** as the URL for connecting to MySQL database , with the driver name ***com.mysql.jdbc.Driver*** and use root account (username ***root*** , password ***root***) of MySQL .

ii. To create a table with the name **Emp_tab** inside the database created in section a(i) to store data to the attributes in the Employee class. Use appropriate types and values for each field.

iii. To insert one row of data to the **Emp_tab** table with appropriate values.

iv. To retrieve the information of all employees whose category value is equal to the value **"T".**

v. To update the attribute "**EmployeeName**" with new name ***"Saman Kumara"*** of the employee who's "**EmployeeID**" is ***5298.***

b.

i. Why event handling is important in Java?

ii. Explain event handling process by using an appropriate diagram.

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