



SCHOOL OF COMPUTING AND ENGINEERING SCIENCES
BACHELOR OF INFORMATICS AND COMPUTER SCIENCE
ICS 2101: Object Oriented Programming II
END OF SEMESTER EXAM

Date: 1st August 2022

Time: 2 Hours

Instructions:

This Examination consists of **FIVE** questions

Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

Question one [30 Marks]

- a) The code below demonstrates an important OOP characteristic. Describe this characteristic, then using a diagram, draw a UML representation of the relationship with the relevant content in it. **[5 marks]**

```
public class Automobile
{
    private String Brand;
    private Date Date_of_Manufacture;

    public void honk()
    {
        [.....] //Method Logic
    }
    [...]
}
public class Car extends Automobile
{
    private int Reg_Num;
    private int Engine_cc;
    private String Model_Name;
    [...]
}
```

- b) For an application to be considered as a distributed application, it must perform which tasks? **[3 marks]**
- c) Transactions represent units of work done by java programs. Explain how these transactions are managed in Java. **[2 marks]**
- d) When developing a JavaFX application, the window containing all other elements of your application is what is referred as a stage. You can implement different types of these stages depending on your preference. Which three of these stages would you implement? **[3 marks]**
- e) What is a middleware and why is it important? Give 3 examples of middleware technologies. **[4 marks]**

- f) Web-view is an important component in JavaFX architecture. Mention at least four activities you can achieve using this component. [2 marks]
- g) Give at least four advantages of having a system as distributed application as opposed to having it centralized. [4 marks]
- h) Mention and explain the purpose of at least four features of JavaFX library [2 marks]
- i) Connecting a JavaFX application to the database using a MySQL connector requires one to follow five steps. Using java code snippets, explain these steps? [5 marks]

Question Two [15 Marks]

- a) Identify the package in Java API that is used to manage SQL-based database connectivity [2 marks]
- b) From the package identified in (a) above, the package can be used to perform which database activities? Mention any two. [2 marks]
- c) Explain any TWO benefits of using prepared statements to execute SQL queries in Java [2 marks]
- d) Identify any three functions of a JDBC driver [3 marks]
- e) You are developing a java application which connects to MySQL database using JDBC API, you encounter the error displayed below. What causes it and how can you solve it? [4 marks]

```
Detected JavaFX Ant API version 1.3
jfx-deployment:
jar:
Copying 12 files to /Users/danielkurui/NetBeansProjects/GUI_DB/dist/run1180240236
jfx-project-run:
Executing /Users/danielkurui/NetBeansProjects/GUI_DB/dist/run1180240236/GUI_DB.jar
java.lang.ClassNotFoundException: com.mysql.jdbc.Driver
```

- f) Explain clearly The ACID properties describing the transaction management in Java. [2 marks]

Question Three [15 Marks]

- a) A thread pool is a managed collection of threads (worker threads) that are available to perform tasks. Explain any TWO reasons why it is advisable to execute tasks or jobs using thread pools [4 marks]
- b) A popular way of calling of methods or passing an object over a network in a distributed systems architecture is the use of Java Remote Method Invocations (RMI). Explain how this system works using a well labelled diagram. [8 marks]
- c) Assume you are developing your distributed Java application called ABC System. The systems is located in a folder whose address is C:\Users\user\Desktop\ABS_System
Write the java command line code to
 - i. Compile all .java files in the folder [1 mark]
 - ii. Start the rmi registry [1 mark]

- iii. Start the server whose code is in the file named BankServerAlpha.java [1 mark]

Question Four [15 Marks]

- a) As a front-end junior developer, you have been assigned to create the following simple interface using JavaFX. Do this, ensuring you document the whole code using single line comments. Populate the ChoiceBox with the following items; **Student**, **Lecture** and **Admin**. [12 marks]



- b) Which JavaFX Architecture component is likely to detect the OS systems error and why? [3 marks]

Question Five [15 Marks]

- a) Differentiate between a Java session bean and a Java entity bean. [4 marks]
- b) Javadoc is a tool, which comes with JDK, and it is used for generating Java code documentation in HTML format from Java source code, which requires documentation in a predefined format. Show how you will write Javadoc comments for the following method [3 mark]

```
public static void tempCheck(int temp) throws InvalidTempException
{
    if (temp>37)
    {
        throw new InvalidTempException("Temperature should be more than 37 degrees");
    }
    else
    {
        System.out.println("The temperatur is okay");
    }
}
```

- c) Among the multiple classes and interfaces in the Servlet API, we have the Servlet interface. Describe the three life-cycle methods that reside in this interface, stating their functions, and using Java, write the syntax of each of these methods. [8 marks]