Strathmore
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES (S.C.E.S)
BACHELOR OF INFORMATICS AND COMPUTER SCIENCE (BICS)
END OF SEMESTER EXAMINATION
ICS 2101 – OBJECT-ORIENTED PROGRAMMING II

DATE: 17th September 2021 Time: 2 Hours

**Instructions**

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

**Question One (30 marks)**

You have been contracted as an OOP developer consultant for an upcoming transport company with similar objectives and functionalities as Uber. The company already has a completed mobile application for hailing vehicles but is in the process of creating a desktop application for the purpose of driver and vehicle registrations and enrolments. Your main role as a consultant is to oversee this new project of coming up with the desktop application for the registrations and enrolments.

a) Identify and describe the state and behaviours of 4 entity beans that would be key in the implementation of the application. **(6 marks)**

b) Draw two wireframes of the application's GUI (should not include login and registration GUIs). Using Java GUI, write code to produce these two wireframes, ensuring one can switch from one to the other through some GUI component. **(10 marks)**

c) With the 6 steps of connecting an application to the database using JDBC in mind, use Java to write code to connect one of the GUI forms in (b) with a MySQL database that will enable it to perform any CRUD functionalities. **(8 marks)**

d) Identify and describe the *three common* types of exceptions you would need to look out for in the implementations of the project. Identify at least 1 type of exception under each. **(6 marks)**

**Question Two (15 marks)**

a) Multitasking can be achieved, among many other technologies, through *multithreading.* Using code snippets, describe the two ways that one can create a thread. **(8 marks)**

b) You stumble upon 3 threads that must execute at different times due to their varied priority. Explain the *two* thread scheduling techniques the JVM would provide as options for multithreading, then point out the preferred thread scheduler for your specific threads. Also, using Java code snippets, use the right method to assign these

different threads with different scheduling constants that would ensure they are executed in the desired order. **(7 marks)**

**Question Three (15 marks)**

a) 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. **(9 marks)**

b) Figure 1 represents the various components that facilitate the Remote Method Invocation (RMI) process. Describe the function of each of these components in the role each plays in facilitating the RMI. **(6 marks)**

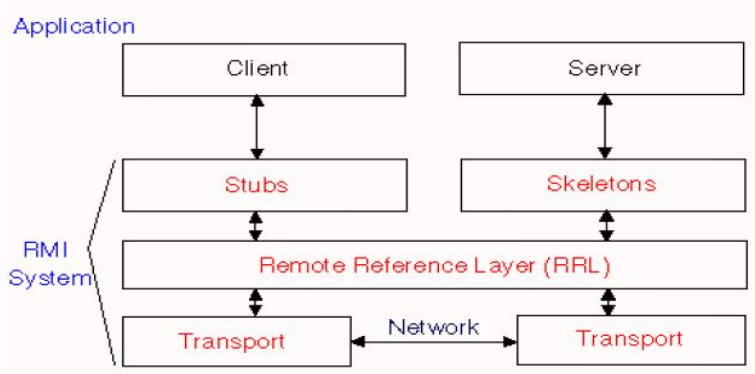
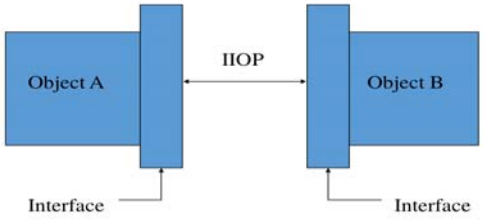
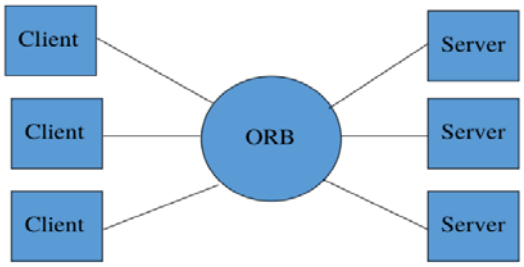



Figure 1

**Question Four (15 marks)**

a) Figures 2 and 3 indicate the interaction of objects, clients, and objects remotely through an architecture that facilitates such interaction in OOP that facilitates distributed system implementation. Name and define the technology, and in an elaborate explanation, explain how the objects in such an environment would communicate. **(8 marks)**




Figures 2 and 3

b) Draw a well-labelled diagram to indicate the *five* states of a thread. In the drawing, indicate at least *one* method that can change the state of a previous state to the next state of the thread. **(7 marks)**

**Question Five (15 marks)**

A multicorporate has been running a legacy Information System implemented in C programming language. As a senior developer lead, you go ahead and create some important separate system that requires integration to the legacy system for effective working. To avoid a long process that would involve rewriting the code of the legacy system due to its large source code, you decide to do research on a technology that would bridge the gap between your application and the legacy system.

a) Describe your findings of the technology to be implemented that would facilitate the integration of your application and the legacy system without changing of either of the source code. **(3 marks)**

b) Using a diagram, explain the working of the technology described above. **(5 marks)**

c) Gaming and animation are an important aspect in the modern world. In a bid to be all rounded, Java provides several technologies to facilitate the development of games among young developers. Describe any two Java tools for creating games and animations. Highlight at least 2 characteristics of each of these gaming tools. **(7 marks)**