School of Information Technology
Department of Computer Science

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty of Engineering, Built Environment and Information Technology

COS326 – Database Systems
Practical 2 2022

Release Date: 11 August 2022
Submission Date: 19 August 2022
Lecturer: Mr S.M Makura
Total: 50 Marks

A. Objectives

Demonstrate that you can use ObjectDB for Java to insert, modify, retrieve and delete objects from an ObjectDB database and that you understand ObjectDB.

In this practical you will have to write a Java program that:

1. Implements Java classes and makes them persistent by storing them in a ObjectDB database
2. Executes queries on the ObjectDB database.

B. Submission Procedure:

1. Create a folder as follows:

   The folder name should be ***uXXXXXXXX***(*XXXXXXXX is your student number)* and shouldcontain the following sub-folders:

   a. **Application: c**ontains your .jar file, as well as any other files necessary to execute your application (this will be opened for marking).
   b. **Source:** all your .java files go here (these files will also be checked during marking)

2. Create a zip file of the folder and upload it to ClickUP via the submission link for practical 2.

NO LATE submissions will be accepted after the submission date and time has lapsed. Do not wait till the last minute to submit and start giving excuses that you faced technical challenges when you tried to submit.

Question 1: ObjectDB Database Programming

JPA Annotations for Relationships

Relationships are persistent fields in persistable classes that reference other entity objects. The four relationship modes are represented by the following annotations:

javax.persistence.ManyToMany

javax.persistence.ManyToOne

javax.persistence.OneToMany

javax.persistence.OneToOne

Read more about these annotations here:

https://www.objectdb.com/api/java/jpa/annotations/relationship

In this practical, you will implement one of the relationships using one of the annotations depicted above. In the COS326 class, one student does many practicals. Based on this information, create a Java application using NetBeans or any Java IDE you are comfortable with. The Java application must interact with an ObjectDB database and must have the following files/capabilities

a) Consist of **two** entity classes, namely **Student** and **Practical**. The Student class should set or get the student name. In the Practical class, you will need to define a variable of type Student and utilise the one of the above relationship annotations then include the getters and setters for the Student variable.

b) You must create a GUI where you can perform CRUD operations on the ObjectDB database. You will also need a main class where you will implement all the methods necessary to perform the CRUD operations. The CRUD operations are:

(i) **Create/Store** - the student's name e.g John Phillips and practical name e.g Practical 2 and save it in the ObjectDB database through a save button. Use an appropriate Java Swing/GUI control to display the message to confirm if the operation has been done successfully.

(ii) **Read** one of the student details from the ObjectDB database and display all the practicals associated with that student via a GUI interface. i.e have a search button to search for the student details based on the student's name then use an appropriate Java Swing/JavaFX GUI control to display the results.

(iii) **Delete** the specified student details i.e have a delete button which when clicked will delete the student's name and the practicals associated with the student. Use an appropriate Java Swing/JavaFX GUI control to display a message to confirm if the operation has been done successfully.

Ensure that your application handles any basic exceptions. Full marks will be awarded for a fully functional Java application based on specification.