

## Programming Assignment

This is an individual assignment. It is due on November 16<sup>th</sup> at 12:00 in printed version (possibly hand-written as long as it is readable) to Philippe Bonnet.

### 1. Conceptual Modelling and SQL DDL

Consider the web site <http://www.cpk.com/order-online>, that provides an online food ordering service. It is a 3 steps process. In the first step, you pick a location (in the US – just pick one, e.g., Alabama / Birmingham). In the second step, you can order different kinds of food. In this assignment, we will focus on pizza.

We consider that the pizza ordering part of this web site is based on a database.

A. Define the conceptual schema for this database using a UML model. You should explain your design concisely. Giving a UML model without explanations is not a good answer to this question.

B. Define the SQL schema corresponding to your UML model. Define the appropriate integrity constraints.

### 2. JDBC and SQL

Consider the ReserveWithUs database schema given in hotel.sql (available on the web site). ReserveWithUs is a (fictitious) hotel reservation portal quite comparable to hotels.com or expedia.com. It buys rooms at discounted rates from its partner hotels and sells them for a bit more. Its clientele is international so the website is multi-lingual.

You are given a script to load data into this database (both the script and the data files are on the web site).

A. Consider the buyer department that negotiates deals on room packages. They buy N rooms of type T in hotel H at price P at date D. Write a Java function that can be used to insert such room packages in the database. You should particularly focus on (a) checking the input parameters, and (b) defining appropriate(s) transaction(s). Write a few test cases that give evidence that your function is working correctly.

B. Consider the online portal where customers can sign in, browse through the hotel packages and make reservations. Write a Java function that takes care of reservation. This function takes as input a customer id, a room type id (which is specific to a given hotel), a period in time (of one or several consecutive days), as well as a number of rooms. This function populates the tables BOOKED and SHOPPING\_CART. You should particularly focus on (a) checking the input parameters (specially the period in time), and (b) making sure that the room is actually available in the period where it is reserved. Write a few test cases that give evidence that your function is working correctly.

C. Consider the marketing department. They want reports of the portal activity. Write a java function that prints (a) the total sales per city per month, (b) the number of customers of each language type (total over all customers) and (c) the number of customers that have ordered for a total price that is greater than than the average total price per customer with the same associated language (total over all customers).