CPSC 304: Introduction to Relational Databases

Tutorial #2a: Relational Schema, DDL, and Key Constraints - Vehicle Rental Application

For the tutorial's specifications and description of the vehicle rental business, refer to the **vehicle_rental_specifications.pdf** document that was uploaded to Canvas for Tutorial 1. We will continue to work with a subset of the entities and attributes described in that document.

In addition to this document, refer to **Tutorial2b_Mapping_ERD_to_Relations.pdf** under Tutorial 2 for practice with mapping general ER diagrams to relational schemas.

Notes:

1. Be sure to complete these tutorials. Tutorials are not for marks, and will not be handed in, but a substantial part of the quizzes and course content are based on them.

2. Tutorials answers are generally released at the start of when the next tutorial is released.

Task #1: SQL DDL Creation

Write the SQL statements needed to turn the following relations into tables using all required and mentioned constraints. Check the database instance given in Task 2 to identify the appropriate datatypes.

Note: PK means Primary Key, FK means Foreign Key
Hint: It's helpful to visualize which one of these tables are "entities" and which are "relations".

Table Name	Attributes	Constraints
Customer	customerID, streetAddress, email, firstName, lastName	- customerID is PK - no two customers can have the same email - firstName and lastName cannot be null
Reservation	confirmationNumber, customerID	- confirmationNumber is PK - customerID is FK, use ON DELETE CASCADE integrity constraint, cannot be null
Branch	branchName, streetAddress, city	- branchName is PK - streetAddress and city cannot be null
VehicleType	typeName, rentalRate, numberOfSeats	- typeName is PK - set default of rentalRate as 0
Reserves	branchName, confirmationNumber, typeName, startDate, endDate	- use Date datatype for startDate and endDate - confirmationNumber, branchName, typeName are both PK and FK - Use ON DELETE SET DEFAULT to be 'Scranton PA' on the branchName key - Use ON DELETE CASCADE on typeName and confirmationNumber - startDate and endDate cannot be null

Task #2: Insertions

Create the DML insertion statements to insert the following data.

Customer

customerID	streetAddress	email	firstName	lastName
101	10 Watford St	a@ubc.ca	Kate	Selvarajah
102	9 Jenner St	NULL	Ming	Lee

Reserves

branchName	confirmationNumber	typeName	startDate	endDate
Sheffield	1	SUV	2017-01-01	2017-01-02
ManCity	2	SUV	2018-02-02	2018-04-02
ManCity	2	Sedan	2018-02-01	2018-04-03

Reservation

confirmationNumber	customerID
1	101
2	102

VehicleType

typeName	rentalRate	numberOfSeats
SUV	40	NULL
Sedan	30	3
Truck	50	6

Branch

branchName	streetAddress	city
Sheffield	1212 Orlando St	New York
ManCity	3434 Raptors St	Shanghai
Bournemouth	5656 Trailblazers St	Seoul

Task #3: Key Constraints and Scenarios

Hint: For the following questions, think about the key constraints you have learned in class. The constraints referred to are the ones listed in Task #1. It may also help to look at the tables in Task #2.

a) What would happen when you delete the tuple for customerID = 101 from the Customer table? Will it get deleted? Why or why not? Are any other tables affected by this action?

b) Explain what would happen if you try to insert the following tuple into the Customer table: (103, NULL, 'c@ubc.ca' , NULL, 'jackson').

c) What would happen if you try to delete the first tuple in the Reserves table (see the table instance in Task #2)? Will it affect any other table; and if so, which one and how?

d) What would happen when you delete the tuple with confirmationNumber=1 from the Reservation table? Will it affect any other tables? If yes, which one(s) and how?

e) Critique the constraints listed in Task #1. Are there any that can be improved/tweaked? Explain. Are there any constraints that are considered to be bad design for this particular business (application domain)? When answering these questions, state any assumptions that you need to make, if any.