DS 501 Database Systems

Class Test #3

Total Marks: 60

Duration: 1.5 hours (90 minutes)

Case Study – TMS (Travel Management Services)

JustGo is an online portal that provides travel management services to users. A registered user can book a ticket between specific source and destination. The ticket could be for travel either by Air and Rail. All the tickets contain information about the source, destination, scheduled departure & arrival times, seat number, ticket class, total ticket price along with any applicable discount information. The passenger information displayed in the ticket includes name, age, and gender. For train tickets, information about passenger category (senior citizen, child, etc.) is mentioned. For air tickets, the particulars of airline, aircraft type are also mentioned in the ticket. For rail travel, the ticket contains the train number, train name, and the boarding station name. Each ticket may optionally be entitled for local transport for pick-up and drop from / to specific address for a specified rate. Details of timings are captured. Payments for all tickets can be done only through credit card. Information about the card number, name in card, transaction authorization number are captured for all card transactions. Additionally, only for train tickets, Cash-on-delivery (C-O-D) payment option is provided. Details of delivery address is captured for all C-O-D payments.

(Note: All the following classes must appear in your UML class diagram. Attributes for these classes must be drawn from the description given above)

S. No.	Class Name	Class Description
1.	RegisteredUser	A registered user in the system
2.	Ticket	Ticket used for the travel
3.	Passenger	Passenger who is travelling on a given ticket
4.	TrainTicket	Ticket for train travel
5.	AirTicket	Ticket for air travel
6.	LocalTransport	Local transportation information
7.	Payment	Payment associated with a given ticket
8.	CardPayment	Credit card payment
9.	CODPayment	Cash-on-delivery payment

Sample Data *(20 marks)*

(Note: All underlined data must appear somewhere in your database in some column)

Mr. Veerd likes to travel a lot. He is planning a long vacation along with his wife **Mrs. Basanti** and their two friends **Mr. Vijay** and **Mrs. Radha**. They decide to go by air on **Dhanno Airlines** from **Ramgarh** to **Bangalore** (PNR **8DF8PLK**) and by train from **Bangalore** to **Mysore** (**19834793847**) in **sleeper class**. They pay for the air ticket using a **credit card** bearing number **308349830348** but they get the train ticket delivered to their home in **17, Ramgarh, Chambal** and pay for it with **COD**. They also request a drop to the airport from **Ramgarh** at **9:00 AM** on **1st Jan 1975**.

Answer the following

A) **(20 marks)** Draw the complete object-oriented schema for given problem statement using the UML class diagram notation.

Note: All the classes mentioned above must (mandatory) appear in the final UML schema. You may add additional association classes where needed. Add ONLY natural attributes to classes based on the given description for the classes and the sample data.

B) **(20 marks)** Map the UML schema to a relational schema. The relational schema should strictly follow the mapping rules discussed in the class. After doing OR mapping, every table in the relational schema should be shown in the following example format:

Table name = EMPLOYEE

Name of column	Data type	Constraints (PK, FK, Surrogate, UNIQUE, NOT NULL, etc.)
EMP_ID	Number	PK, Surrogate
Emp_Name	String	NOT NULL
Dept_ID	Number	FK references Department.Dept_ID, NOT NULL

Note: DDL statements are NOT needed.

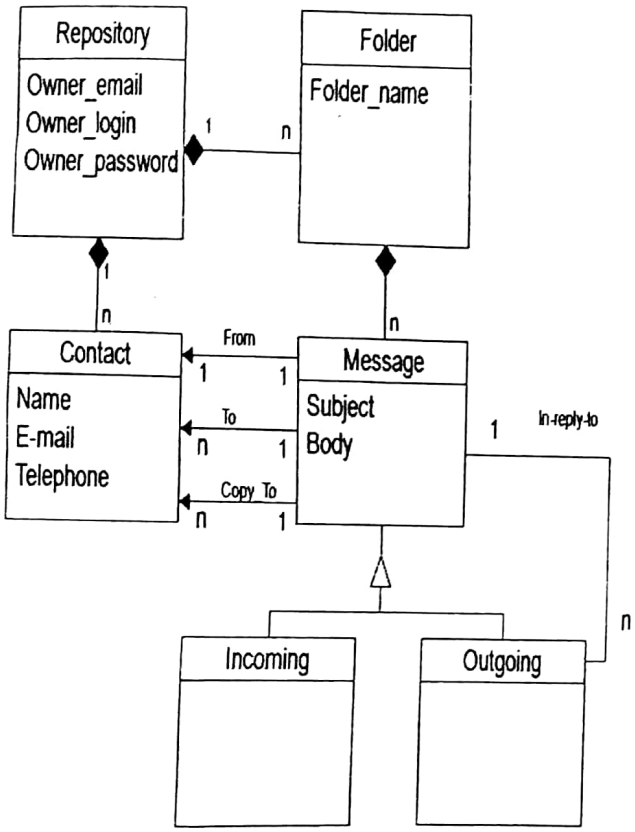
C) **(20 marks)** Convert the sample narrative data given in "**Sample Data**" into actual table data as per the relational schema designed in (B) above. For every table, show the sample data in simple tabular form as shown in the following example:

Employee

Employee_Id	Name	Age	Dept_Id
394873	John Doe	34	D01
353636	Jane Doe	35	D01

Note:

- *Every piece of information specified (underlined) in the "**Sample Data**" section must collectively find a place in the relational database you have designed.*
- *INSERT / UPDATE statements are NOT needed*




```
From: <johndoe@iiitb.ac.in>
To: <peterdoe@iiitb.ac.in>
Subject: Re: Demo email
Date: Tue, 18 Feb 2014 19:30:30 +0530
Message-ID: <93847639>
In-Reply-To: <93487345>
Content-Type: text/html; charset="us-ascii"

Hello Peter, thank you. I got your mail.
John Doe
```

```
From: <peterdoe@iiitb.ac.in>
To: <johndoe@iiitb.ac.in>
Subject: Demo email
Date: Tue, 17 Feb 2014 15:30:30 +0530
Message-ID: <93487345>
In-Reply-To: <>
Content-Type: text/html; charset="us-ascii"

Hello John, can you reply after you see this mail?
  Peter Doe
```