

DBMS-2006: Introductory Project – Train Booking System

You have been asked to design and develop a Train Booking System database. Travel and Trains has been using a legacy system that is end of support. They are interested in having data from legacy system moved over to the new system. The system will be used to manage travel trips within Europe. The company has provided you with sample data and a train ticket so that you can begin setting up a data model!

Learning Outcomes:

- Gather, analyze, document business requirements in Entity Relationship diagram
- Apply Normalization process to table design
- Create Database objects including tables, PK/FKs
- Manipulate existing data to fit new database structure
- Create a Stored Procedure to swap Arrival and Departure dates
- Create a Trigger for auditing purposes

Sample Train Ticket

Train Booking System		
Confirmation Number:	12345	
Train:	Galen	
Class:	Silver	
Departure:	Welchside	
Destination:	Langtown	
Departure Date/Time:	5/31/20	1:48 PM
Arrival Date/Time:	5/31/20	2:48 PM
<u>Passenger(s)</u>	<u>Ticket Number</u>	
Alaina Konopelski	wxjhtcc1gj	
John Smith	wxjhtcc2gj	

Deliverables:

1. Conceptual Model
 - Using the sample ticket and test data provided, create an Entity Relationship Diagram, ensuring tables are in 3NF.
2. Physical Model
 - Map your ERD to the database schema and then implement in SQL Server Management Studio (SSMS), respecting Referential Integrity where appropriate.

3. Data Manipulation – manipulate and import data into Database

4. Stored Procedure

- The legacy system contained a bug that must not appear in the new system. The bug mixes up the departure and arrival times. (Hint – you may need to implement a stored procedure with the following functionality)
 - Determine which departing and arrival times need to be swapped then update them accordingly. The DATEDIFF function may be used in determining this.
 - A message should be outputted to the SSMS Messages window notifying the operator how many rows have/have not been updated. Please make use of explicit transactions to avoid having to import data each time sproc is run

No swaps performed between departure and arrival times.	82 swaps performed between departure and arrival times
0 Rows will be swapped/updated. Completion time: 2022-05-24T14:57:35.7078095-05:00	82 Rows will be swapped/updated. Completion time: 2022-05-24T15:00:46.2253531-05:00

5. Table level Auditing

Create an auditing table called customers AuditLog that tracks changes made to the customer's table. A trigger will need to be created on the customers table. The changes that should be tracked for each record in the customers table include INSERT, UPDATE, DELETE operations.

Fields specific to the customerAuditLog table include the following:

- | | | |
|-----------------------|----------|--|
| ○ customerAuditID(PK) | Integer | id field for audits |
| ○ modifiedBy | nvarchar | who created/modified the record |
| ○ modifiedDate | datetime | date/time when record was created/modified |
| ○ operationType | nvarchar | Type of operation(INSERT, UPDATE, DELETE) |

The customers AuditLog table is populated as shown below after inserting 4 new customers: Jen Irving, Gene Simons, Sidney Mark, Prescott Mandy; updating Jen Irving to Chris Irving and finally deleting Prescott Mandy.

5 continued...

customersAuditLog table

Results Messages

	customerAuditID	modifiedBy	modifiedDate	operationType	first_name	last_name	gender	phone	streetNo	address	city	province	age
1	146	sa	2022-05-26 18:27:54.530	DELETED	Prescot	Mandy	M	431-987-6543	879	Sinclair	Winnipeg	Manitoba	25
2	145	sa	2022-05-26 18:27:44.023	UPDATED	Jen	Irving	F	204-123-4567	123	boulevard west	Winnipeg	Manitoba	28
3	144	sa	2022-05-26 18:27:44.023	UPDATED	Chris	Irving	F	204-123-4567	123	boulevard west	Winnipeg	Manitoba	28
4	143	sa	2022-05-26 18:23:49.390	INSERTED	Jen	Irving	F	204-123-4567	123	boulevard west	Winnipeg	Manitoba	28
5	142	sa	2022-05-26 18:23:49.390	INSERTED	Gene	Simons	M	204-222-5858	333	Inkster	Winnipeg	Manitoba	33
6	141	sa	2022-05-26 18:23:49.390	INSERTED	Sidney	Mark	M	431-876-3636	333	Pandora	Winnipeg	Manitoba	57
7	140	sa	2022-05-26 18:23:49.390	INSERTED	Prescot	Mandy	M	431-987-6543	879	Sinclair	Winnipeg	Manitoba	25

Milestone Check-in Schedule

Week 1 – Oct 9 –13

No Milestone check-in this week, work period for entire week

Begin Project – work periods

Week 2 – Oct 16 –20 – Milestone #1

Deliverables 1 & 2: One on One Evaluations – Sign up sheet to be posted

- Conceptual Model (Entity Relationship diagram) and based on 3NF, include any business requirements (assumptions made). Make sure to include Tables, fields, cardinality, PK's, FK's.
- Physical Model – Implemented in SQL Server RDMS, with data provided

Week 3 – Oct 23- 27 Milestone #2

Deliverables 3, 4, 5: One on One Evaluations – Sign up sheet to be posted

- Importing Data into Database
- Departure and Arrival Stored Procedure
- Table Level Auditing