CSE 5260 – Database Systems

Summer 2022

Final Project

Total Points: 30

Date Assigned: Friday, June 24, 2022 **Due Date:** Monday, July 4, 2022

Instructions: Please submit your work on Canvas as a Jupyter Notebook `ipynb` file named `cse5260_yourname_final.ipynb`. Make sure to include in your notebook the question number and the corresponding output for each question. Also, include all DDL statements or the contents from your DDL file in your notebook.

You may code your solution in Python, Java or C, or your may use a tool such as MySQL Workbench to complete the assignment. Whichever option you choose, please document your notebook accordingly.

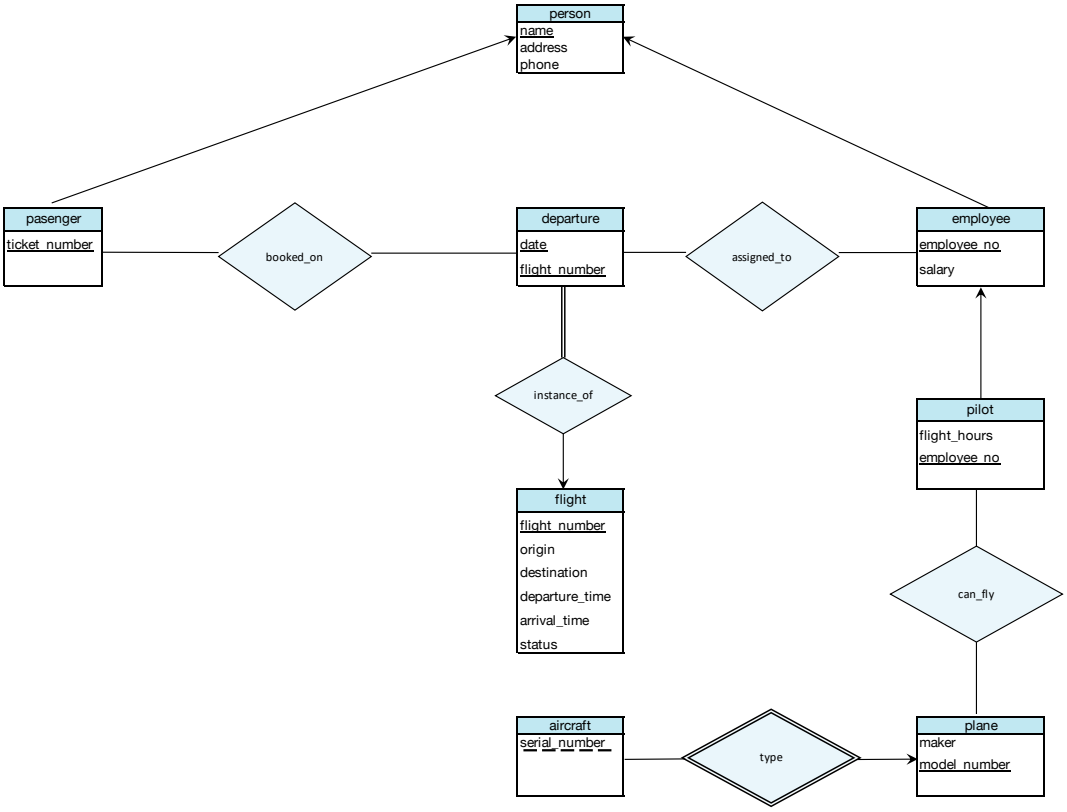
Key Concepts Demonstrated

- Reducing an ER Diagram into tables
- Inserting data into a database
- Coding/presenting work in a Jupyter notebook
- Inserting record(s) into a database table
- Creating and verifying a trigger on a database table
- Writing and testing a stored procedure on a database
- Issuing SQL statements on a cloud-based database (AWS RDS)

For this assignment, you will be working with an ER diagram related to an airline named DB Airways, which is owned by Mr. DB. You will reduce an ER diagram into tables, create a DDL file, process the DDL file in order to create a database, and perform CRUD operations on the database. Sample CSV files have been provided on Canvas for the main tables in the diagram (excluding some relationships). See a snapshot of the CSV files overleaf.

1. (a) (10 points) Create a database named **db_airways**. Create tables in your database by reducing the following ER diagram into tables and issuing the necessary DDL statements on your database. Please take into consideration the sample data provided in the CSV files on Canvas and shown as a picture overleaf when reducing your tables.

Figure 1: ER Diagram for DB Airlines



(b) (5 points) Write SQL statements to insert the following passenger bookings and employee assignments into the database.

Figure 2: Passengers and employees on a given flight

passenger bookings

name	departure_date	flight_number	ticket_number
Smith	June 30, 2022	100	DBA001
Green	June 30, 2022	206	DBA002
Hooper	June 30, 2022	334	DBA003
Edwards	June 30, 2022	449	DBA004
MacBride	July 8, 2022	991	DBA005
Gates	July 8, 2022	991	DBA006
Rowe	July 8, 2022	100	DBA007
Clark	July 8, 2022	100	DBA008
Phillips	June 30, 2022	449	DBA009
Warnock	June 30, 2022	449	DBA010
Smith	July 8, 2022	991	DBA011
Peters	July 8, 2022	100	DBA012

employees_assigned_to_flight

employee_no	departure_date	flight_number
1001	June 30, 2022	100
1002	June 30, 2022	100
1003	June 30, 2022	100
1004	June 30, 2022	100
1007	June 30, 2022	206
1003	June 30, 2022	337
1004	June 30, 2022	337
1005	June 30, 2022	337
1006	June 30, 2022	337
1001	July 8, 2022	100
1002	July 8, 2022	100
1006	July 8, 2022	991
1007	July 8, 2022	991
1007	July 8, 2022	112

(c) (5 points) Write a single query that returns a list of all passengers on flight 991. By single query we mean making a single trip to the database. Include the following fields in your result: **passenger_name, ticket_number, address, phone**

(d) (5 points) Imagine that the airline would like to implement a trigger named ***emergency*** that sets a flight status to "canceled" when there is an emergency and the departure date for a flight has been changed to a later date. Now, suppose a hurricane has been forecasted for July 8, 2022 and the company would like to change the departure date for all flights booked for July 8, 2022 to July 15, 2022. Create and test a trigger that makes the necessary changes. To test the trigger, issue an SQL statement to change all flights scheduled to depart on July 8, 2022 to a new departure date of July 15, 2022. Then print out the data in your flight table to show the cancellations.

(e) (5 points) It has been estimated that airline pilots fly an average of 75 hours per month. Write a procedure named **"estimate_pilot_years"** that accepts a pilot's employee ID and returns the number of years the pilot has been flying based on their flight hours in the database. (Assume the pilots at DB Airways work for 12 months per year. Do not worry about overtime, breaks, or any other complicating factor). Test your procedure by returning the estimated years for all pilots in the database.

Figure 3: Snapshot of the data provided in the CSV files

person

name	address	phone
Smith	123 Elm St.	801-556-2239
Jones	234 Oak St.	801-552-2943
Peters	345 Pine St.	801-393-2230
Green	435 Alder St.	801-933-2320
Rowe	348 Elder St.	801-343-2320
Phillips	395 Pine St.	801-323-2320
Gates	285 Kapok St.	801-493-2203
Clark	223 Easy St.	801-193-2320
Warnock	775 Main St.	801-303-2222
Hooper	456 Maple St.	313-912-2101
Edwards	567 Spruce St.	801-228-6729
Majeris	678 Willow St.	null
MacBride	789 Fir St.	null

employee

name	salary	employee_no
Jones	50000	1001
Peters	45000	1002
Rowe	35000	1003
Phillips	25000	1004
Gates	5000000	1005
Clark	150000	1006
Warnock	500000	1007

pilot

employee_no	flight_Hours
1001	6000
1002	24000
1003	15000

plane

maker	model_no
Boeing	B727
Boeing	B747
Boeing	B757
MD	DC9
MD	DC10
Airbus	A310
Airbus	A320
Airbus	A330
Airbus	A340

aircraft

serial_no	model_no
11	B727
13	B727
10	B747
13	B747
22	B757
93	B757
21	DC9
22	DC9
23	DC9
24	DC9
21	DC10
70	A310
80	A320

departure

departure_date	flight_number
June 30, 2022	100
June 30, 2022	112
June 30, 2022	206
June 30, 2022	334
June 30, 2022	335
June 30, 2022	337
June 30, 2022	449
July 8, 2022	100
July 8, 2022	112
July 8, 2022	206
July 8, 2022	334
July 8, 2022	395
July 8, 2022	991

flight

flight_number	origin	destination	departure_time	arrival_time	status
100	SLC	BOS	8:00	17:50	on-time
206	DFW	STL	9:00	11:40	on-time
334	ORD	MIA	12:00	14:14	on-time
335	MIA	ORD	15:00	17:14	on-time
336	ORD	MIA	18:00	20:14	on-time
337	MIA	ORD	20:30	23:53	on-time
121	STL	SLC	7:00	9:13	on-time
122	STL	YYV	8:30	10:19	on-time
330	JFK	YYV	16:00	18:53	on-time
991	BOS	ORD	17:00	18:22	on-time
394	DFW	MIA	19:00	21:30	on-time
395	MIA	DFW	21:00	23:43	on-time
449	CDG	DEN	10:00	19:29	on-time
930	YYV	DCA	13:00	16:10	on-time
931	DCA	YYV	17:00	18:10	on-time
932	DCA	YYV	18:00	19:10	on-time
112	DCA	DEN	14:00	18:07	on-time

can_fly

employee_no	model_number
1001	B727
1001	B747
1001	DC10
1002	DC9
1002	A340
1002	B757
1002	A320
1003	A310
1003	DC9