MCCOY COLLEGE OF BUSINESS, TEXAS STATE UNIVERSITY

Course: **CIS 5355 Database Management Systems**

Project: Train Booking

Instructor: Barbara Hewitt

```
-- CREATION OF DATABASE --
CREATE DATABASE train_booking;

USE train_booking;


-- CREATION OF TABLES --

CREATE TABLE schedule (
schedule_id VARCHAR(20) PRIMARY KEY,
schedule_name VARCHAR(200)
);

CREATE TABLE train (
train_id VARCHAR(20) PRIMARY KEY,
train_name VARCHAR(200),
schedule_id VARCHAR(20),
FOREIGN KEY (schedule_id) REFERENCES schedule (schedule_id) ON DELETE SET NULL
);

CREATE TABLE train_station (
train_station_id VARCHAR(20) PRIMARY KEY,
train_station_name VARCHAR(200)
);

CREATE TABLE train_journey_station (
train_id VARCHAR(20),
train_station_id VARCHAR(20),
stop_order INT,
departure_time DATETIME,
PRIMARY KEY (train_id,train_station_id),
FOREIGN KEY (train_id) REFERENCES train (train_id) ON DELETE CASCADE,
FOREIGN KEY (train_station_id) REFERENCES train_station (train_station_id) ON DELETE
CASCADE
);
```

```sql
CREATE TABLE carriage_class (
    carriage_class_id VARCHAR(20) PRIMARY KEY,
    carriage_class_name VARCHAR(200),
    seating_capacity INT
);



CREATE TABLE carriage_price (
    schedule_id VARCHAR(20),
    carriage_class_id VARCHAR(20),
    price MONEY,
    PRIMARY KEY (schedule_id, carriage_class_id),
    FOREIGN KEY (schedule_id) REFERENCES schedule (schedule_id) ON DELETE CASCADE,
    FOREIGN KEY (carriage_class_id) REFERENCES carriage_class (carriage_class_id) ON
DELETE CASCADE
);

CREATE TABLE journey_carriage (
    train_id VARCHAR(20),
    carriage_class_id VARCHAR(20),
    position INT,
    PRIMARY KEY (train_id, carriage_class_id),
    FOREIGN KEY (train_id) REFERENCES train (train_id) ON DELETE CASCADE,
    FOREIGN KEY (carriage_class_id) REFERENCES carriage_class (carriage_class_id) ON
DELETE CASCADE
);

CREATE TABLE booking_status (
    booking_status_id VARCHAR(20) PRIMARY KEY,
    name VARCHAR(200)
);


CREATE TABLE passenger (
passenger_id VARCHAR(20) PRIMARY KEY,
passenger_first_name VARCHAR(200),
passenger_last_name VARCHAR(200),
passenger_email_address VARCHAR(200),
password VARCHAR(200)
);
```

```sql
CREATE TABLE passenger_card_details (
    passenger_card_id VARCHAR(20) PRIMARY KEY,
    card_number BIGINT ,
    card_holder_name VARCHAR(100),
    card_type VARCHAR(50),
    card_expiration_date DATE,
    passenger_id VARCHAR(20),
    FOREIGN KEY (passenger_id) REFERENCES passenger (passenger_id) ON DELETE SET NULL
);
```

```sql
CREATE TABLE booking (
booking_id VARCHAR(20) PRIMARY KEY,
passenger_id VARCHAR(20),
passenger_card_id VARCHAR(20),
booking_status_id VARCHAR(20),
booking_date DATE,
starting_station_id VARCHAR(20),
ending_station_id VARCHAR(20),
train_id VARCHAR(20),
schedule_id VARCHAR(20),
ticket_class_id VARCHAR(20),
amount_paid INT,
ticket_no INT,
seat_no VARCHAR(10),
FOREIGN KEY (passenger_id) REFERENCES passenger (passenger_id) ON DELETE SET NULL,
FOREIGN KEY (passenger_card_id) REFERENCES passenger_card_details (passenger_card_id)
ON DELETE SET NULL,
FOREIGN KEY (booking_status_id) REFERENCES booking_status (booking_status_id) ON
DELETE SET NULL,
FOREIGN KEY (starting_station_id) REFERENCES train_station (train_station_id) ON
DELETE SET NULL,
FOREIGN KEY (ending_station_id) REFERENCES train_station (train_station_id) ON DELETE
NO ACTION,
FOREIGN KEY (train_id) REFERENCES train (train_id) ON DELETE SET NULL,
FOREIGN KEY (schedule_id) REFERENCES schedule (schedule_id) ON DELETE SET NULL,
FOREIGN KEY (ticket_class_id) REFERENCES carriage_class (carriage_class_id) ON DELETE
SET NULL
);
```

```sql
-- INSERTION OF VALUES --

INSERT INTO schedule (schedule_id, schedule_name) VALUES
('S1', 'Weekday Schedule'),
('S2', 'Weekend Schedule'),
('S3', 'Holiday Schedule'),
('S4', 'Special Event Schedule'),
('S5', 'Regular Schedule'),
('S6', 'Express Schedule'),
('S7', 'Local Schedule'),
('S8', 'Night Schedule'),
('S9', 'Morning Schedule'),
('S10', 'Afternoon Schedule');


INSERT INTO train (train_id, train_name, schedule_id) VALUES
('T1', '8:00 Express Train Montreal to Pittsburg', 'S6'),
('T2', '10:00 Local Train Raleigh to Miami', 'S7'),
('T3', '20:00 Night Train New Orleans to Austin', 'S8'),
('T4', '6:00 Morning Train Montreal to Pittsburg ', 'S9'),
('T5', '12:00 Afternoon Train Raleigh to Miami', 'S10'),
('T6', '14:00 Special Train New York to Atlanta', 'S4'),
('T7', '8:00 Regular Train New York to Washington', 'S5'),
('T8', '10:00 Weekend Train Washington to New York', 'S2'),
('T9', '12:00 Holiday Train Charleston to Atlanta', 'S3'),
('T10', '7:00 Weekday Train New Orleans to Charleston', 'S1');


INSERT INTO train_station (train_station_id, train_station_name) VALUES
('TS1', 'Montreal'),
('TS2', 'New York'),
('TS3', 'Pittsburg'),
('TS4', 'Washington'),
('TS5', 'Raleigh'),
('TS6', 'Charleston'),
('TS7', 'Miami'),
('TS8', 'New Orleans'),
('TS9', 'Atlanta'),
('TS10', 'Austin');
```

```sql
INSERT INTO train_journey_station (train_id, train_station_id, stop_order,
departure_time) VALUES
('T1', 'TS1', 1, '2024-01-01 08:00:00'),
('T1', 'TS2', 2, '2024-01-01 09:30:00'),
('T1', 'TS3', 3, '2024-01-01 11:00:00'),
('T2', 'TS5', 1, '2024-01-01 10:00:00'),
('T2', 'TS6', 2, '2024-01-01 11:30:00'),
('T2', 'TS7', 3, '2024-01-01 13:00:00'),
('T3', 'TS8', 1, '2024-01-01 20:00:00'),
('T3', 'TS9', 2, '2024-01-01 21:30:00'),
('T3', 'TS10', 3,'2024-01-01 23:00:00'),
('T4', 'TS1', 1, '2024-01-01 06:00:00'),
('T4', 'TS2', 2, '2024-01-01 07:30:00'),
('T4', 'TS3', 3, '2024-01-01 09:00:00'),
('T5', 'TS5', 1, '2024-01-01 12:00:00'),
('T5', 'TS6', 2, '2024-01-01 13:30:00'),
('T5', 'TS7', 3, '2024-01-01 14:30:00'),
('T6', 'TS2', 1, '2024-01-01 14:00:00'),
('T6', 'TS6', 2, '2024-01-01 17:30:00'),
('T6', 'TS9', 3, '2024-01-01 19:30:00'),
('T7', 'TS2', 1, '2024-01-01 08:00:00'),
('T7', 'TS3', 2, '2024-01-01 09:00:00'),
('T7', 'TS4', 3, '2024-01-01 10:00:00'),
('T8', 'TS4', 1, '2024-01-01 10:00:00'),
('T8', 'TS3', 2, '2024-01-01 11:00:00'),
('T8', 'TS2', 3, '2024-01-01 12:00:00'),
('T9', 'TS6', 1, '2024-01-01 12:00:00'),
('T9', 'TS8', 2, '2024-01-01 13:00:00'),
('T9', 'TS9', 3, '2024-01-01 14:00:00'),
('T10', 'TS8', 1, '2024-01-01 07:00:00'),
('T10', 'TS7', 2, '2024-01-01 08:00:00'),
('T10','TS6',3,'2024-01-01 09:00:00');
```

```sql
INSERT INTO carriage_class (carriage_class_id, carriage_class_name, seating_capacity)
VALUES
    ('CC1', 'Economy Class', 150),
    ('CC2', 'Business Class', 50),
    ('CC3', 'First Class', 20);
```

```sql
INSERT INTO carriage_price (schedule_id, carriage_class_id, price) VALUES
    ('S1', 'CC1', 50.00),
    ('S1', 'CC2', 100.00),
    ('S1', 'CC3', 150.00),
    ('S2', 'CC1', 40.00),
    ('S2', 'CC2', 90.00),
    ('S2', 'CC3', 140.00),
    ('S3', 'CC1', 60.00),
    ('S3', 'CC2', 110.00),
    ('S3', 'CC3', 160.00),
    ('S4', 'CC1', 70.00),
    ('S4', 'CC2', 120.00),
    ('S4', 'CC3', 170.00),
    ('S5', 'CC1', 80.00),
    ('S5', 'CC2', 130.00),
    ('S5', 'CC3', 180.00),
    ('S6', 'CC1', 90.00),
    ('S6', 'CC2', 140.00),
    ('S6', 'CC3', 190.00),
    ('S7', 'CC1', 100.00),
    ('S7', 'CC2', 150.00),
    ('S7', 'CC3', 200.00),
    ('S8', 'CC1', 110.00),
    ('S8', 'CC2', 160.00),
    ('S8', 'CC3', 210.00),
    ('S9', 'CC1', 120.00),
    ('S9', 'CC2', 170.00),
    ('S9', 'CC3', 220.00),
    ('S10', 'CC1', 130.00),
    ('S10', 'CC2', 180.00),
    ('S10', 'CC3', 230.00);


INSERT INTO journey_carriage (train_id, carriage_class_id, position) VALUES
    ('T1', 'CC1', 1),
    ('T1', 'CC2', 2),
    ('T1', 'CC3', 3),
    ('T2', 'CC1', 1),
    ('T2', 'CC2', 2),
    ('T2', 'CC3', 3),
    ('T3', 'CC1', 1),
    ('T3', 'CC2', 2),
    ('T3', 'CC3', 3),
    ('T4', 'CC1', 1),
    ('T4', 'CC2', 2),
    ('T4', 'CC3', 3),
    ('T5', 'CC1', 1),
```

```
    ('T5', 'CC2', 2),
    ('T5', 'CC3', 3),
    ('T6', 'CC1', 1),
    ('T6', 'CC2', 2),
    ('T6', 'CC3', 3),
    ('T7', 'CC1', 1),
    ('T7', 'CC2', 2),
    ('T7', 'CC3', 3),
    ('T8', 'CC1', 1),
    ('T8', 'CC2', 2),
    ('T8', 'CC3', 3),
    ('T9', 'CC1', 1),
    ('T9', 'CC2', 2),
    ('T9', 'CC3', 3),
    ('T10', 'CC1', 1),
    ('T10', 'CC2', 2),
    ('T10', 'CC3', 3);

INSERT INTO booking_status (booking_status_id, name) VALUES
('BS1', 'Confirmed'),
('BS2', 'Pending'),
('BS3', 'Cancelled');

INSERT INTO passenger (passenger_id, passenger_first_name, passenger_last_name,
passenger_email_address, password) VALUES
  ('P1', 'John', 'Doe', 'john.doe@gmail.com', 'password1'),
  ('P2', 'Jane', 'Smith', 'jane.smith@outlook.com', 'password2'),
  ('P3', 'Michael', 'Johnson', 'michael.johnson@gmail.com', 'password3'),
  ('P4', 'Emily', 'Williams', 'emily.williams@gmail.com', 'password4'),
  ('P5', 'David', 'Brown', 'david.brown@gmail.com', 'password5'),
  ('P6', 'Olivia', 'Jones', 'olivia.jones@yahoo.com', 'password6'),
  ('P7', 'William', 'Taylor', 'william.taylor@yahoo.com', 'password7'),
  ('P8', 'Sophia', 'Anderson', 'sophia.anderson@gmail.com', 'password8'),
  ('P9', 'Matthew', 'Moore', 'matthew.moore@outlook.com', 'password9'),
  ('P10', 'Emma', 'Clark', 'emma.clark@gmail.com', 'password10');

  INSERT INTO passenger_card_details (passenger_card_id, card_number,
card_holder_name, card_type, card_expiration_date, passenger_id) VALUES
  ('PC1', 1234567890123456, 'John Doe', 'Visa', '2023-12-31', 'P1'),
  ('PC2', 2345678901234567, 'Jane Smith', 'MasterCard', '2024-06-30', 'P2'),
  ('PC3', 3456789012345678, 'Michael Johnson', 'American Express', '2023-09-15','P3'),
  ('PC4', 4567890123456789, 'Emily Williams', 'Discover', '2024-03-28', 'P4'),
  ('PC5', 5678901234567890, 'David Brown', 'Visa', '2023-11-30', 'P5'),
  ('PC6', 6789012345678901, 'Olivia Jones', 'MasterCard', '2024-02-15', 'P6'),
  ('PC7', 7890123456789012, 'William Taylor', 'American Express', '2023-08-22', 'P7'),
  ('PC8', 8901234567890123, 'Sophia Anderson', 'Discover', '2024-04-10', 'P8'),
  ('PC9', 9012345678901234, 'Matthew Moore', 'Visa', '2023-10-05', 'P9'),
  ('PC10', 1234901234567890, 'Emma Clark', 'MasterCard', '2024-01-18', 'P10');
```

```sql
INSERT INTO booking (

    booking_id,
    passenger_id,
    passenger_card_id,
    booking_status_id,
    booking_date,
    starting_station_id,
    ending_station_id,
    train_id,
    schedule_id,
    ticket_class_id,
    amount_paid,
    ticket_no,
    seat_no
) VALUES
('B1', 'P1', 'PC1', 'BS1', '2024-01-15', 'TS1', 'TS3', 'T1','S6', 'CC1', 90, 123456,
'A1'),
('B2', 'P2', 'PC2', 'BS2', '2024-02-20', 'TS5', 'TS7', 'T2','S7', 'CC2', 150, 789012,
'B3'),
('B3', 'P3', 'PC3', 'BS1', '2024-03-25', 'TS8', 'TS10', 'T3','S8', 'CC3', 210, 345678,
'C2'),
('B4', 'P4', 'PC4', 'BS2', '2024-04-10', 'TS1', 'TS3', 'T4','S9', 'CC1', 120, 901234,
'D4'),
('B5', 'P5', 'PC5', 'BS1', '2024-05-15', 'TS5', 'TS7', 'T5','S10', 'CC1', 130, 567890,
'E5'),
('B6', 'P6', 'PC6', 'BS2', '2024-06-20', 'TS2', 'TS9', 'T6','S4', 'CC3', 170, 234567,
'F1'),
('B7', 'P7', 'PC7', 'BS1', '2024-07-25', 'TS2', 'TS4', 'T7','S5', 'CC1', 80, 789012,
'G2'),
('B8', 'P8', 'PC8', 'BS2', '2024-08-30', 'TS4', 'TS2', 'T8','S2','CC2', 90, 456789,
'H3'),
('B9', 'P9', 'PC9', 'BS1', '2024-09-05', 'TS6', 'TS9', 'T9', 'S3','CC3', 160, 123490,
'I4'),
('B10', 'P10', 'PC10', 'BS2', '2024-10-10','TS8', 'TS6', 'T10','S1', 'CC2', 100,
987654, 'J5');
```

```sql
-- QUERIES TO GENERATE THE REPORT --

--Query1
-- give the deatils of passenger who booked the train T1 , T2 ,T9 and sort it by
passanger_id in ascending order.

Select b.train_id ,b.passenger_ID , CONCAT(p.passenger_first_name,'
',p.passenger_last_name ) AS Passanger_name
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
where b.train_id IN ('T1','T2','T9')
order by b.passenger_id;

--Query2
-- Write a SQL query to retrieve details of passenger along with their journey
details,
--including the starting and ending stations, the total cost of the journey, and sort
by the amount paid in descending order?

SELECT b.passenger_id ,
CONCAT(p.passenger_first_name,' ',p.passenger_last_name ) AS Passanger_name ,
b.booking_date,
s.schedule_name,
t.train_name,
ts_start.train_station_name as Journey_started_station,
ts_end.train_station_name as Journey_end_station,
b.amount_paid as Total_cost_of_Journey
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
INNER JOIN schedule s
ON b.schedule_id = s.schedule_id
INNER JOIN train t
ON b.train_id = t.train_id
INNER JOIN train_station ts_start
ON b.starting_station_id = ts_start.train_station_id
INNER JOIN train_station ts_end
ON b.ending_station_id = ts_end.train_station_id
Order by b.amount_paid DESC;
```

```sql
--Query3
-- Could you retrieve the top 3 bookings based on passenger details, booking date,
schedule, train, carriage class, seat number, amount paid, and
-- booking status, specifically for bookings where the amount paid is equal to or
exceeds $150? and sort by amount paid in descending order.
SELECT TOP 3 b.passenger_id ,
CONCAT(p.passenger_first_name,' ',p.passenger_last_name ) AS Passanger_name ,
b.booking_date,
s.schedule_name,
t.train_name,
cc.carriage_class_name,
b.seat_no,
b.amount_paid,
bs.name as Booking_Status
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
INNER JOIN schedule s
ON b.schedule_id = s.schedule_id
INNER JOIN train t
ON b.train_id = t.train_id
INNER JOIN carriage_class cc
ON b.ticket_class_id = cc.carriage_class_id
INNER JOIN booking_status bs
ON b.booking_status_id = bs.booking_status_id
WHERE b.amount_paid >= $150
ORDER BY b.amount_paid DESC;

--Query4
-- Write a query to give the deatils of booking status of each passenger
SELECT b.booking_id,CONCAT(p.passenger_first_name,' ',p.passenger_last_name ) as
passenger_name ,bs.name as booking_status
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
INNER JOIN booking_status bs
ON b.booking_status_id = bs.booking_status_id
Order By booking_id;
```

```sql
--Query5
-- Could you provide a report showing the passenger details, booking date, schedule
and train information, seat number,
-- amount paid, carriage class, and booking status for each booking?

SELECT b.passenger_id ,
CONCAT(p.passenger_first_name,' ',p.passenger_last_name ) AS Passanger_name ,
b.booking_date,
s.schedule_name,
t.train_name,
cc.carriage_class_name,
b.seat_no,
b.amount_paid,
bs.name as Booking_Status
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
INNER JOIN schedule s
ON b.schedule_id = s.schedule_id
INNER JOIN train t
ON b.train_id = t.train_id
INNER JOIN carriage_class cc
ON b.ticket_class_id = cc.carriage_class_id
INNER JOIN booking_status bs
ON b.booking_status_id = bs.booking_status_id
ORDER BY passenger_id;

--Query6
--Could you generate a report displaying the passenger details, booking date, train
name, carriage class, and
-- passenger card type used for each booking?

SELECT b.passenger_id ,
CONCAT(p.passenger_first_name,' ',p.passenger_last_name ) AS Passanger_name ,
b.booking_date,
t.train_name,
cc.carriage_class_name,
pc.card_type
FROM booking b
INNER JOIN passenger p
ON b.passenger_id = p.passenger_id
INNER JOIN train t
ON b.train_id = t.train_id
INNER JOIN carriage_class cc
ON b.ticket_class_id = cc.carriage_class_id
INNER JOIN passenger_card_details pc
ON b.passenger_card_id = pc.passenger_card_id
Order by passenger_id;
```

```sql
--Query7
-- Write a query to retrieve total revenue generated per schedule, including the
schedule ID, schedule name,
-- and the amount paid and sort in descending order by the total amount paid?
SELECT b.schedule_id, s.schedule_name, b.amount_paid AS total_revenue
FROM booking b
JOIN schedule s ON b.schedule_id = s.schedule_id
ORDER BY b.amount_paid DESC;

-- Query8
--Write a query to count the number of trains that use each station:

SELECT
  train_station.train_station_id,
  train_station.train_station_name,
  COUNT(train_journey_station.train_id) AS number_of_trains
FROM train_station
LEFT JOIN train_journey_station ON train_station.train_station_id =
train_journey_station.train_station_id
GROUP BY train_station.train_station_id, train_station.train_station_name
ORDER BY number_of_trains DESC;

--Query9
-- Writea a query to retrieve details of a train T1 journey with stations and
departure times:
SELECT t.train_id, t.train_name, ts.train_station_name, tjs.stop_order,
tjs.departure_time
FROM train t
INNER JOIN train_journey_station tjs
ON t.train_id = tjs.train_id
INNER JOIN train_station ts ON
tjs.train_station_id = ts.train_station_id
WHERE t.train_id = 'T1'
ORDER BY tjs.stop_order;
```