

CS306 Database Systems – Project Phase II Report

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1. Introduction

In this second phase of our project, we improved our Airline Operations System. We added **database triggers** and **stored procedures** to make the system more automatic and secure.

We used **MariaDB** with **HeidiSQL** for this project. We preferred this setup because we have experience with it from our other projects. The SQL code we wrote works perfectly with the project requirements.

2. Triggers

We created two triggers. One prevents mistakes (like overbooking), and the other keeps a record of deleted data.

2.1. Trigger 1: `check_capacity_before_insert`

- **What it does:** This trigger runs BEFORE a new passenger is added to the Booking table. It checks the aircraft's capacity. If the flight is full, the trigger stops the action and shows an error message. This makes sure we do not sell more tickets than the seat count.
- Evidence:
The screenshot below shows that when we try to add a 3rd passenger to a flight with a capacity of 2, the system gives an error: "ERROR: Flight is full! Cannot accept new booking."

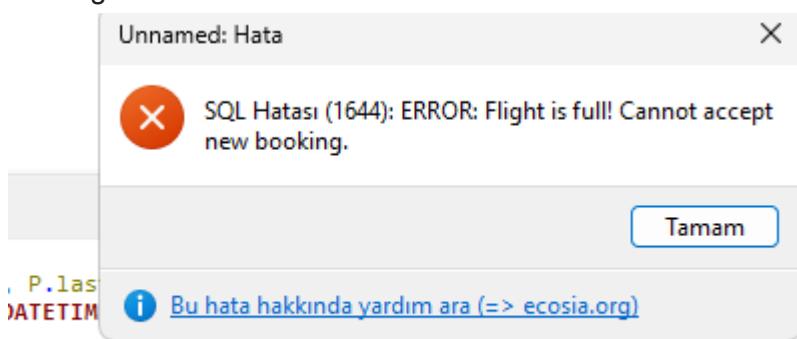


Figure 1: The trigger prevents adding a new passenger because the flight is full.

2.2. Trigger 2: `log_booking_delete`

- **What it does:** This trigger runs AFTER a booking is deleted. It is used for security and auditing. When a reservation is cancelled, this trigger automatically saves the flight number, seat number, and the deletion time into a separate table called `Booking_Log`.

- Evidence:

Below, you can see the log table is empty at first. After we delete a booking, the log table automatically gets the new record.

The screenshot shows a MySQL Workbench interface with the title bar 'cs306_project.booking_log: 0 satır mevcut (bire bir)'. Below the title bar is a toolbar with icons for 'Komutlar', 'Veritabanı', 'CS306_project', 'Tablo: booking_log', 'Sorgu', 'Tablo Ekle', and 'Tablo Düzenle'. The main area displays the table structure with columns: #, log_id (key icon), flight_number, seat_number, deleted_at, and user_action. There are no data rows present.

Figure 2: The log table is empty before deletion.

Figure

```
SELECT * FROM `cs306_project`.`booking_log` LIMIT 1000;
DELETE FROM Booking WHERE passenger_id_fk = 2;
/* Etkilenen satırlar: 2 Bulunan satırlar: 0 Uyarılar: 0 Süre 1 sorgu: 0,016 sn. */
SELECT * FROM `cs306_project`.`booking_log` LIMIT 1000;
```

3: We execute the delete command.

The screenshot shows the same MySQL Workbench interface as Figure 2. The table now contains two rows. Row 1 has log_id 1, flight_number BA247, seat_number 22B, deleted_at 2025-11-30 23:20:29, and user_action Booking Cancelled. Row 2 has log_id 2, flight_number TK001, seat_number 1B, deleted_at 2025-11-30 23:20:29, and user_action Booking Cancelled.

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Figure 4: The deleted booking information appears in the log table.

3. Stored Procedures

We wrote two stored procedures to make complex tasks easier and faster.

3.1. Procedure 1: GetPassengerManifest

- **What it does:** This procedure takes a flight_number as input. It joins the Booking and Passenger tables. It returns a simple list of all passengers (Names and Seat Numbers) for that specific flight. This is useful for the flight crew.

- Evidence:

The screenshot below shows the passenger list for flight TK001.

#	1 first_name	2 last_name	3 seat_number
1	Ahmet	Yilmaz	10F
2	John	Doe	1A

Figure 5: The procedure shows the passenger list.

3.2. Procedure 2: ScheduleFlight

- **What it does:** This procedure makes it easy to add a new flight. Instead of writing a long `INSERT` command, we just call this procedure with the flight details (Flight Number, Time, Plane). It automatically fills in the route (IST to LHR) and airline information.
- Evidence:

The screenshot below shows that a new flight is successfully created with a simple command.

```
705 /* Etkilenen satirlar: 0 Bulunan satirlar: 0 Uyarilar: 0 Sure 1 sorgu: 0,000 sn. */
706 CALL ScheduleFlight('TK999', '2025-12-01 10:00:00', '2025-12-01 14:00:00', 'TC-JNA');
707 /* Etkilenen satirlar: 1 Bulunan satirlar: 1 Uyarilar: 0 Sure 1 sorgu: 0,000 sn. */
```

Figure 6: A new flight is scheduled successfully.