

LAB ASSIGNMENT 6

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Assignment on Constraints

1. Add a CHECK constraint on the Passenger table so that Age must always be greater than or equal to 18.

```
mysql> ALTER TABLE Passenger
-> ADD CONSTRAINT chk_age CHECK (age>=18);
Query OK, 5 rows affected (1.626 sec)
Records: 5 Duplicates: 0 Warnings: 0

mysql> select * from Passenger;
```

Passenger_ID	First_Name	Last_Name	Email	Gender	Age	Street	State	Nationality	City
101	Ankit	jaiswal	ankit.new@example.com	Male	30	A-123	Bihar	Indian	Patna
102	Anurag	balaji	balaji@example.com	Male	28	A-124	WB	Indian	Indore
103	Suraj	Kumar	suraj@123.com	MAle	20	B-123	Delhi	Indian	New delhi
104	Ram	Prasad	prasad.ram@rp23.com	Male	36	B-162	UP	Indian	Jaunpur
105	Mohan	Pandey	pandey.ram@r5623.com	Male	39	B-132	MP	Indian	Rewa

```
5 rows in set (0.011 sec)
```

2. Add a UNIQUE constraint on the Passenger table so that no two passengers can have the same Email.

```
mysql> ALTER TABLE Passenger
-> ADD UNIQUE(Email);
```

3. Add a NOT NULL constraint to the Payment_Mode column in the Payment table.

```
mysql> ALTER TABLE Payment
-> MODIFY Payment_Mode VARCHAR(50) NOT NULL;
Query OK, 0 rows affected (0.488 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

4. Define a PRIMARY KEY on the Reservation table for the Reservation_ID column.

```
mysql> ALTER TABLE Reservation DROP PRIMARY KEY;
ERROR 1553 (HY000): Cannot drop index 'PRIMARY': needed in a foreign key constraint
mysql> ALTER TABLE Payment DROP FOREIGN KEY payment_ibfk_1;
Query OK, 0 rows affected (0.360 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> ALTER TABLE Reservation DROP PRIMARY KEY;
Query OK, 5 rows affected (0.979 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

```
mysql> DESCRIBE Reservation;
```

Field	Type	Null	Key	Default	Extra
Reservation_ID	int	NO		NULL	
Passenger_ID	int	YES	MUL	NULL	
Train_ID	int	YES	MUL	NULL	
Journey_Date	date	YES		NULL	
Booking_Date	date	YES		NULL	
Seat_Number	int	YES		NULL	
Class	varchar(20)	YES		NULL	
Status	varchar(20)	YES		NULL	

8 rows in set (0.020 sec)

```
mysql> ALTER TABLE Reservation ADD PRIMARY KEY (Reservation_ID);
Query OK, 0 rows affected (0.685 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> DESCRIBE Reservation;
```

Field	Type	Null	Key	Default	Extra
Reservation_ID	int	NO	PRI	NULL	
Passenger_ID	int	YES	MUL	NULL	
Train_ID	int	YES	MUL	NULL	
Journey_Date	date	YES		NULL	
Booking_Date	date	YES		NULL	
Seat_Number	int	YES		NULL	
Class	varchar(20)	YES		NULL	
Status	varchar(20)	YES		NULL	

8 rows in set (0.012 sec)

5. Add a FOREIGN KEY constraint between Reservation.Passenger_ID and Passenger.Passenger_ID.

```
mysql> ALTER TABLE Reservation
-> ADD CONSTRAINT fk_reservation_passenger
-> FOREIGN KEY (Passenger_ID)
-> REFERENCES Passenger(Passenger_ID)
-> ON DELETE CASCADE
-> ON UPDATE CASCADE;
Query OK, 5 rows affected (0.635 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

```
CONSTRAINT `fk_reservation_passenger` FOREIGN KEY (`Passenger_ID`) REFERENCES `passenger` (`Passenger_ID`) ON DELETE CASCADE ON UPDATE CASCADE,
CONSTRAINT `reservation_ibfk_1` FOREIGN KEY (`Passenger_ID`) REFERENCES `passenger` (`Passenger_ID`),
CONSTRAINT `reservation_ibfk_2` FOREIGN KEY (`Train_ID`) REFERENCES `train` (`Train_ID`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci
1 row in set (0.026 sec)
```

6. Add a FOREIGN KEY constraint between Reservation.Train_ID and Train.Train_ID.

```
mysql> ALTER TABLE Reservation
-> ADD CONSTRAINT fk_reservation_train
-> FOREIGN KEY (Train_ID)
-> REFERENCES Train(Train_ID)
-> ON DELETE CASCADE
-> ON UPDATE CASCADE;
Query OK, 5 rows affected (0.591 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

```
PRIMARY KEY (`Reservation_ID`),
KEY `fk_reservation_passenger` (`Passenger_ID`),
KEY `fk_reservation_train` (`Train_ID`),
CONSTRAINT `fk_reservation_passenger` FOREIGN KEY (`Passenger_ID`) REFERENCES `passenger` (`Passenger_ID`) ON DELETE CASCADE ON UPDATE CASCADE,
CONSTRAINT `fk_reservation_train` FOREIGN KEY (`Train_ID`) REFERENCES `train` (`Train_ID`) ON DELETE CASCADE ON UPDATE CASCADE,
CONSTRAINT `reservation_ibfk_1` FOREIGN KEY (`Passenger_ID`) REFERENCES `passenger` (`Passenger_ID`),
CONSTRAINT `reservation_ibfk_2` FOREIGN KEY (`Train_ID`) REFERENCES `train` (`Train_ID`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci
1 row in set (0.014 sec)
```

7. Add a CHECK constraint on the Payment table to ensure that Amount must always be greater than 0.

```
mysql> ALTER TABLE Payment
-> ADD CONSTRAINT chk_total_amount CHECK (Total_Amount > 0);
Query OK, 5 rows affected (0.516 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

8. Add a UNIQUE constraint on the Train table to ensure that no two trains can have the same Train_Name.

```
mysql> ALTER TABLE Train
-> ADD CONSTRAINT unique_train_name UNIQUE (Train_Name);
ERROR 1062 (23000): Duplicate entry 'Vande Bharat' for key 'train.unique_train_name'
mysql> select * from Train;
+-----+-----+-----+-----+-----+
| Train_ID | Train_Name | Source | Destination | Total_Coaches |
+-----+-----+-----+-----+-----+
| 501 | Sampooran Kranti | Patna | New Delhi | 21 |
| 502 | Tejas Express | Kolkata | Jaipur | 17 |
| 503 | Rajdhani Express | Delhi | Ranchi | 20 |
| 504 | Vande Bharat | Patna | Mumbai | 15 |
| 505 | Vande Bharat | Delhi | Chennai | 19 |
+-----+-----+-----+-----+-----+
5 rows in set (0.011 sec)

mysql> DELETE FROM Train WHERE Train_ID = 505;
Query OK, 1 row affected (0.095 sec)

mysql> ALTER TABLE Train
-> ADD CONSTRAINT unique_train_name UNIQUE (Train_Name);
Query OK, 0 rows affected (0.334 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> select * from Train;
+-----+-----+-----+-----+-----+
| Train_ID | Train_Name | Source | Destination | Total_Coaches |
+-----+-----+-----+-----+-----+
| 501 | Sampooran Kranti | Patna | New Delhi | 21 |
| 502 | Tejas Express | Kolkata | Jaipur | 17 |
| 503 | Rajdhani Express | Delhi | Ranchi | 20 |
| 504 | Vande Bharat | Patna | Mumbai | 15 |
+-----+-----+-----+-----+-----+
4 rows in set (0.012 sec)
```

9. Test the CHECK constraint on Passenger.Age by trying to insert a record with an age below 18.

```
mysql> INSERT INTO Passenger
-> (Passenger_ID, First_Name, Last_Name, Email, Gender, Age, Street, State, Nationality, City)
-> VALUES
-> (106, 'Ravish', 'Kumar', 'ravish@example.com', 'Male', 16, 'A-456', 'Bihar', 'Indian', 'Muzaffarpur');
ERROR 3819 (HY000): Check constraint 'chk_age' is violated.
```

10. Test the FOREIGN KEY constraint by trying to insert a reservation with a non-existing Train_ID.

```
mysql> INSERT INTO Reservation
-> (Reservation_ID, Passenger_ID, Train_ID, Journey_Date, Booking_Date, Seat_Number, Class, Status)
-> VALUES
-> (3001, 101, 999, '2025-09-10', '2025-08-27', 401, 'Sleeper', 'Confirmed');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails ('railway_reservation_system'.`reservation`, CONSTRAINT `fk_reservation_train` FOREIGN KEY (`Train_ID`) REFERENCES `train` (`Train_ID`) ON DELETE CASCADE ON UPDATE CASCADE)
```

