

Cab Booking System

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Database Transactions:

We are using 3 transactions:

Transaction 1: Book a ride

BEGIN;

```
INSERT INTO bookings (customer_id, driver_id, pickup_location_id,
dropoff_location_id, pickup_time, fare, payment_method, status, rating)
VALUES (1, 3, 5, 7, '2023-04-24 18:30:00', 20.00, 'credit card', 'Active', NULL);
UPDATE Driver SET CurrentState = FALSE WHERE driver_id = 3;
COMMIT;
```

Transaction 2: update driver's current state

BEGIN;

```
UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;
UPDATE bookings SET status = 'Completed', rating = 4 WHERE booking_id = 1;
COMMIT;
```

Transaction 3: cancel a booking

BEGIN;

```
UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;
UPDATE bookings SET status = 'Cancelled', cancel_time = NOW() WHERE
booking_id= 1;
COMMIT;
```

We have defined 2 schedules for these transactions, first is conflict serializable:

CONFLICT SERIALIZABLE:

```
T1.1: INSERT INTO bookings (customer_id, driver_id, pickup_location_id,
dropoff_location_id, pickup_time, fare, payment_method, status, rating)
VALUES (1, 3, 5, 7, '2023-04-24 18:30:00', 20.00, 'credit card', 'Active', NULL);
```

T1.2: UPDATE Driver SET CurrentState = FALSE WHERE driver_id = 3;

T2.1: UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;

T3.1: UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;

T2.2: UPDATE bookings SET status = 'Completed', rating = 4 WHERE booking_id = 1;

T3.2: UPDATE bookings SET status = 'Cancelled', cancel_time = NOW() WHERE booking_id = 1;

T1	T2	T3
T1.1(Write booking status= active)		
T1.2(Write driver state=false)		
	T2.1(Write driver state=true)	
		T3.1(write driver status=true)
	T2.2(Write booking state=completed)	
		T3.2(Write booking status=cancelled)

This is a conflict serializable schedule as it will have write -write conflict for T1.1 with T2.2 and T3.1 as both are accessing bookings table to write status of the booking. T1.2 is write-write conflict serializable with T2.1 and T3.2 as they are writing driver's currentState. T2.1 is write-write conflict with T3.2 as both are accessing driver's currentState. T2.2 is write-write conflict with T3.2 as both are accessing booking table changing the status of the booking.

The precedence graph of this sequence does not contain any loop or cycle which means that this is conflict serializable

We can identify a serialized equivalent for the sequence as T1->T2->T3.

NON-CONFLICT SERIALIZABLE:

T1.1: INSERT INTO bookings (customer_id, driver_id, pickup_location_id, dropoff_location_id, pickup_time, fare, payment_method, status, rating) VALUES (1, 3, 5, 7, '2023-04-24 18:30:00', 20.00, 'credit card', 'Active', NULL);

T2.1: UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;

T3.1: UPDATE Driver SET CurrentState = TRUE WHERE driver_id = 3;

T2.2: UPDATE bookings SET status = 'Completed', rating = 4 WHERE booking_id = 1;

T3.2: UPDATE bookings SET status = 'Cancelled', cancel_time = NOW() WHERE booking_id = 1;

T1.2: UPDATE Driver SET CurrentState = FALSE WHERE driver_id = 3;

T1	T2	T3
T1.1(Write booking status= active)		
	T2.1(Write driver state=true)	
		T3.1(write driver status=true)
	T2.2(Write booking status=completed)	
		T3.2(Write booking status=cancelled)
T1.2(Write driver state=false)		

This sequence's precedence graph contains 3 loops so we needed to test it through view serializability which confirmed that this is a non- conflict serializable sequence. As the commands T2.2 and T3.1 changes the booking status to different values(completed and cancelled) and T3.2 and T2.2 changes the driver's state to True and false, hence if we try to change the sequence to a serializable sequence, for example T1->T2->T3, then the final output of driver's state will change to true, instead of false as in this sequence. Hence we can not find any sequence in which all the attributes' value remain the same.

User Interface:

The user interface of our project is as follows:

The login / sign-up page

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : |
```

Signup

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : 2

You have decided to register yourself!
The roles that you can register as are as follows...
1. Admin
2. Customer
3. Driver

Please enter the role that you want to register yourself for : 1

You have decided to sign up as an Admin!

Please enter your name here : Aud
Please enter your address here : 123-belmont street, London
Please enter your phone number here : 12343434
Please enter your email here : Aud@gmail.com

Congratualtions, you have successfully registered as an admin!
```

Login page

```
-----XXXXXXXXXXXX-----

You have selected to login into an existing account
The roles that you can login as are as follows...
1. Customer
2. Driver
3. Admin

Please enter your role here : |
```

Customer Workflow: Booking a cab

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----
                                Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : 1

-----XXXXXXXXXXXX-----

You have selected to login into an existing account
The roles that you can login as are as follows...
1. Customer
2. Driver
3. Admin

Please enter your role here : 1

-----XXXXXXXXXXXX-----
You have decided to login as a Customer
Please enter your name : Vin
Please enter your password here : Ou5BNdB4

Welcome customer 'Vin' to the Cab Booking System!
-----XXXXXXXXXXXX-----

As a customer the various actions that you can perform are...
1. View all the locations
2. Book a cab
3. Cancel your ongoing trip

Please enter what you wish to do : 2

-----XXXXXXXXXXXX-----
You have wished to book a cab!
Do you wish to see the locations that can be booked?n

You have wished to not see the loactions that can be booked
Please enter the details...
Please enter your name : Vin
Please enter the destination : Bireun
Please enter the payement method : Cash
Please enter the pickup date (yyyy-mm-dd) : 2023-5-12

You have successfully booked your trip!

-----XXXXXXXXXXXX-----
```

Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : 1

You have selected to login into an existing account
The roles that you can login as are as follows...
1. Customer
2. Driver
3. Admin

Please enter your role here : 1

You have decided to login as a Customer
Please enter your name : Vin
Please enter your password here : Ou5Bk4B4

Welcome customer 'Vin' to the Cab Booking System!

As a customer the various actions that you can perform are...
1. View all the locations
2. Book a cab
3. Cancel your ongoing trip

Please enter what you wish to do : 1

You wish to see all the locations that you can visit

Sidonsimur
Bazibayah
Angochi
Nijaeen
Novospasskoye
Levandeira
Przemorsk
Nancaleun
Anren Chengguanzen
Logang
Shin'ichi
Lukicevo
Burnaby
Abuwarda
Falkenberg
Alvardez
Chistopol'
Purwojoyo
Janang
Pule
Duncans
Jiangyi
Casais
Pesnica pri Mariboru
San Diego
ibkcln
Oslo
Dayuan
Paris 69
Wagashine
Wloclamek
Plácido de Castro
Wangyang
Sa dah
Velká Karlovice
Praha de Mira
Witosław
Chiri
Ganjuran
Zaporizhzhya
Maclear
Castellon De La Plana/Castello De La Pla
Heman
Bailadores
Konongo
Catu
Malgobek
Haarlem
Huangjin
Anka
Guabito
Cerrito
Novikovo
Mogo
Challhuahuacho
Ostarije
Tanychanka
Tahitay
Boise
Ostancaico
Guli
Telennice
Izumi
Ingeniero Guillermo N. Juárez
Songkar 8
Gancak Wetan
Standerton
Wyfany
Jiangkou
Dalangdong
Wartou
Simusfin
Nauikupa
Kudahavadhoo
Povenets
Sani
Longao Dajah
Vandton
Jishigang
Willingsby
General Cabrera
Dagestanskiye Ogn'i
Além
Energeticheskoy
Uquernes
Kafir Qala
Natal
Baratã
Botucatu
Beit Jann
Huailya
Ertai
Kroonstad
Gongting
Totomas
Zheyuan
Alto de la Estancia
Arta
Lushino-Petrovskiy
Eireun

Driver Workflow

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----  
Welcome to the Cab Booking System  
  
You can currently perform three functions...  
1. Login  
2. Sign Up  
  
Please enter the your choice here : 1  
  
-----XXXXXXXXXXXX-----  
  
You have selected to login into an existing account  
The roles that you can login as are as follows...  
1. Customer  
2. Driver  
3. Admin  
  
Please enter your role here : 2  
  
-----XXXXXXXXXXXX-----  
You have decided to login as a Driver  
Please enter your name : Sinclare  
Please enter your password here : iNaHxhoR  
  
-----XXXXXXXXXXXX-----  
  
Welcome Driver 'Sinclare' to the Cab Booking System!  
You can perform the following tasks...  
1. You can check your current status  
2. You can check all the locations  
Please enter your choice : 1  
  
You have decided to check your current status  
You are currently booked!  
Do you want to check the location? y  
  
You have decided to check the locations  
  
The customer pickup location is : 'Novospasskoye'  
The customer dropoff location is : 'Oslo'  
  
-----XXXXXXXXXXXX-----
```

Admin Workflow

```
-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----  
Welcome to the Cab Booking System  
  
You can currently perform three functions...  
1. Login  
2. Sign Up  
  
Please enter the your choice here : 1  
  
-----XXXXXXXXXXXX-----  
  
You have selected to login into an existing account  
The roles that you can login as are as follows...  
1. Customer  
2. Driver  
3. Admin  
  
Please enter your role here : 3  
  
-----XXXXXXXXXXXX-----  
You have decided to login as an Admin  
  
Please enter the id of the admin : 1  
Welcome Mr. Adolphe to the Cab Booking System as an admin  
  
As the admin you can perform various tasks  
1. Update the location data  
2. Remove an existing Customer/Driver  
3. Run other queries on the database  
  
Please enter the task that you wish to perform : 1  
  
-----XXXXXXXXXXXX-----  
You have wished to update the location data  
  
Please enter the name of the city/region that you want to add : Beirut  
  
You have successfully added the location into the database!
```

```

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : 1

-----XXXXXXXXXXXX-----

You have selected to login into an existing account
The roles that you can login as are as follows...
1. Customer
2. Driver
3. Admin

Please enter your role here : 3

-----XXXXXXXXXXXX-----

You have decided to login as an Admin

Please enter the id of the admin : 1
Welcome Mr. Adolphe to the Cab Booking System as an admin

As the admin you can perform various tasks
1. Update the location data
2. Remove an existing Customer/Driver
3. Run other queries on the database

Please enter the task that you wish to perform : 2

-----XXXXXXXXXXXX-----

You have wished to remove an existing Customer/Driver
Please select the user whose data needs to be removed...
1. Customer
2. Driver
Please select the natuer of the user : 1

-----XXXXXXXXXXXX-----

You have wished to remove the data of the customer!

Please enter the name of the user here : |

```

```

-----XXXXXXXXXXXXXXXXXXXXXXXXXXXX-----

Welcome to the Cab Booking System

You can currently perform three functions...
1. Login
2. Sign Up

Please enter the your choice here : 1

-----XXXXXXXXXXXX-----

You have selected to login into an existing account
The roles that you can login as are as follows...
1. Customer
2. Driver
3. Admin

Please enter your role here : 3

-----XXXXXXXXXXXX-----

You have decided to login as an Admin

Please enter the id of the admin : 1
Welcome Mr. Adolphe to the Cab Booking System as an admin

As the admin you can perform various tasks
1. Update the location data
2. Remove an existing Customer/Driver
3. Run other queries on the database

Please enter the task that you wish to perform : 3

-----XXXXXXXXXXXX-----

You have wished to view other queries

The queries that can be executed are...
1. Embedded SQL queries
2. OLAP queries
3. Triggers
4. Basic SQL queries
5. Queries regarding Database Transactions

Please enter the nature of the query that you wish to execute2

-----XXXXXXXXXXXX-----

```