Vehicle Renting Management System

SE – 606 : Software Design & Analysis

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Chapter One: Architectural Design

Software architectural design represents the structure of the data and program components that are required to build a computer-based system. There are 4 steps in architectural design:

1. Representing the system in context

2. Define archetypes

3. Refine the architecture into components

4. Describe instantiations of the system

1.1 Representing the System in Context

While representing the system in context, systems that interoperate with the target system are represented as,

- ❏ Superordinate systems—those systems that use the target system as part of some higher-level processing scheme. There is no superordinate system that use our VRMS target system.
- ❏ Subordinate systems—those systems that are used by the target system and provide data or processing that are necessary to complete target system functionality. There is a subordinate system "Digital payment system" that is used as subordinate system of VRMS.
- ❏ Peer-level systems—those systems that interact on a peer-to-peer basis (i.e., information is either produced or consumed by the peers and the target system. There is no peer-level-system here.
- ❏ Actors—entities (people, devices) that interact with the target system by producing or consuming information that is necessary for requisite processing. In VRMS system, the actors are basically the users: Admin, Owner and Client.

Representation of Vehicle Renting Management System in Context:

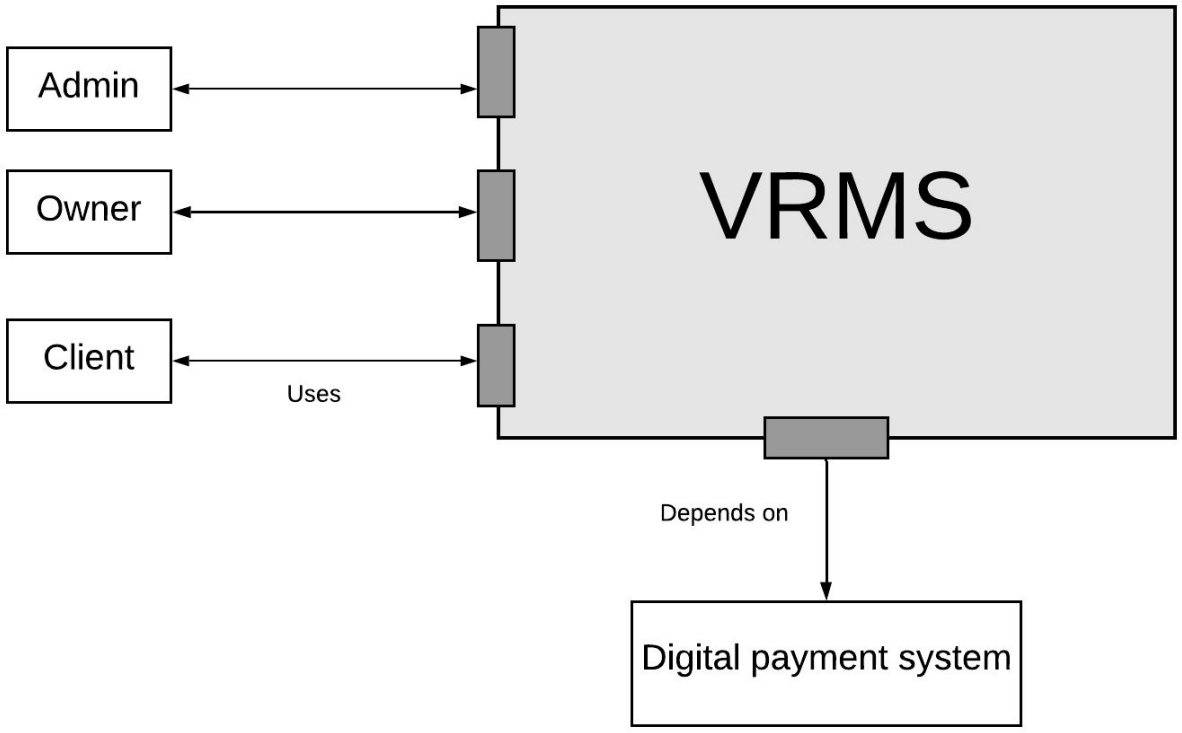


Figure 1: Vehicle Renting Management System in Context

1.2 Define Archetypes

An archetype is a class or pattern that represents a core abstraction that is critical to the design of an architecture for the target system. The target system architecture is composed of these archetypes, which represent stable elements of the architecture but may be instantiated many different ways based on the behavior of the system.

Archetype Diagram for Vehicle Renting Management System:

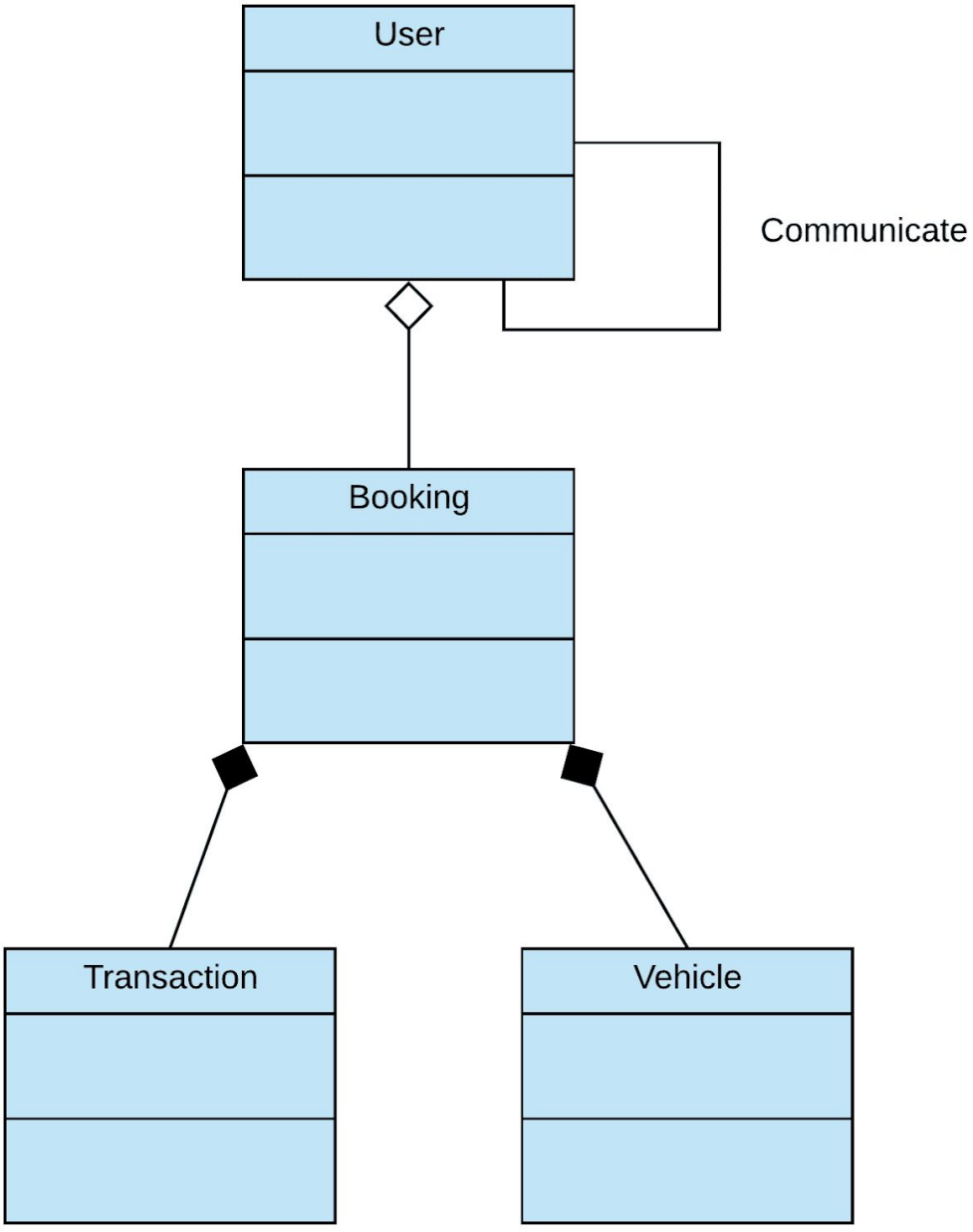


Figure 2: Vehicle Renting Management System Archetypes

1.3 Refine the Architecture into Components

Architectural Structure for Vehicle Renting Management System with top-level Components:

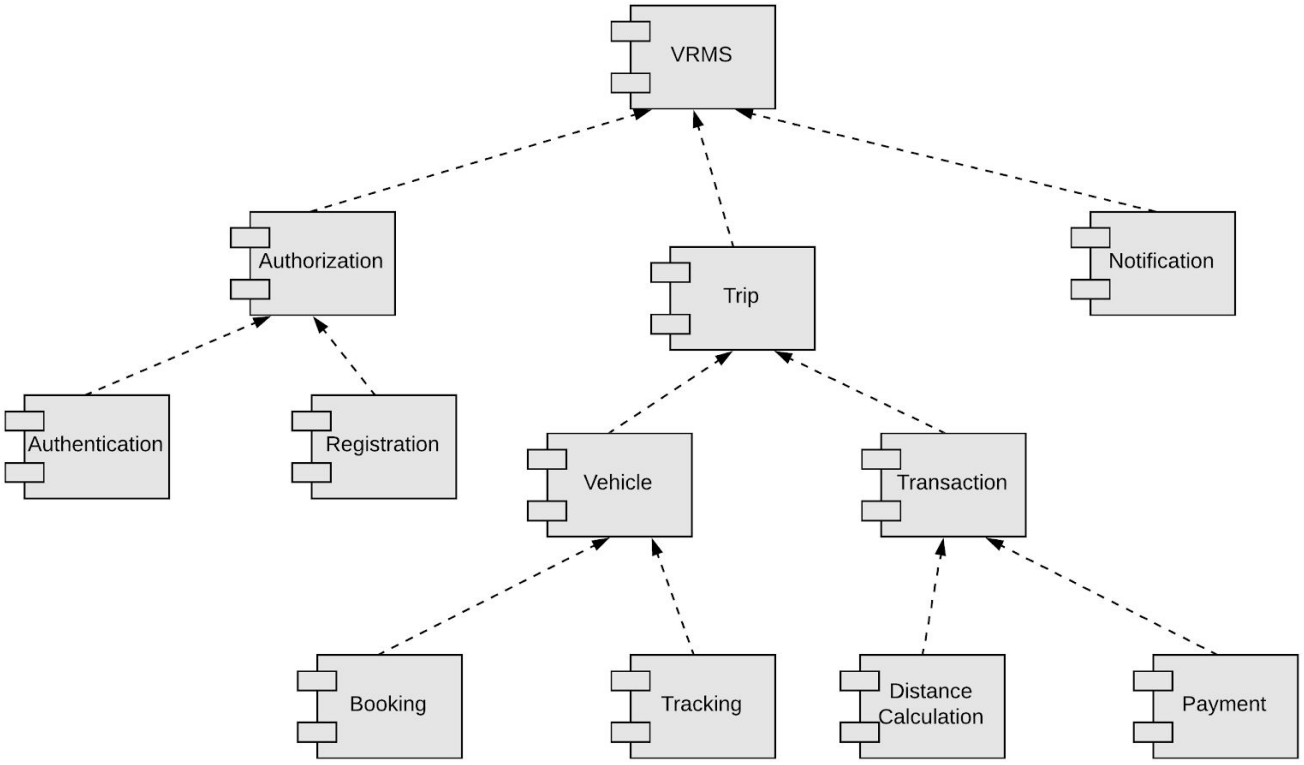


Figure 3: Components of Vehicle Renting Management System

1.4 Instantiation of VRMS with Component Elaboration

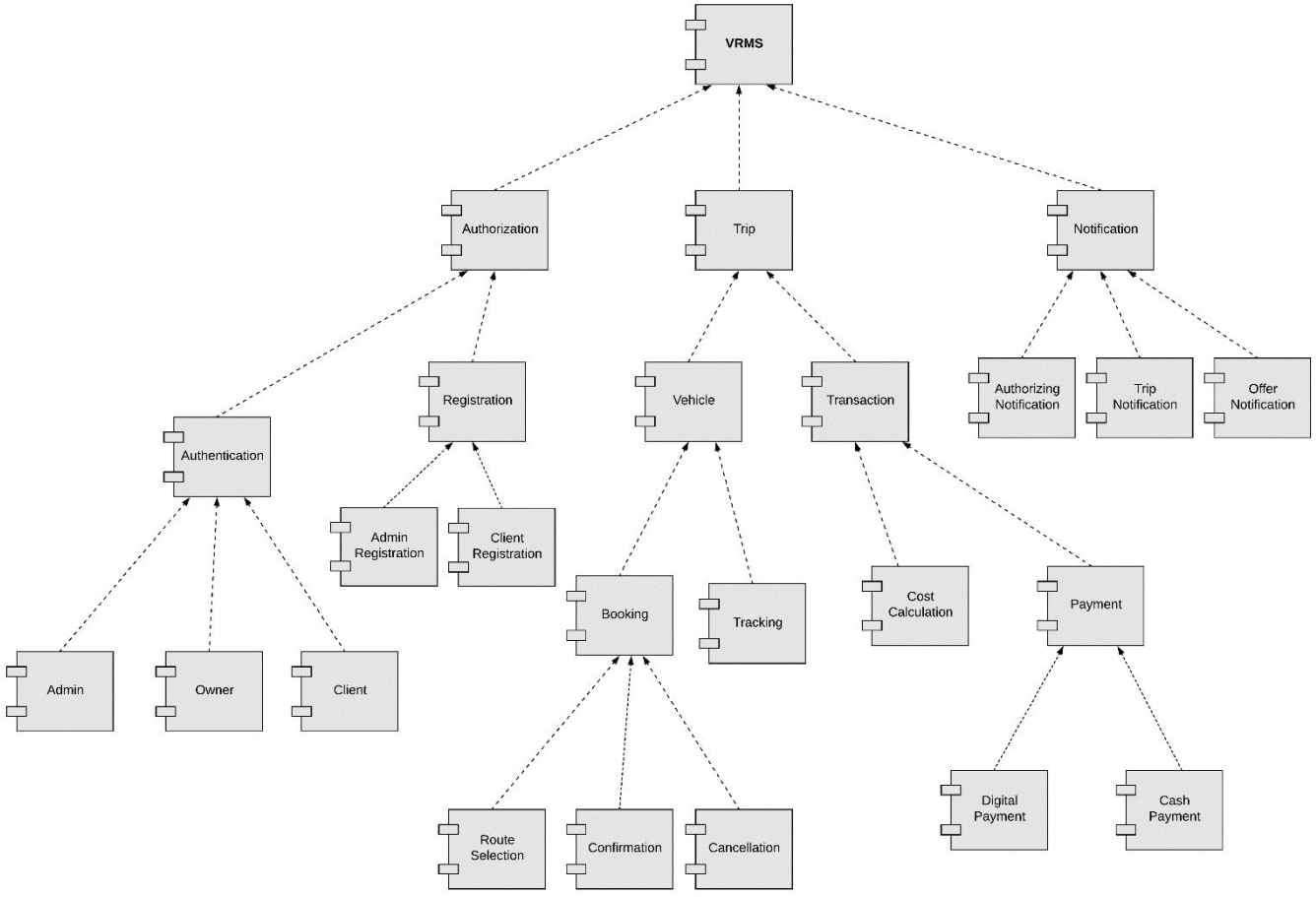


Figure 4: Instantiation of Vehicle Renting Management System

Chapter Two: Component Design

2.1 Design Classes that correspond to the problem domain

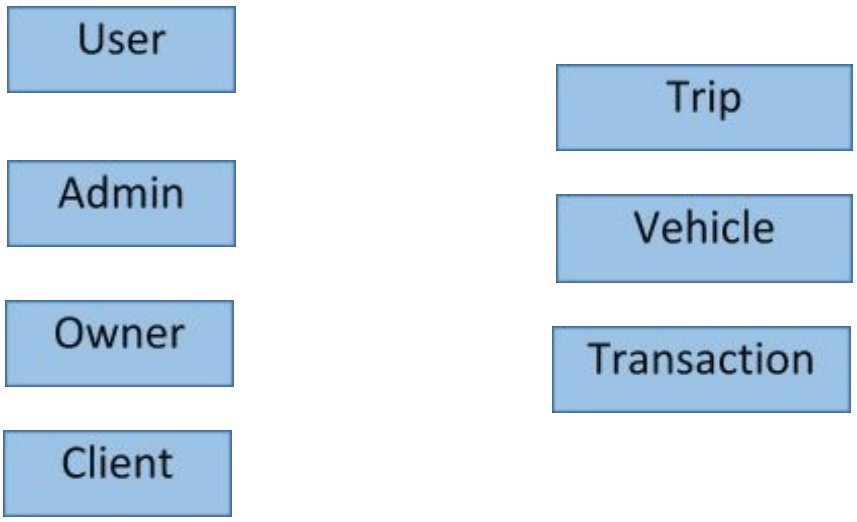


Figure 5: Design Classes of VRMS

2.2 Elaboration of Design Components

2.2.1 User

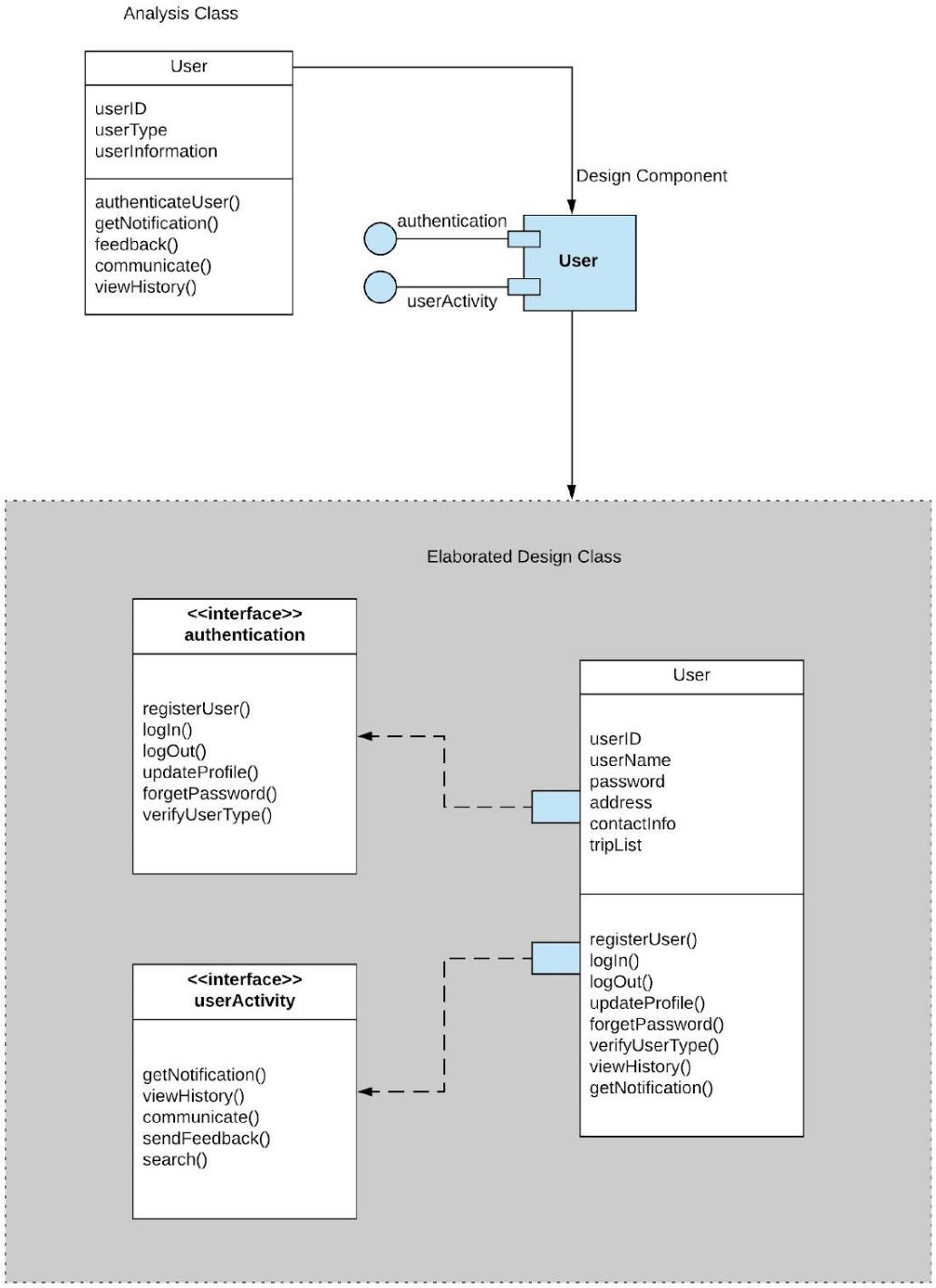


Figure 6: Elaboration of User

2.2.2 Admin

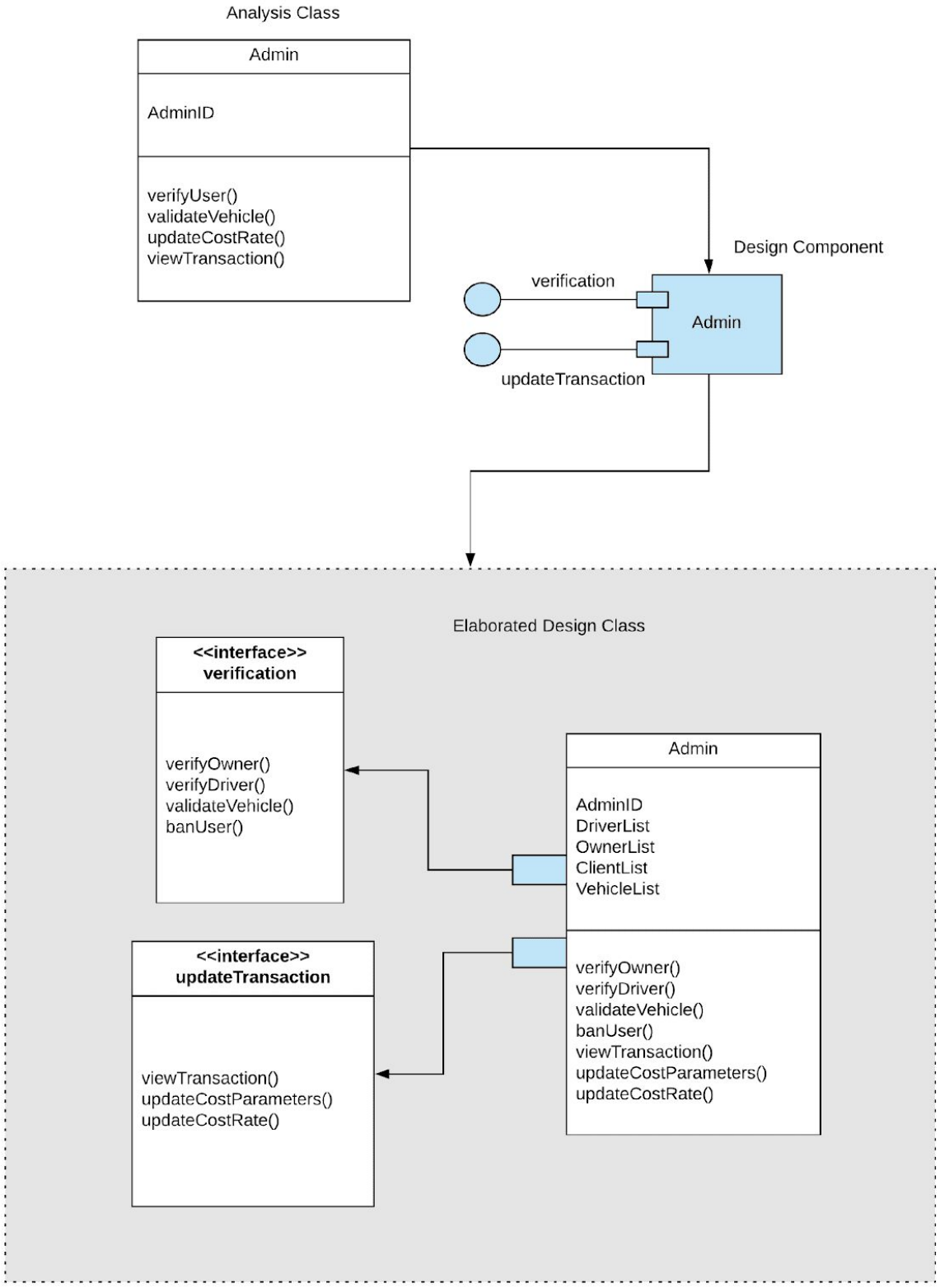


Figure 7: Elaboration of Admin

2.2.3 Owner

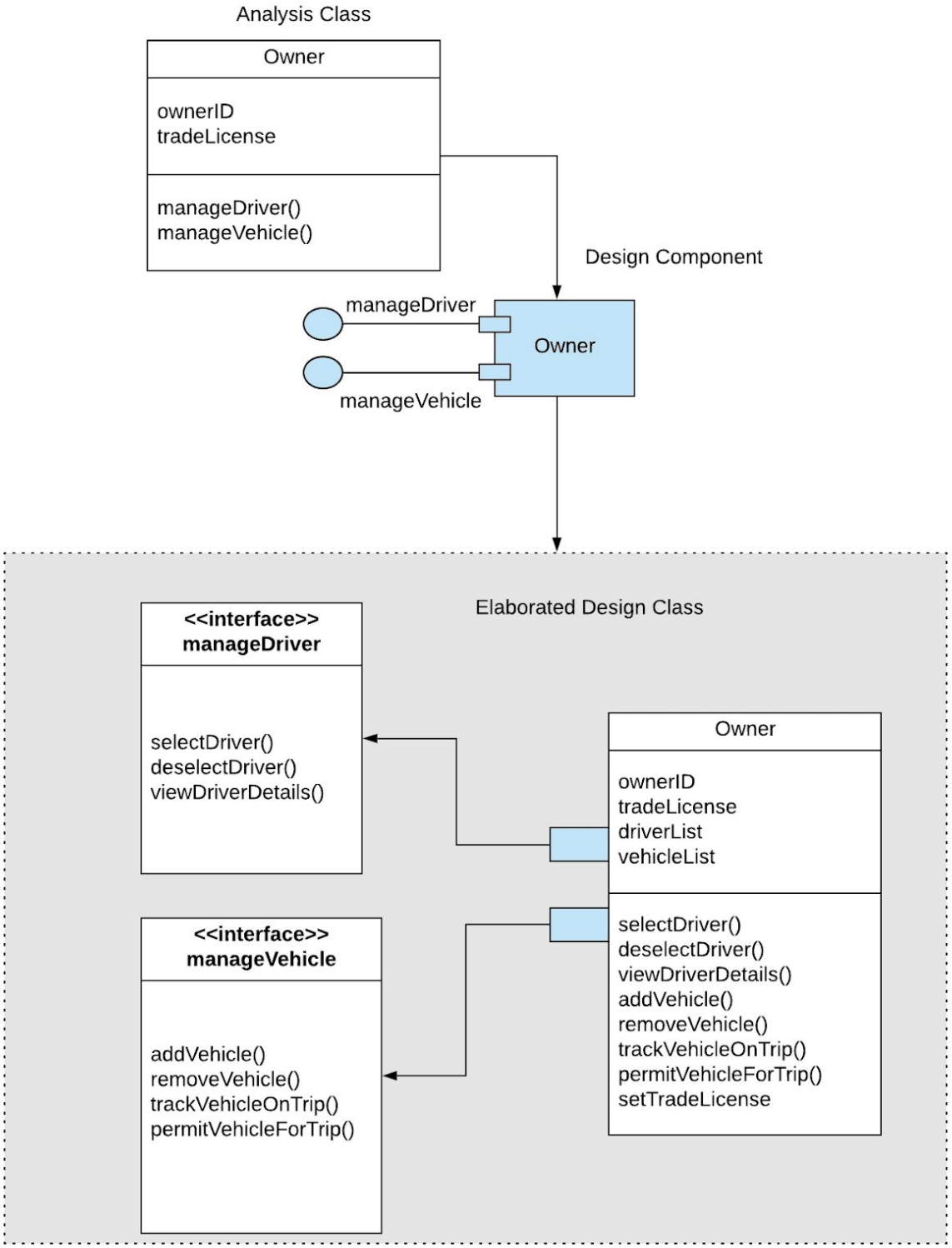


Figure 8: Elaboration of Owner

2.2.4 Client

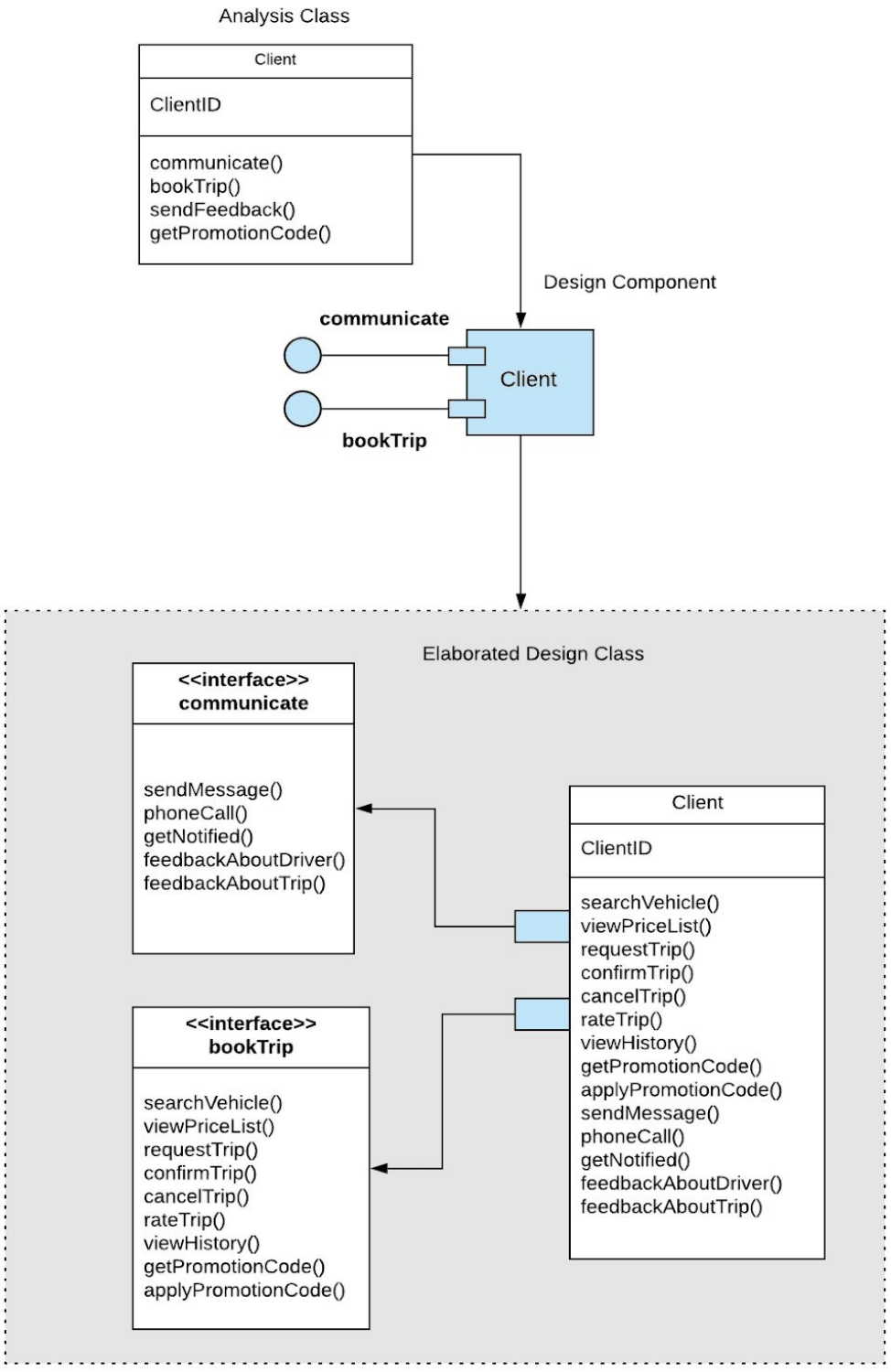


Figure 9: Elaboration of Client

2.2.5 Trip

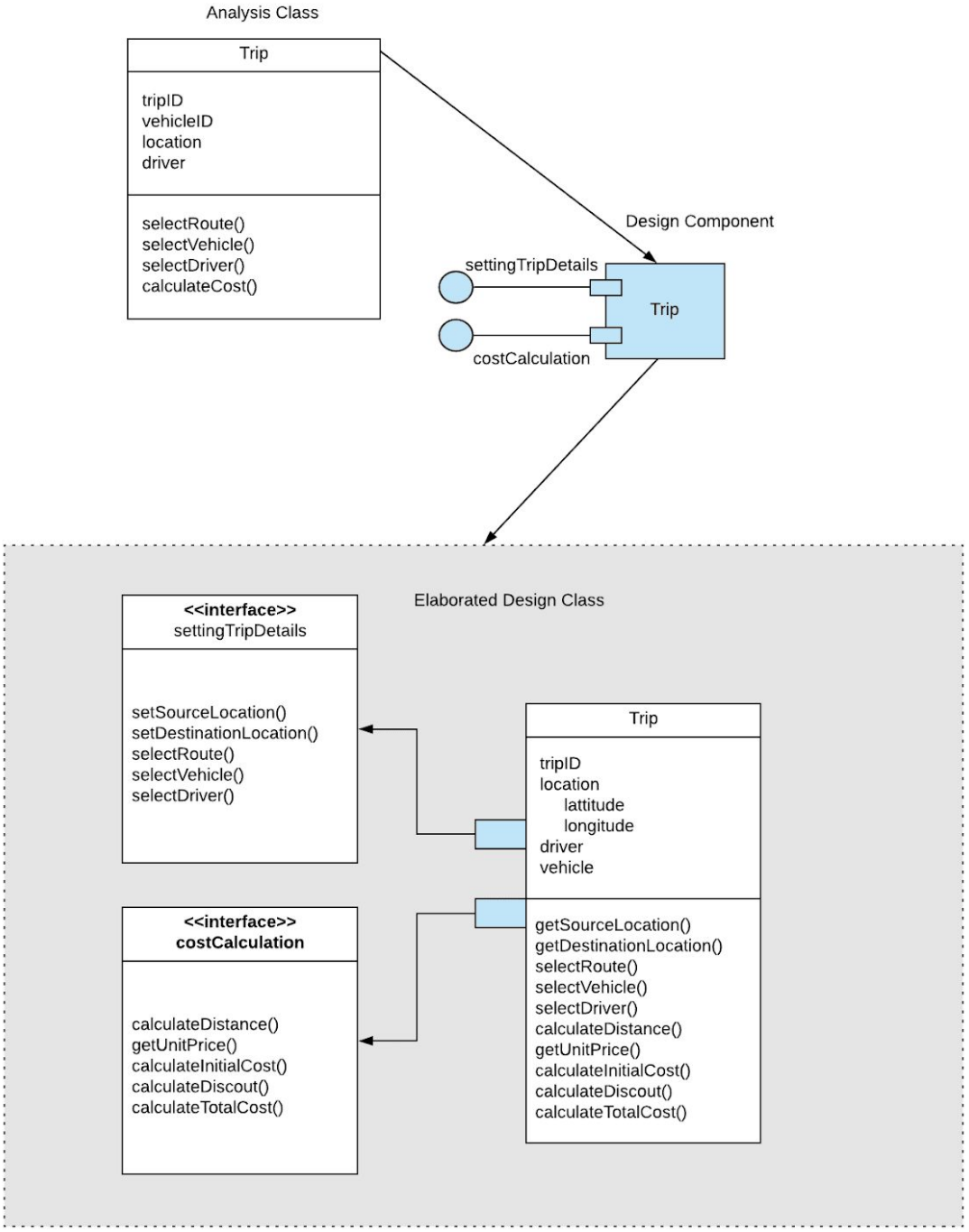


Figure 10: Elaboration of Trip

2.2.6 Transaction

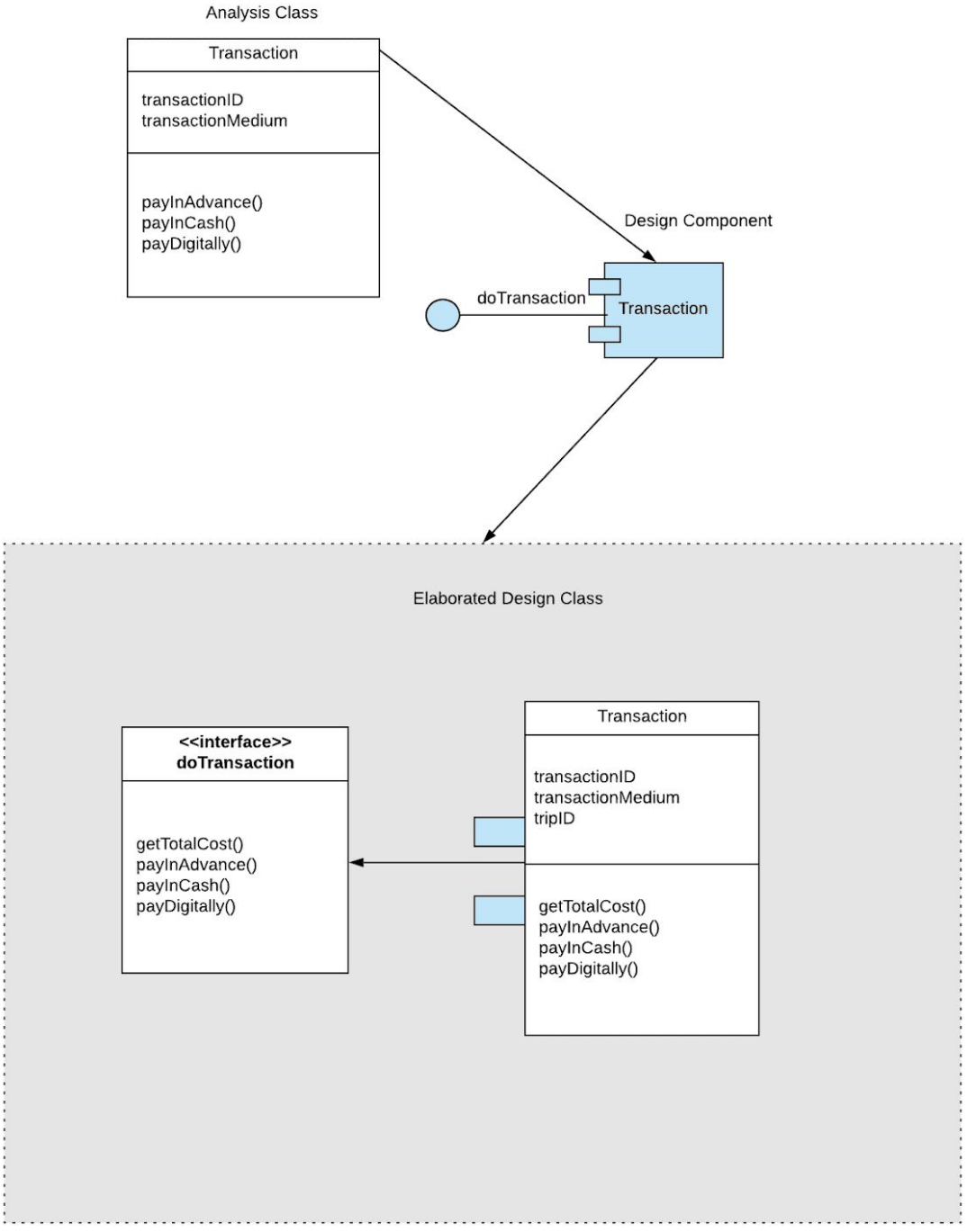


Figure 11: Elaboration of Transaction

2.2.7 Vehicle

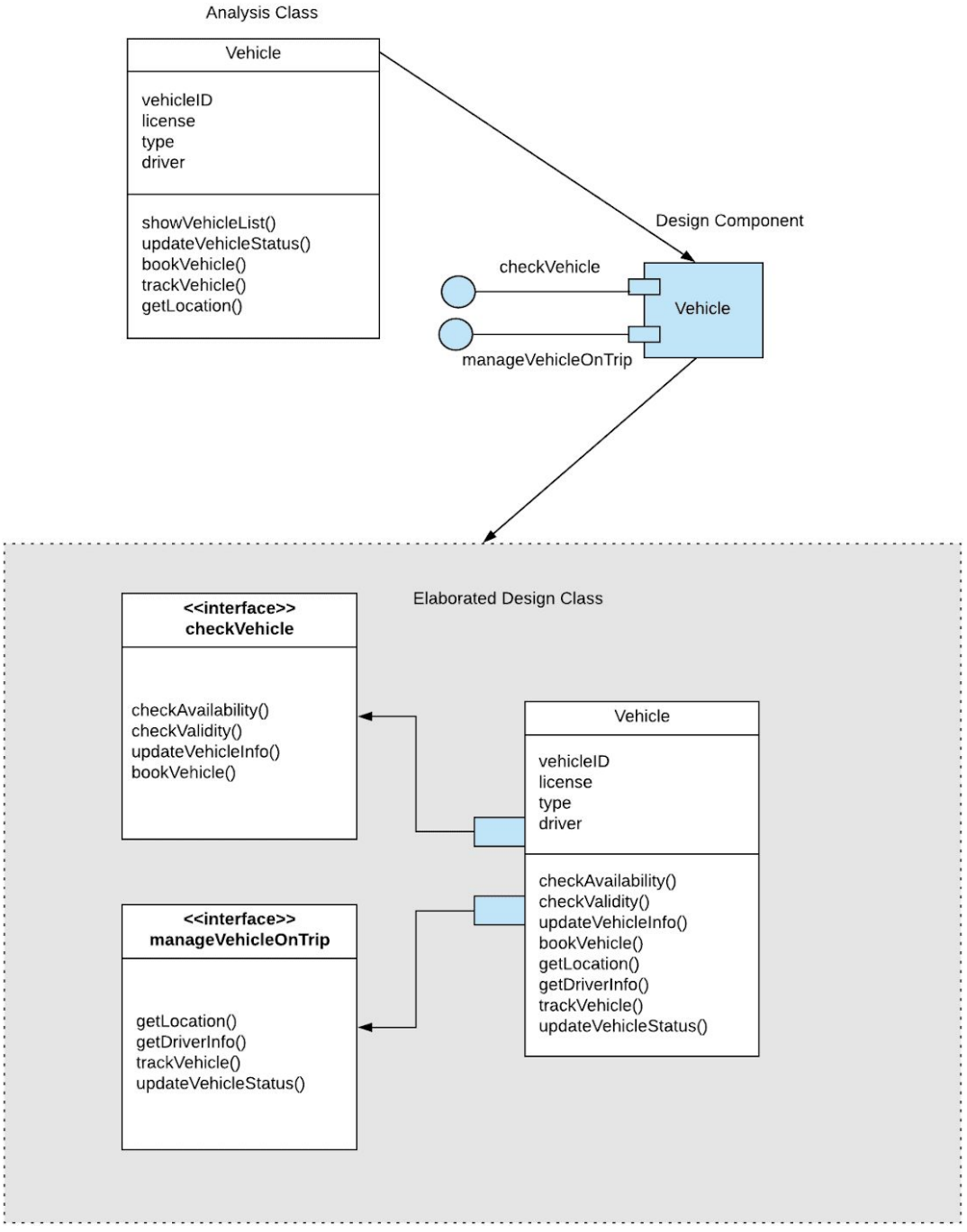


Figure 12: Elaboration of Vehicle

2.3 Collaboration Diagram with Messaging

The requirements model makes use of a collaboration diagram to show how analysis classes collaborate with one another. As component-level design proceeds, it is sometimes useful to show the details of these collaborations by specifying the structure of messages that are passed between objects within a system. Although this design activity is optional, it can be used as a precursor to the specification of interfaces that show how components within the system communicate and collaborate.

Collaboration Diagrams for Vehicle Renting Management System are the followings,

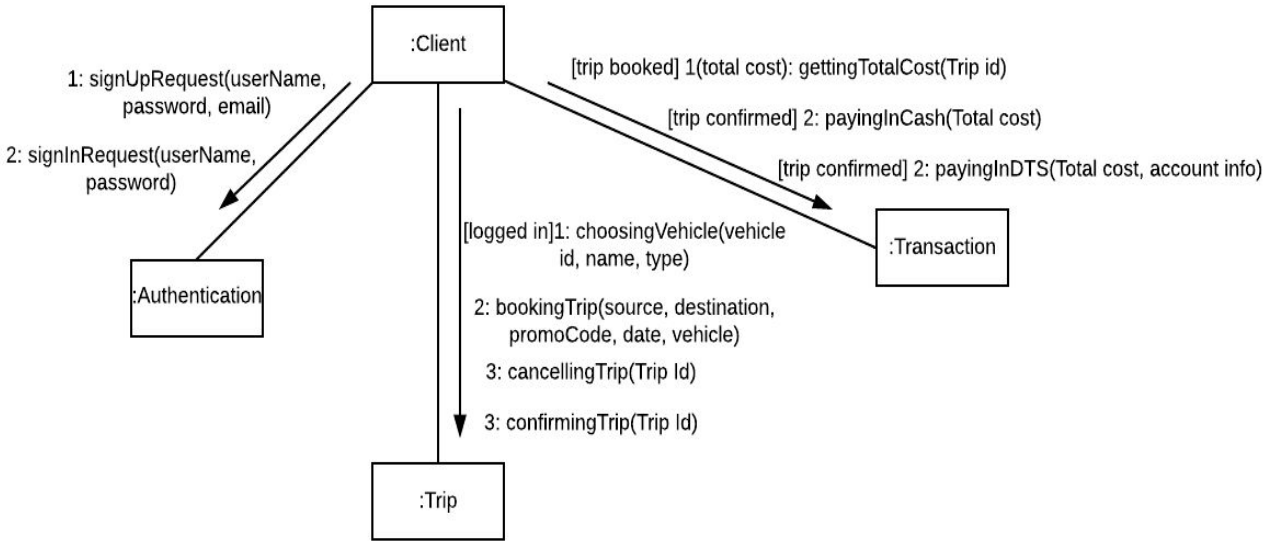


Figure 13: Collaboration Diagram of Client,Trip & Transaction

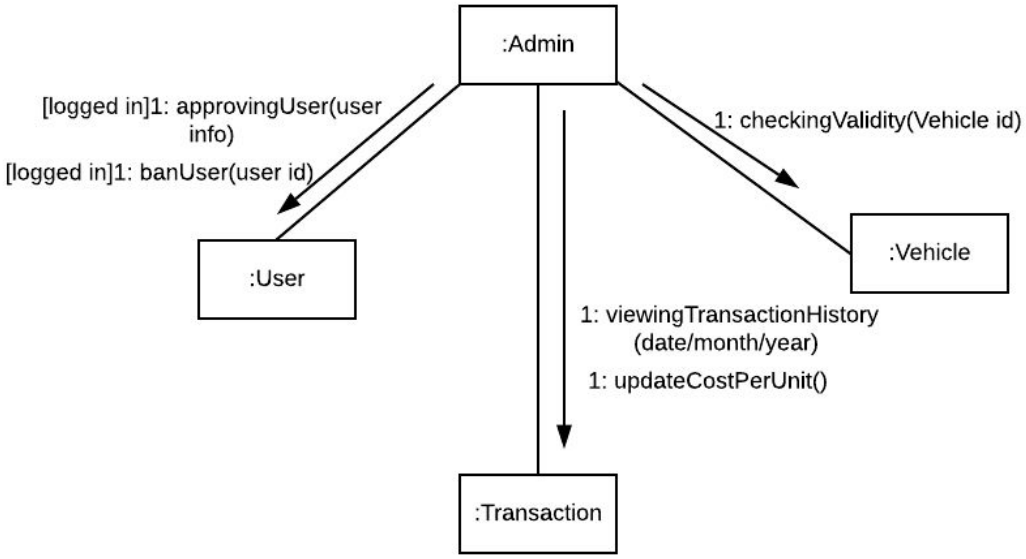


Figure 14: Collaboration Diagram of Admin, User, Vehicle & Transaction

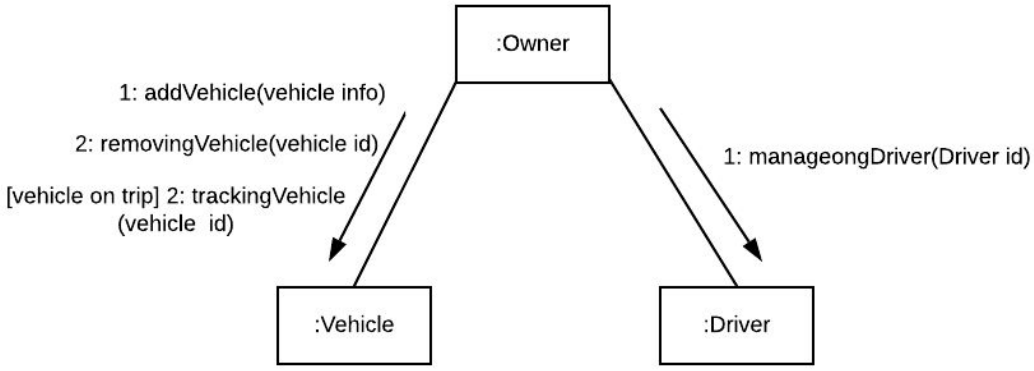


Figure 15: Collaboration Diagram of Owner, Vehicle & Driver

2.4 Describe Processing Flow

2.4.1 updateProfile() [Class: User]

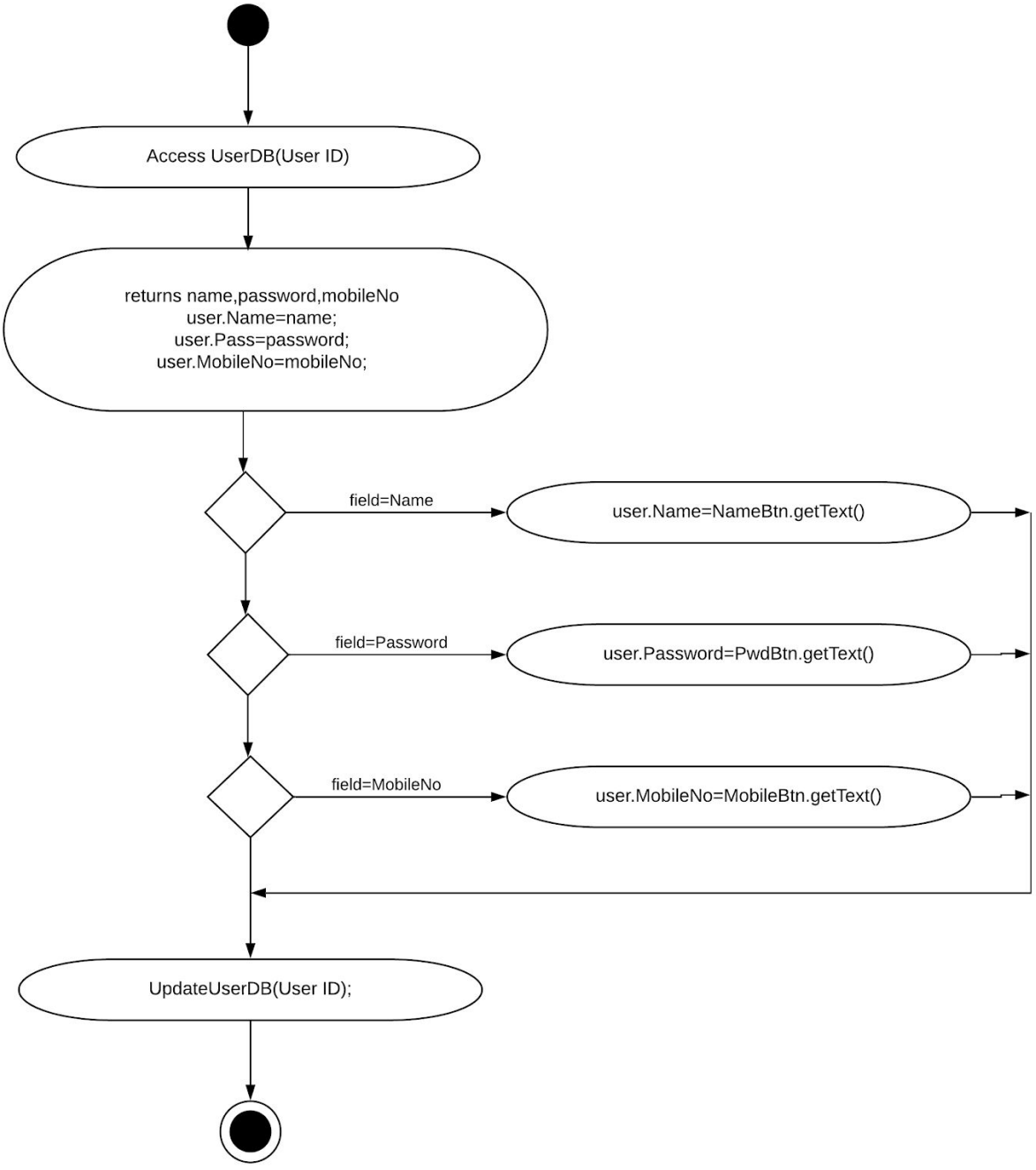


Figure 16: Processing Flow of UpdateProfile() method

2.4.2 addNewVehicle() [Class: Owner]

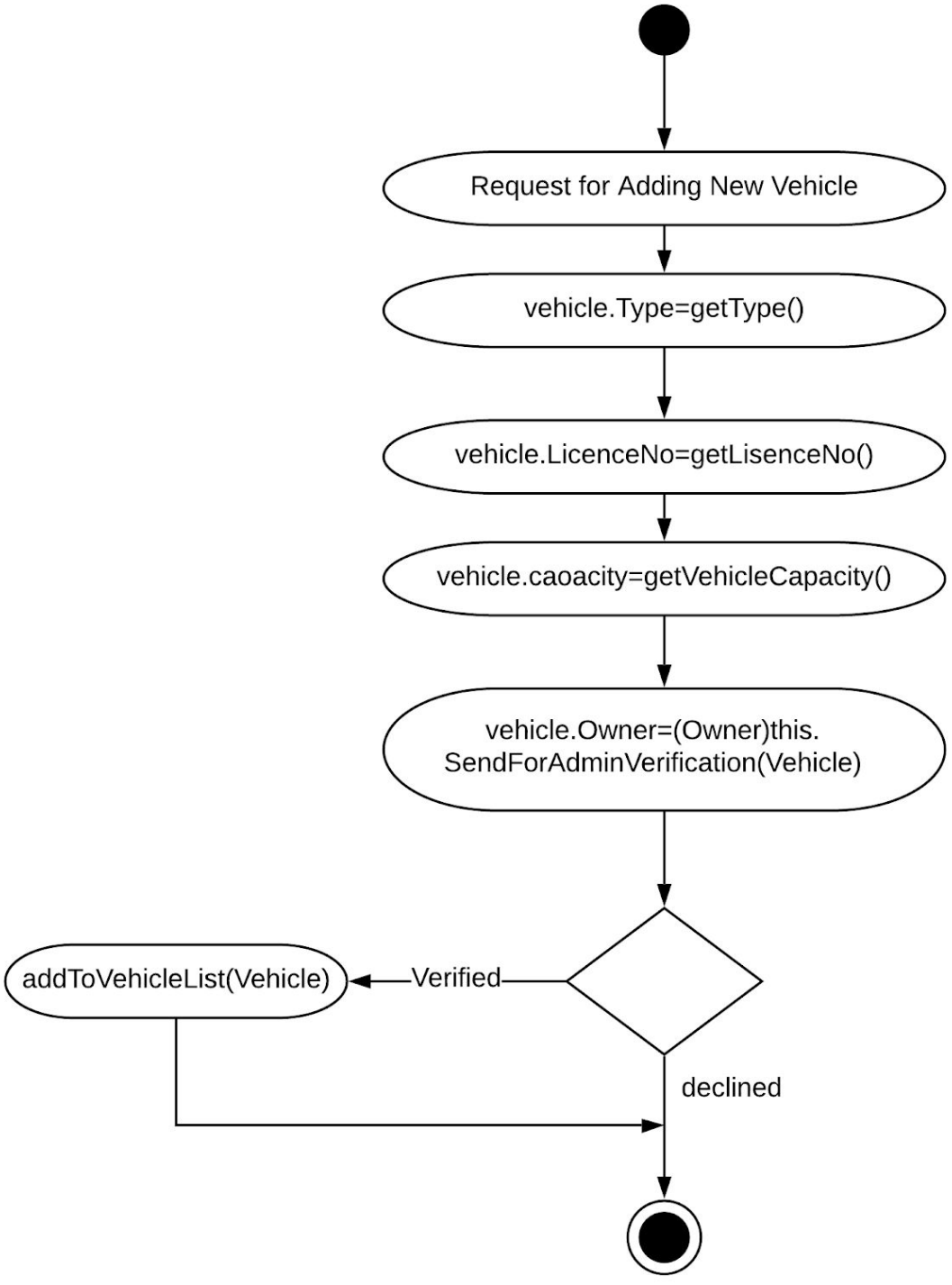


Figure 17: Processing Flow of addNewVehicle() method

2.4.3 bookTrip() [Class: Client]

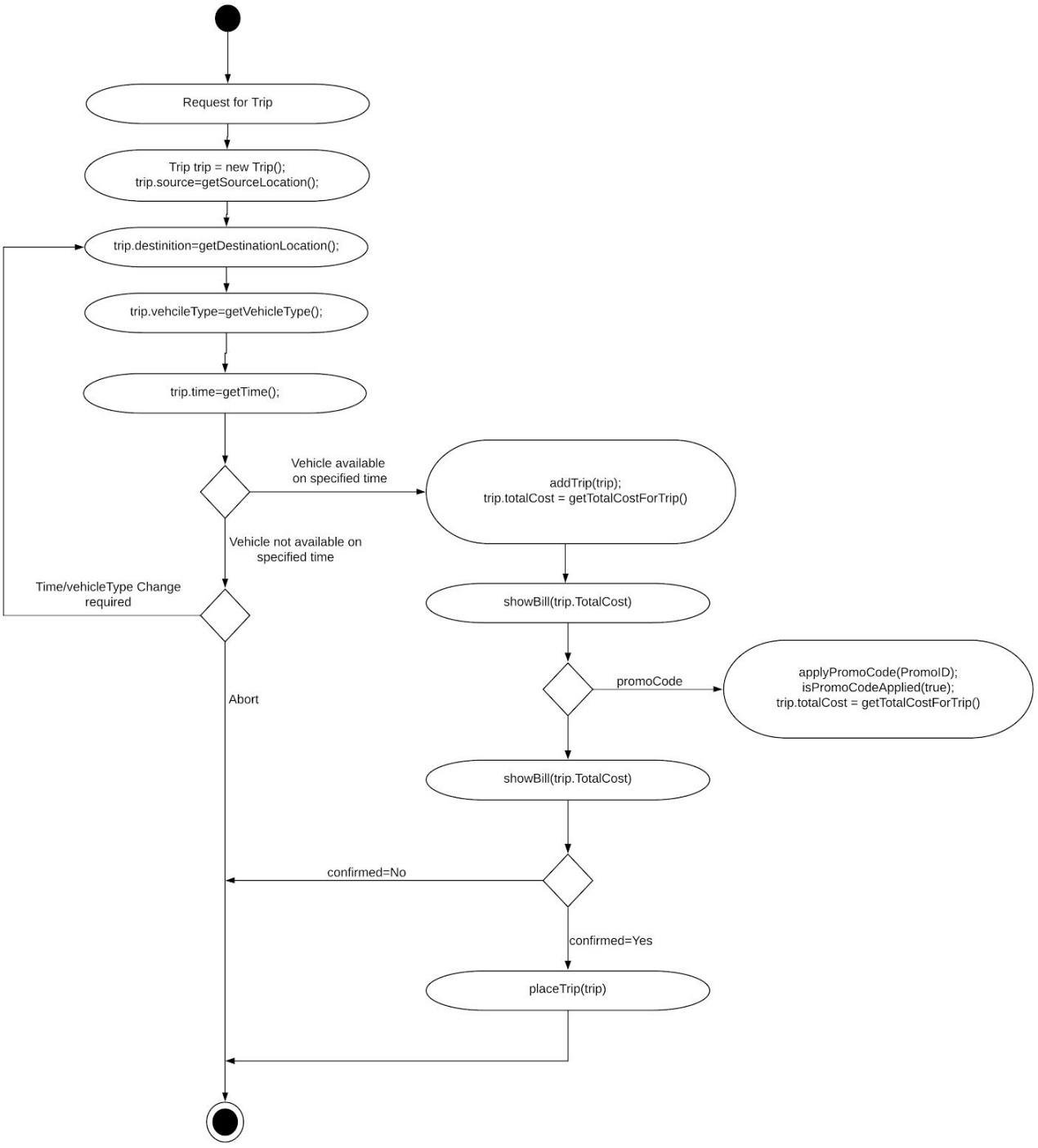


Figure 18: Processing Flow of bookTrip() method

2.4.5 calculateCost() [Class: Trip]

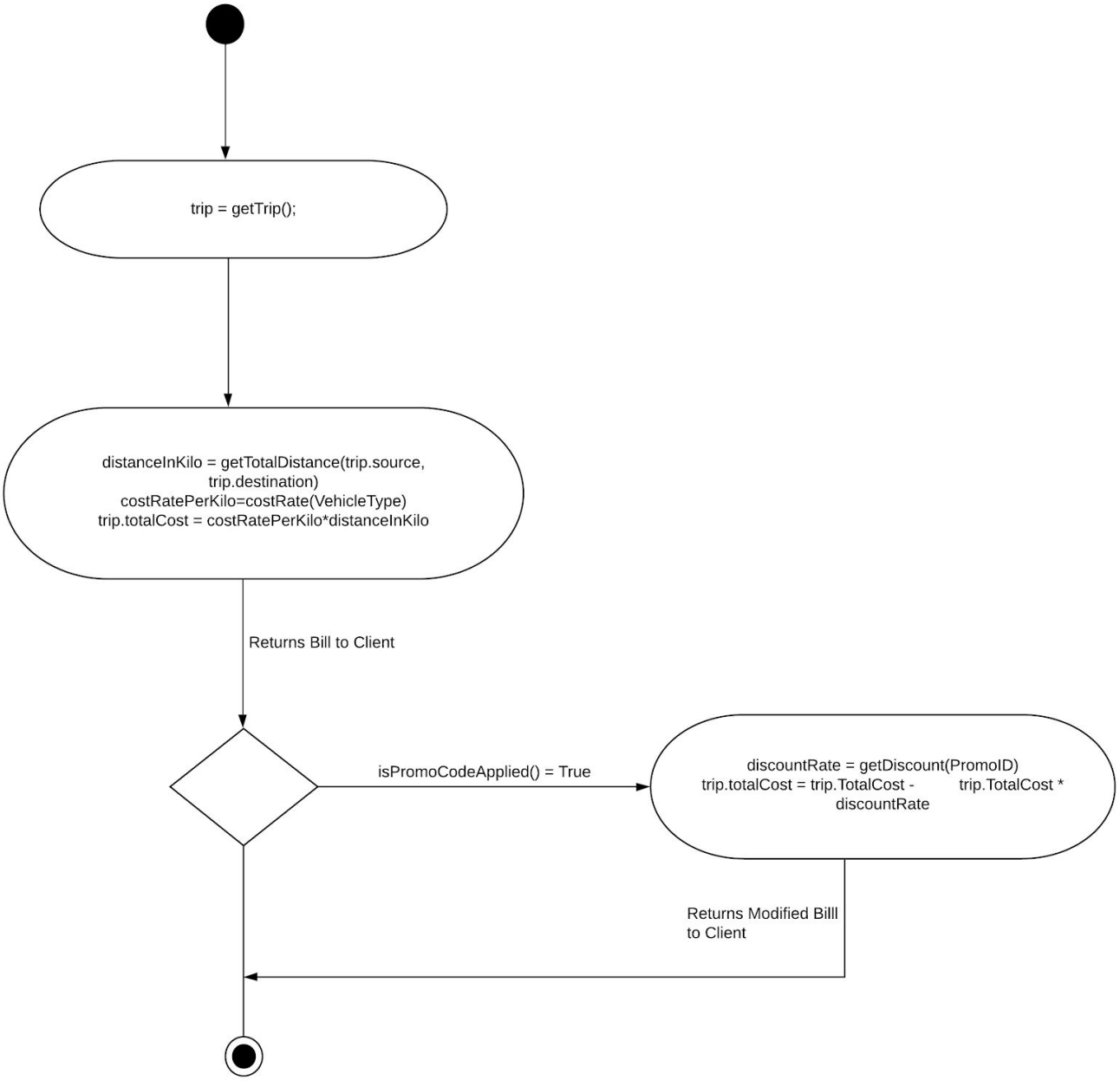


Figure 19: Processing Flow of calculateCost() method

2.4.6 payDigitally() [Class: Transaction]

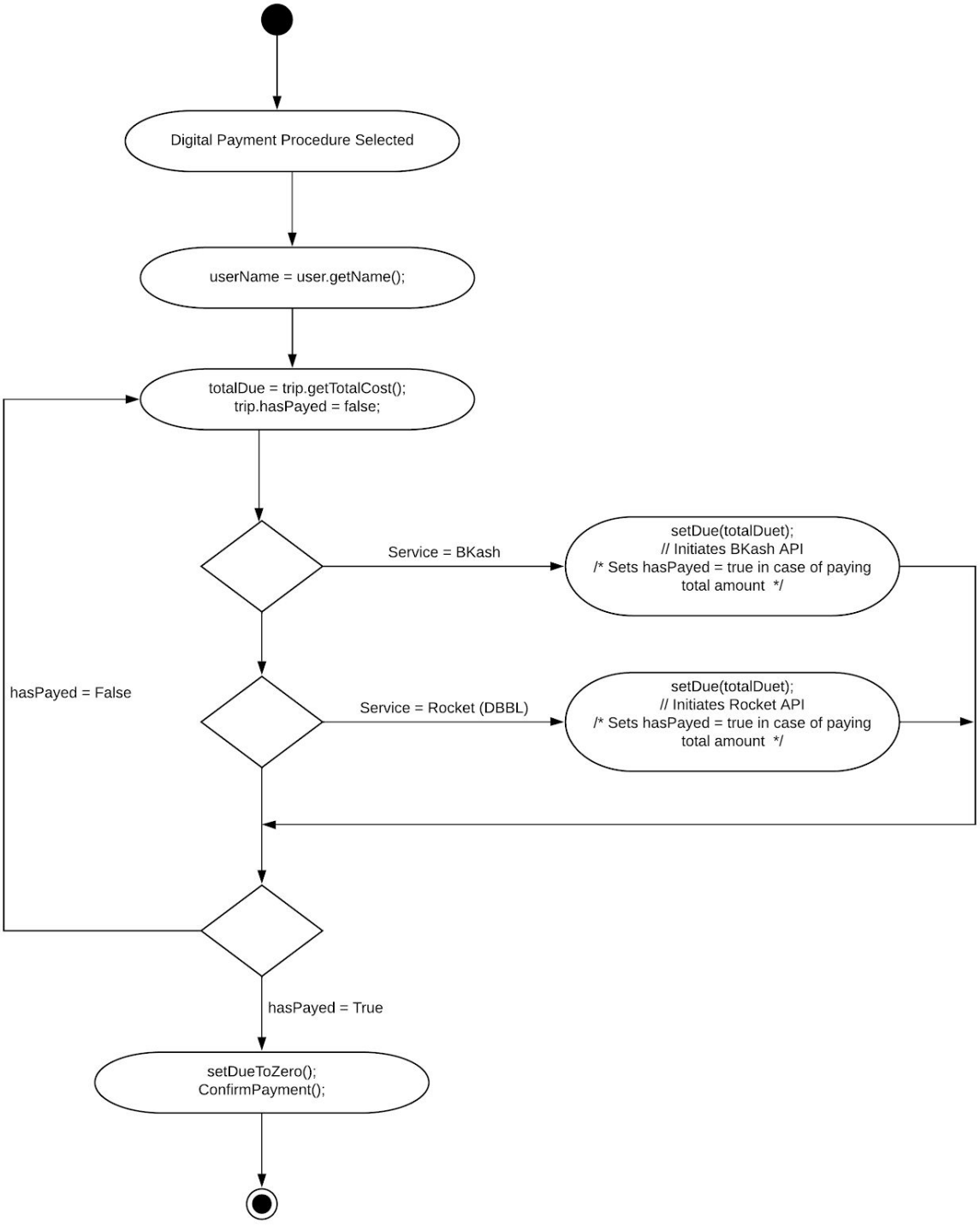


Figure 20: Processing Flow of payDigitally() method

2.5 Statechart Diagram

2.5.1 Client

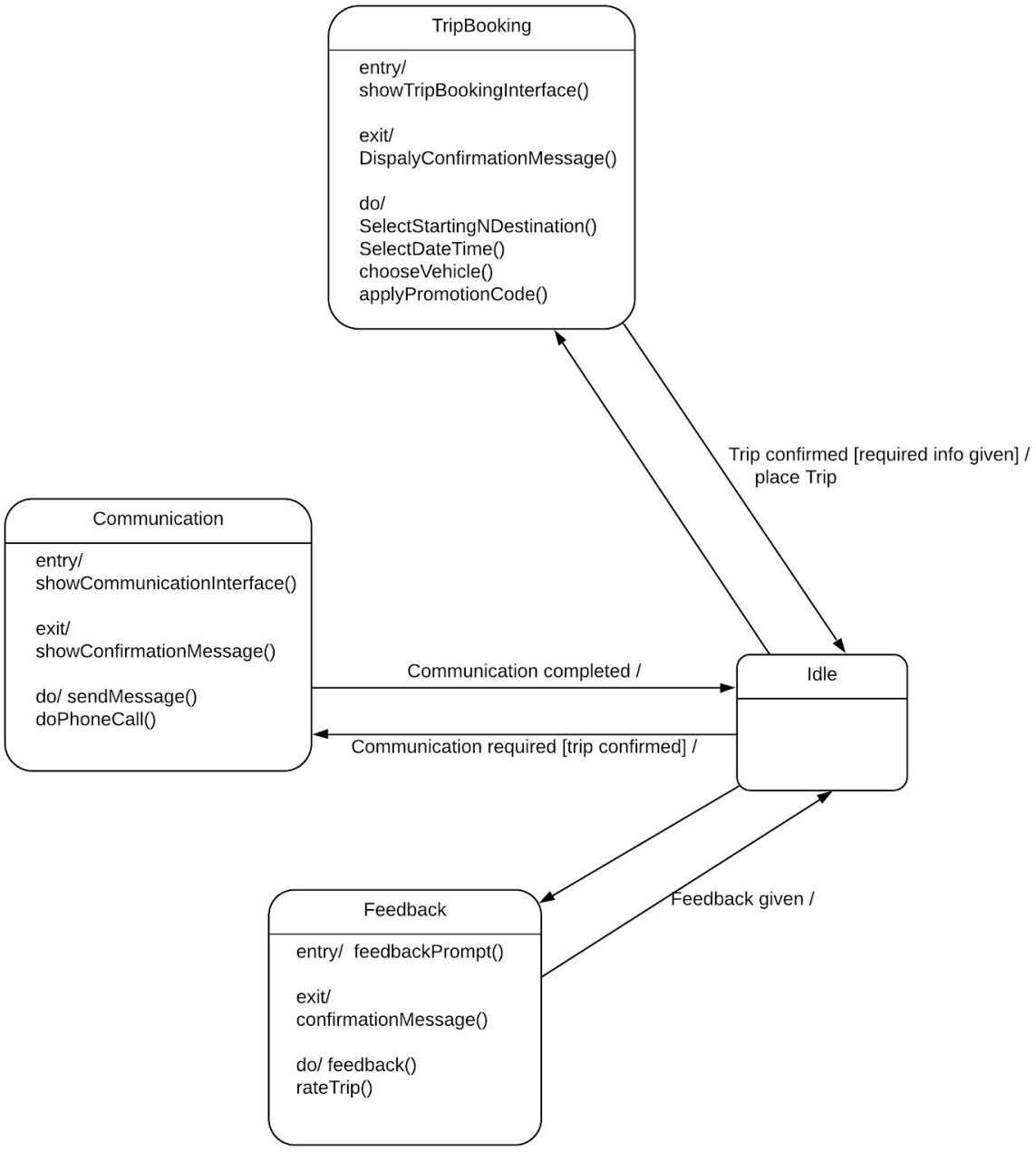


Figure 21: State chart of Client class

2.5.2 Owner

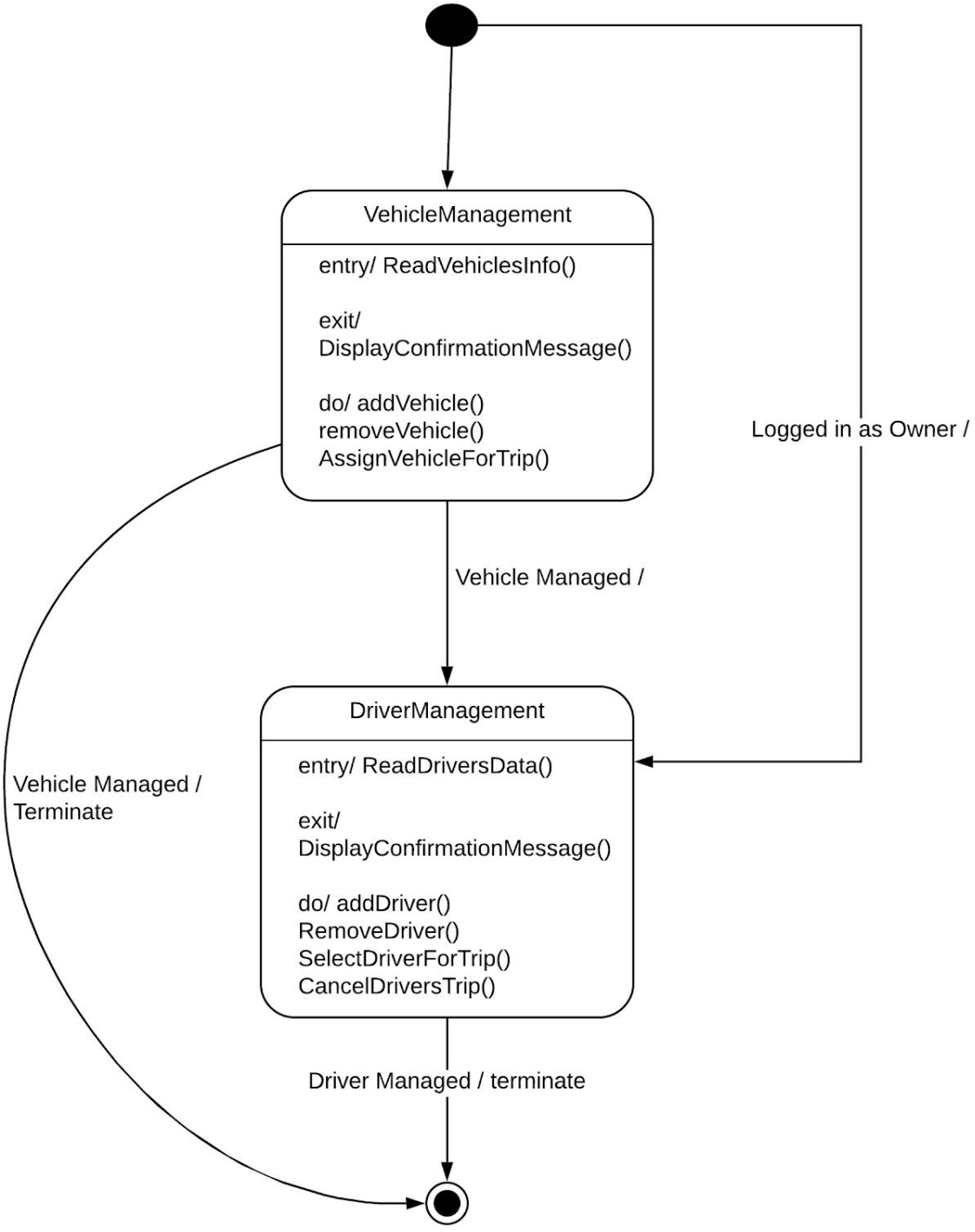


Figure 22: State chart of Owner class

2.5.3 User

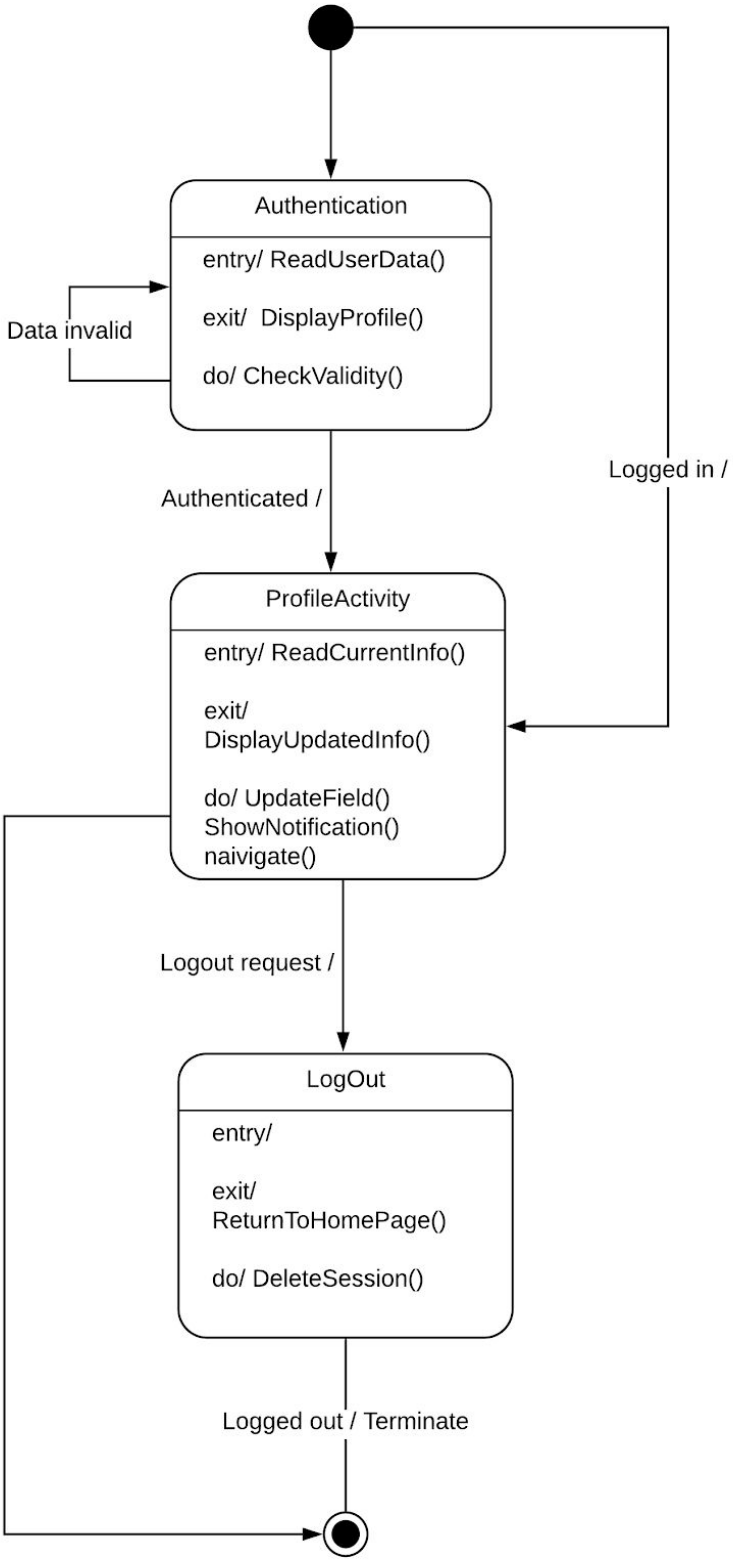


Figure 23: State chart of User class

2.5.4 Admin

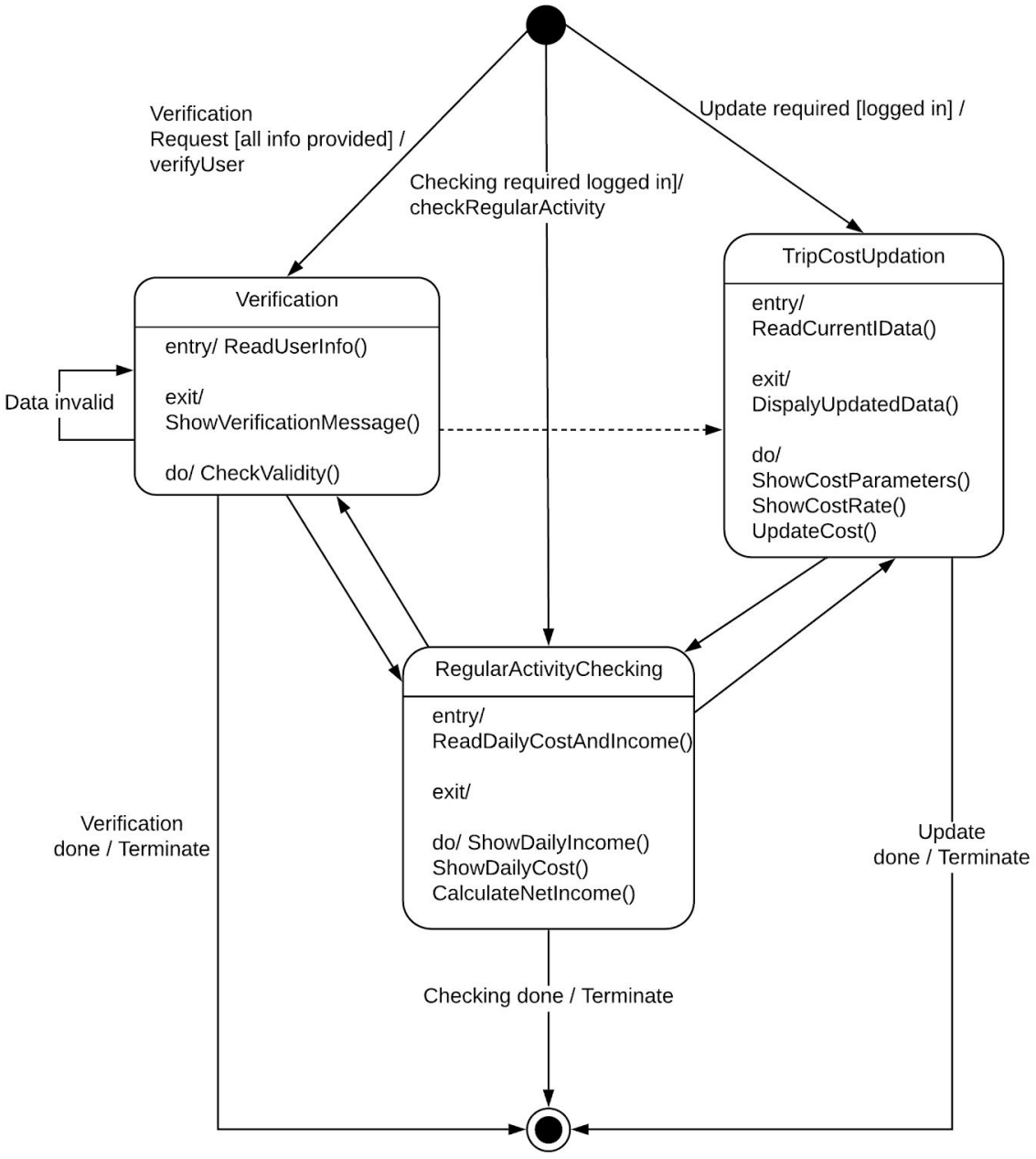


Figure 24: State chart of Admin class

2.5.5 Trip

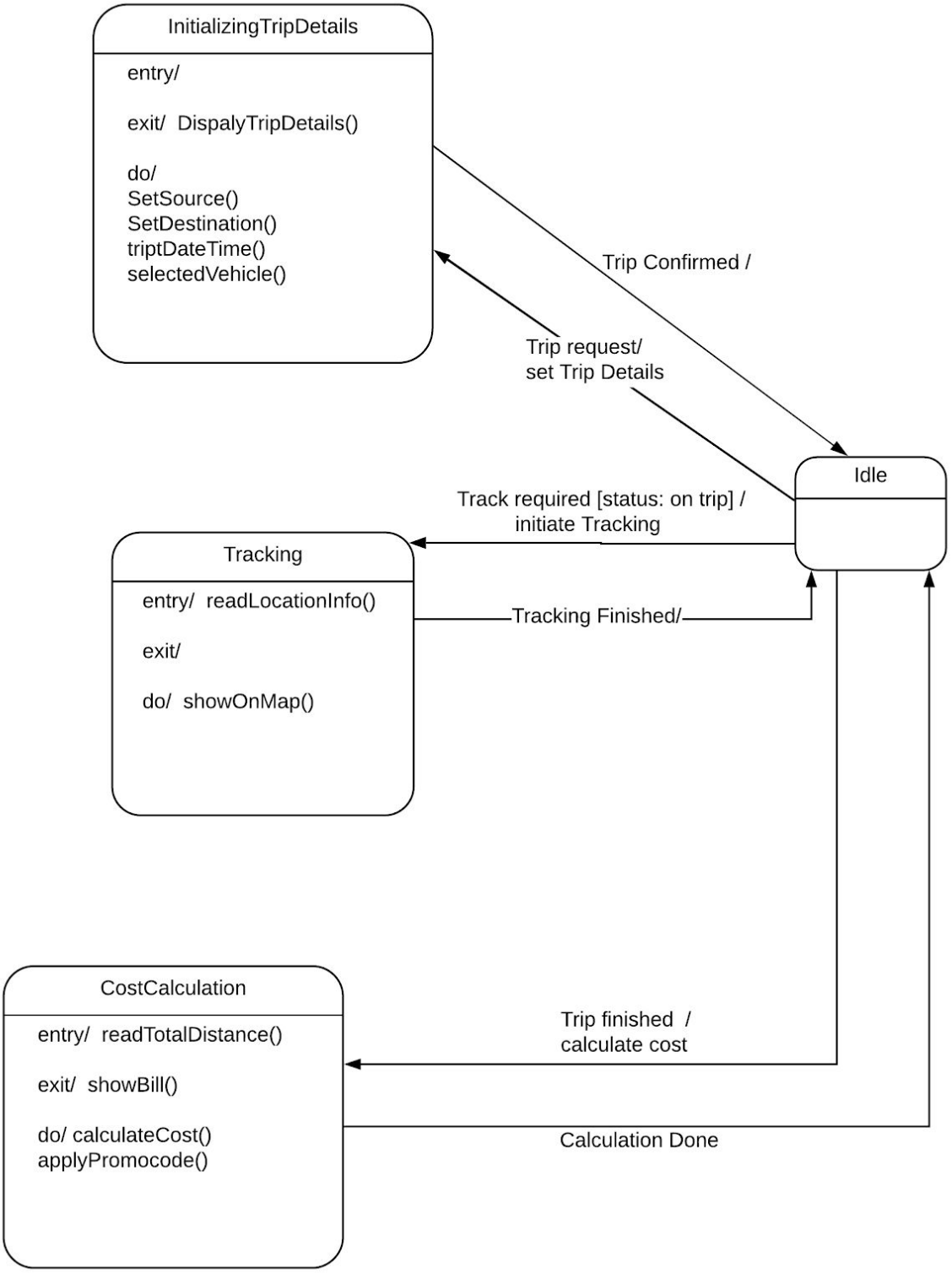


Figure 25: State chart of Trip class

2.5.6 Transaction

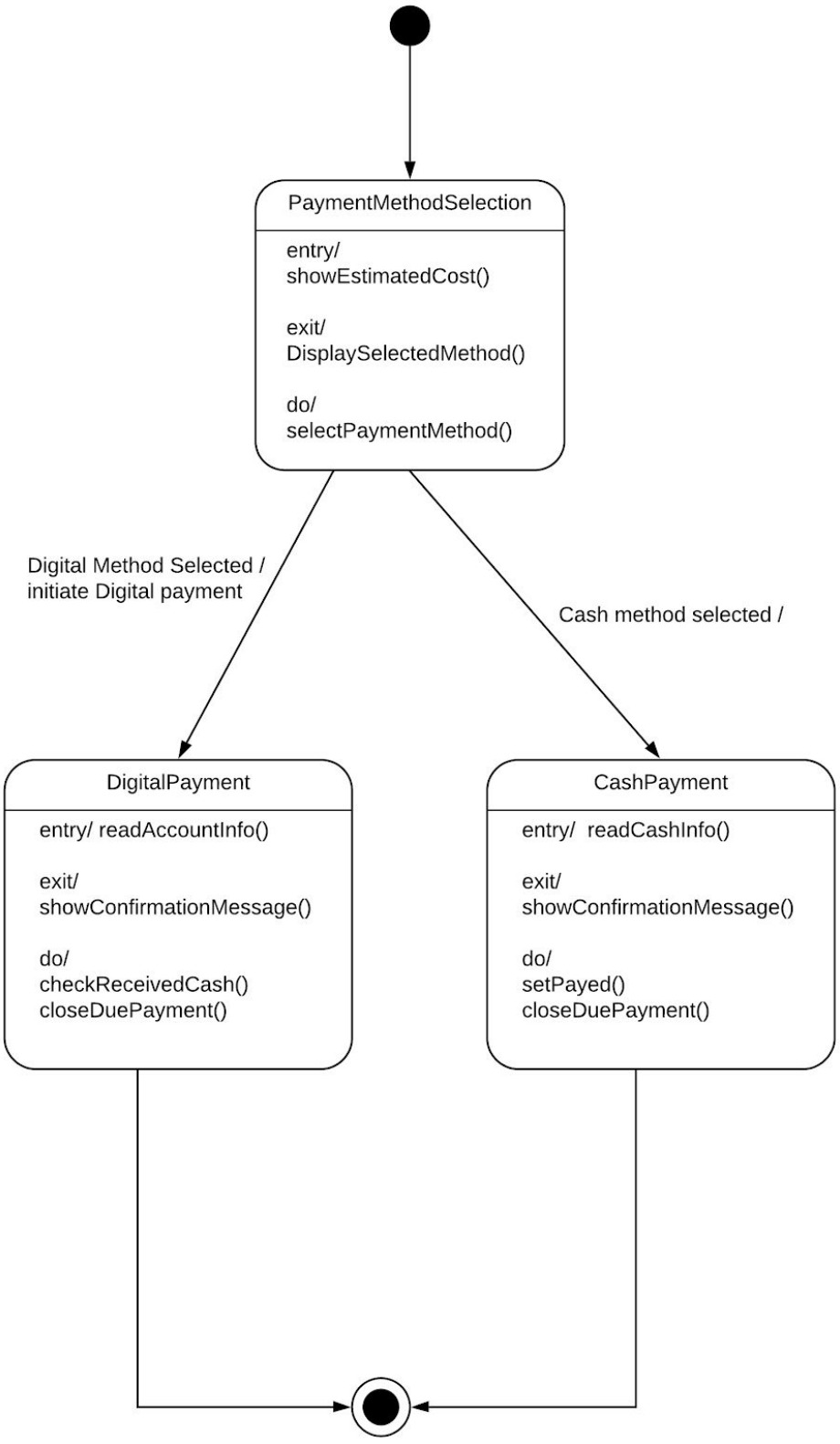


Figure 26: State chart of Transaction class

2.6 Deployment Diagram

Elaborating deployment diagrams provide additional implementation details. Deployment diagrams are used as part of architectural design and are represented in descriptor form. In this form, major system functions (often represented as subsystems) are represented within the context of the computing environment that will house them.

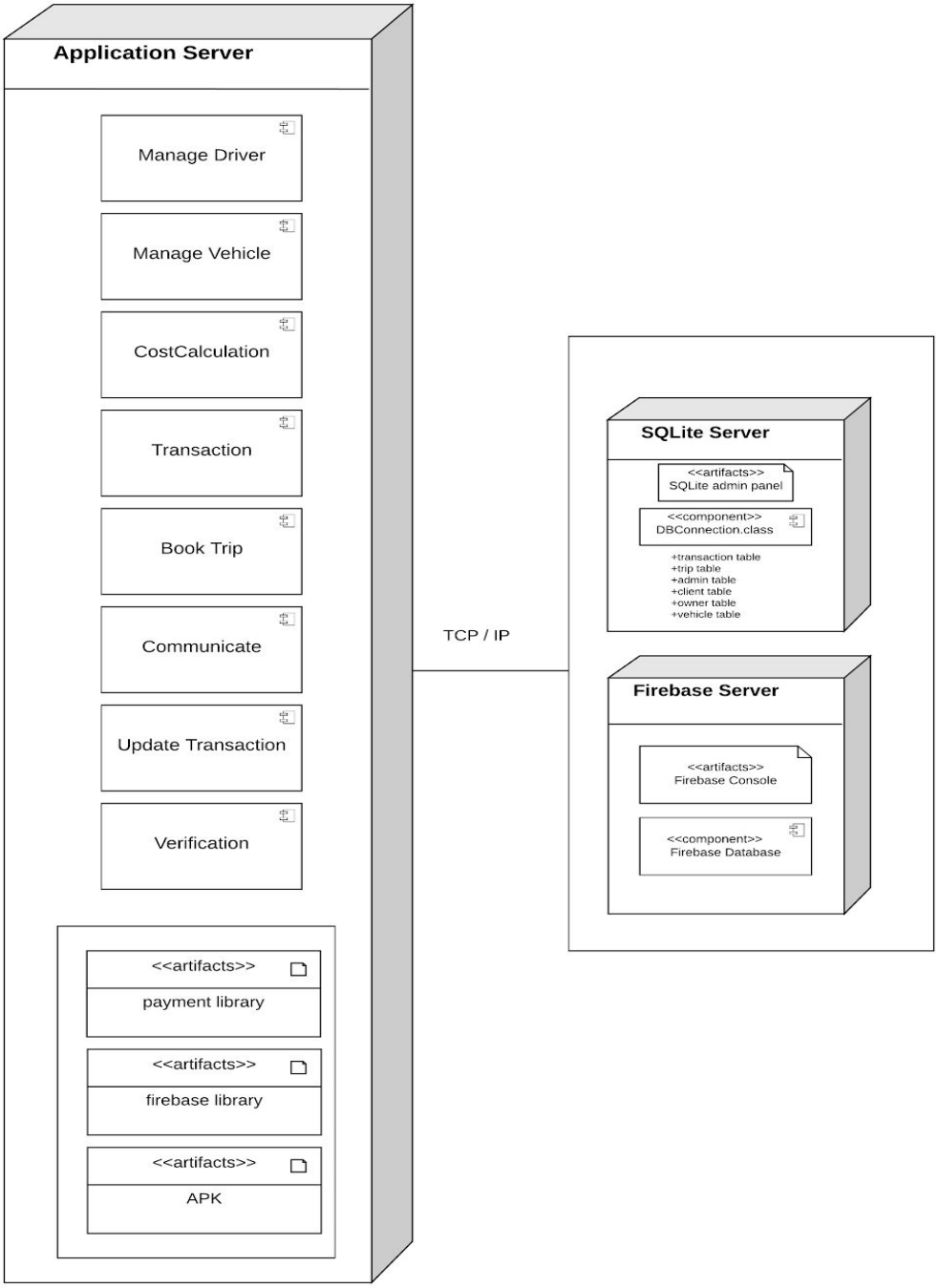


Figure 27: Elaborated Deployment of VRMS

Chapter Three: User Interface Design

User Interface Design is the design of websites, computers, appliances, machines, mobile communication devices, and software applications with the focus on the user's experience and interaction.

The Golden Rules:

Three golden rules for interface design are:

1. Place the user in control.

2. Reduce the user's memory load.

3. Make the interface consistent.

These golden rules actually form the basis for a set of user interface design principles

that guide this important aspect of software design.

3.1 Interface Analysis

We divide interface analysis into the following part:

1. User analysis
2. Task analysis

3.1.1 User Analysis

There are two steps in this part-

1. Identify user
2. Know user

3.1.1.1 Identify User

From the requirement and specification document, we have found three types of user-

1. Admin
2. Client
3. Owner

3.1.1.2 Know User

Admin

Age: 25-60

Skills: Above Average

Domain expert: Yes

Application expert: Yes

Frequency of use: Frequently

Consequence of a mistake: Low

General computer experience: Yes

Client

Age: 20-60

Skills: Below Average

Domain expert: Yes

Application expert: No

Frequency of use: Occasionally

Consequence of a mistake: High

General computer experience: No

Owner

Age: 30-60

Skills: Average

Domain expert: Yes

Application expert: No

Frequency of use: Occasionally

Consequence of a mistake: Medium

General computer experience: No

3.2 Task Analysis

Admin

1. Verify User

Process Goal:

- Checking validity for Account creation of Owner, Client

Pre-condition:

- Logged in as admin.

Sub-tasks:

- Accept request
- Decline request
- Ban user

2. Validate Vehicle

Process Goal:

- Checking validity of Vehicle

Pre-condition:

- Logged in as admin.

Sub-tasks:

- Check license
- Check fitness Details
- Accept vehicle
- Reject vehicle

3. Update Cost Rate

Process Goal:

- Updating Cost Rate

Pre-condition:

- Logged in as admin.

Sub-tasks:

- Update cost parameters
- Provide offer
- Change unit cost rate

4. View Transaction details

Process Goal:

- Viewing transaction history

Pre-condition:

- Logged in as admin.

Sub-tasks:

- Check regular transaction
- View profit
- View regular expenses

Client

1. Authentication

Process Goal:

- Registration. profile authorization

Pre-condition:

- Client must be at least 16 years old

Sub-tasks:

- Registration
- Sign in
- Sign Out

2. Update Profile

Process Goal:

- Change any field of profile information

Pre-condition:

- Logged in as client.

Sub-tasks:

- Change field data
- Update profile picture

3. Book Trip

Process Goal:

- Booking vehicle for a trip

Pre-condition:

- Logged in as a Client.

Sub-tasks:

- Request for a Trip
- Select source and destination
- Confirm trip
- Cancel trip
- Search vehicle
- Apply promotional code
- Rate a trip

4. View vehicle position on trip

Process Goal:

- To track the vehicle on trip

Pre-condition:

- Logged in as a client
- Requested trip must be on the way

Sub-tasks:

- Request tracking
- View route
- Real-time position of vehicle on the route

5. Communicate

Process Goal:

- To communicate with other users and give feedback

Pre-condition:

- Logged in as a client
- User with whom to communicate must be online

Sub-tasks:

- Send message
- Give feedback about trip
- Give feedback about driver
- Get notification

Owner

1. Manage Driver

Process Goal:

- To manage driver activities

Pre-condition:

- Logged in as an owner

Sub-tasks:

- Add driver
- Remove driver
- View driver details

2. Manage Vehicle

Process Goal:

- To manage own vehicles

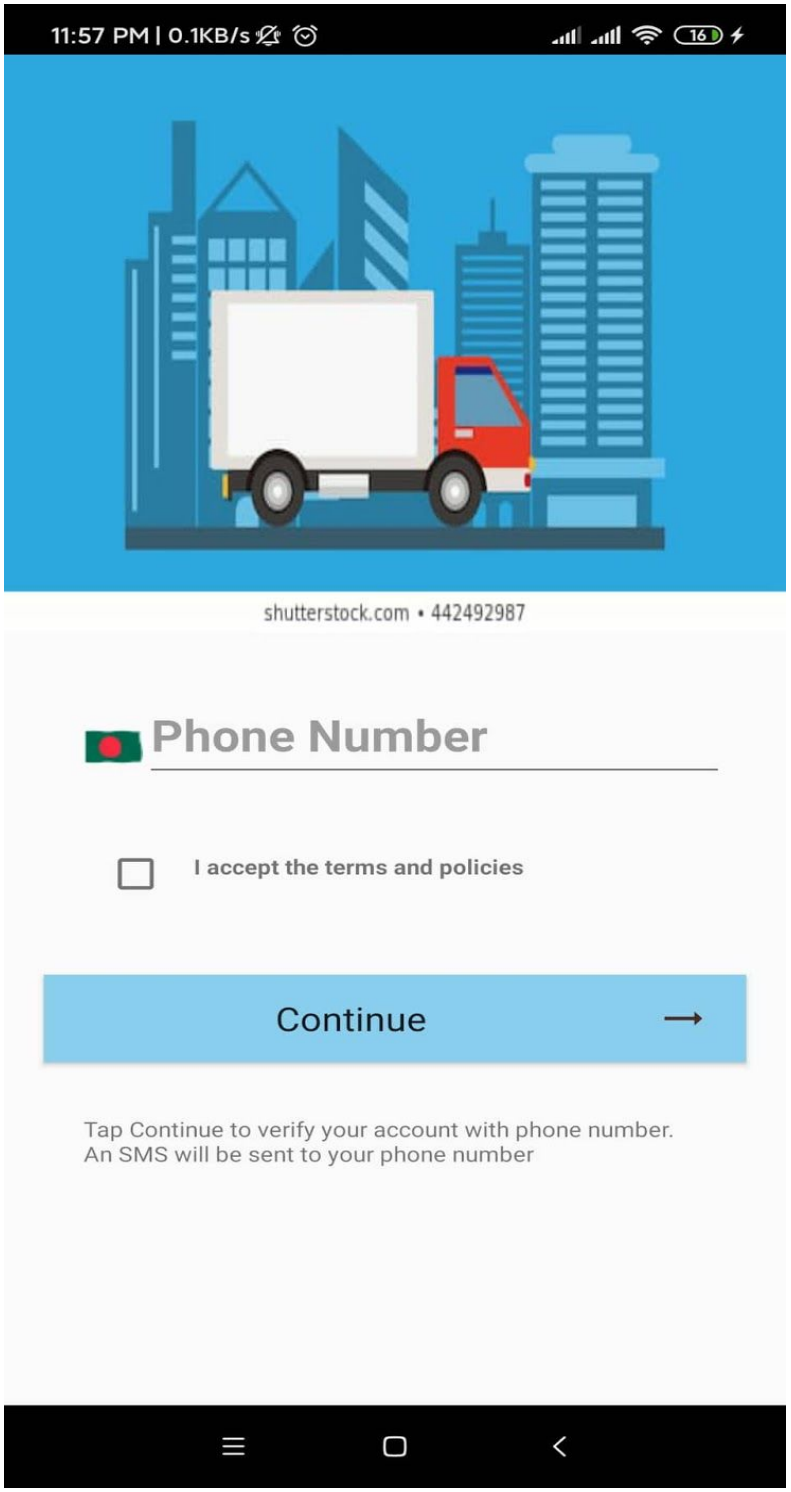
Pre-condition:

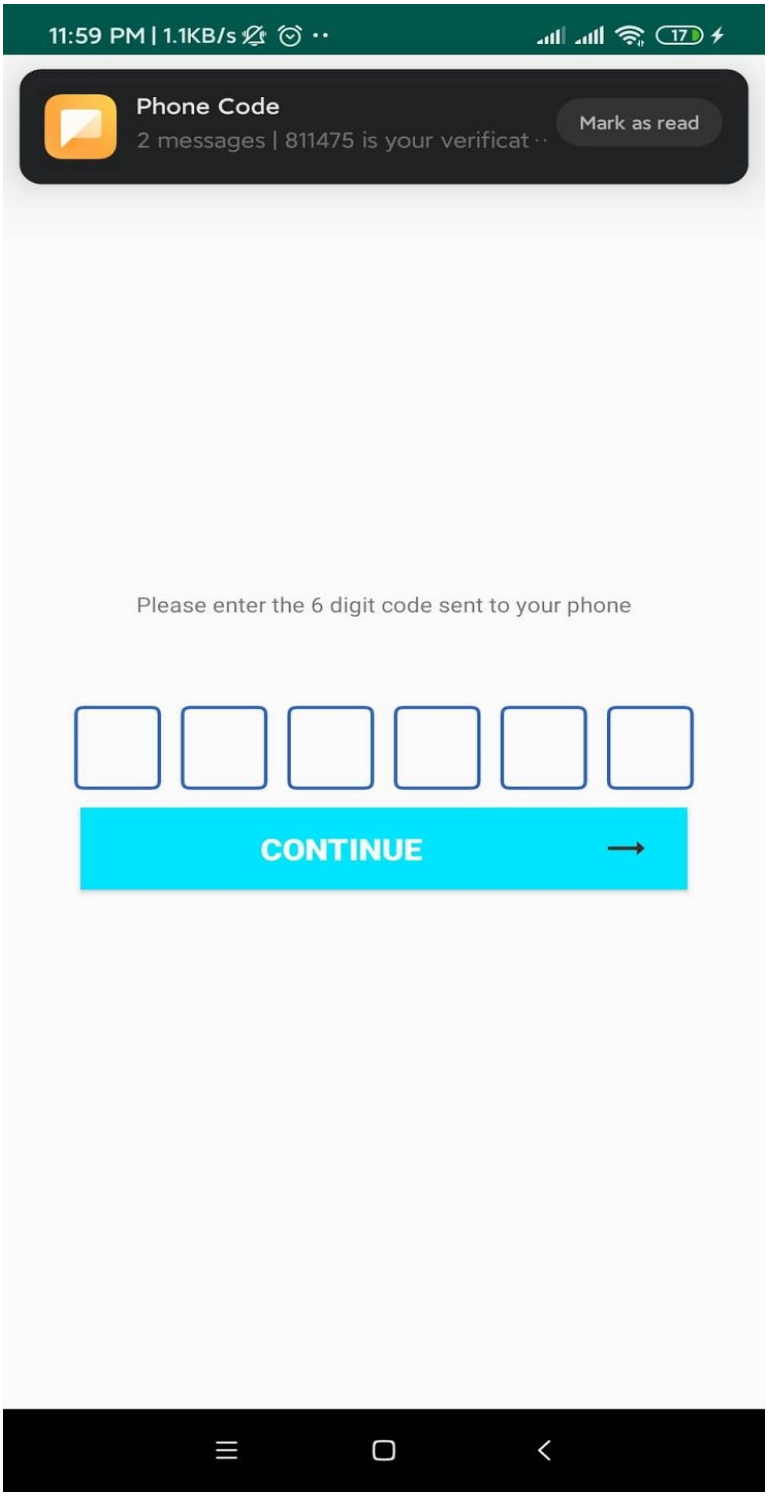
- Logged in as Owner

Sub-tasks:

- Add vehicle
- Remove vehicle
- Update vehicle information
- Track vehicle
- Permit vehicle for trip

3.3 Interface Design Steps of VRMS

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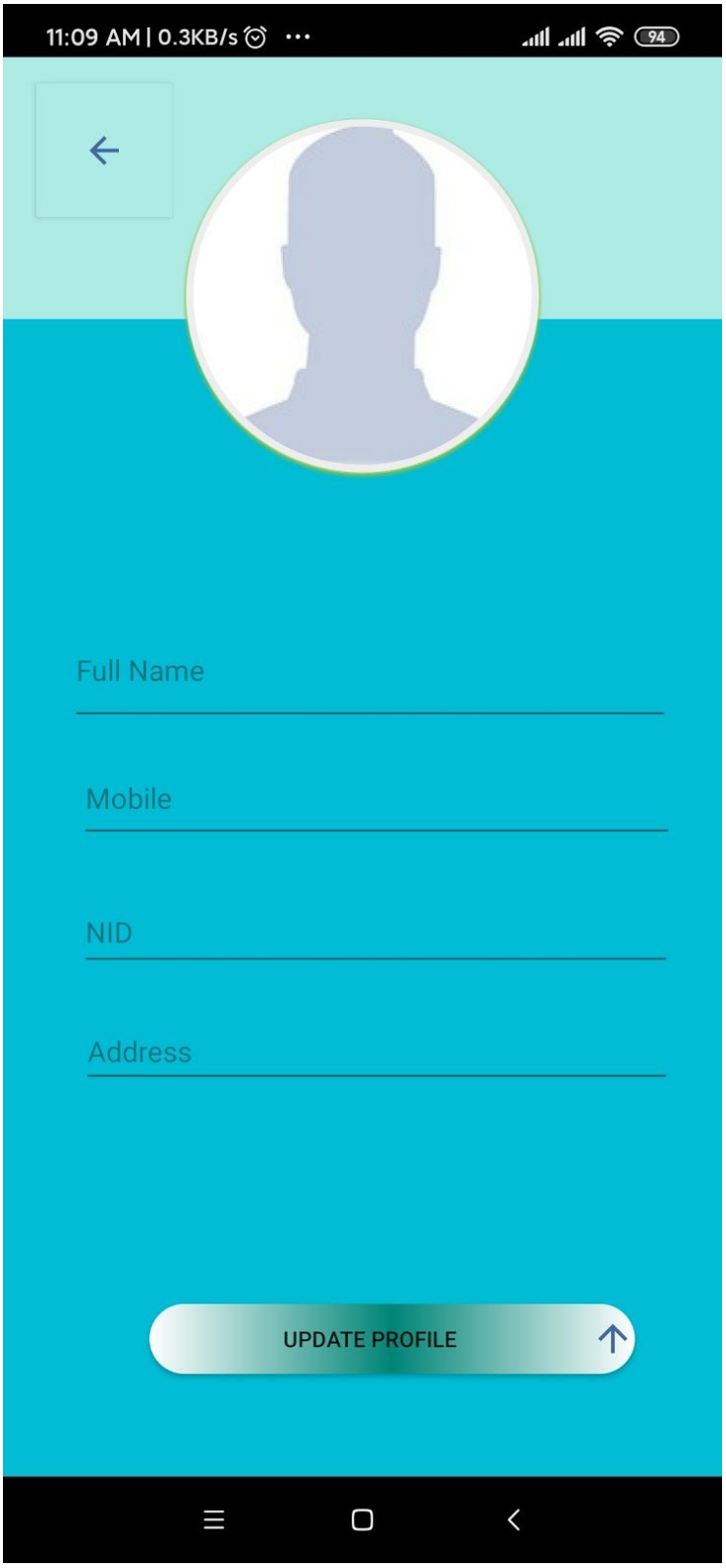
Phone Code
2 messages | 811475 is your verificat ··
Mark as read
Please enter the 6 digit code sent to your phone
CONTINUE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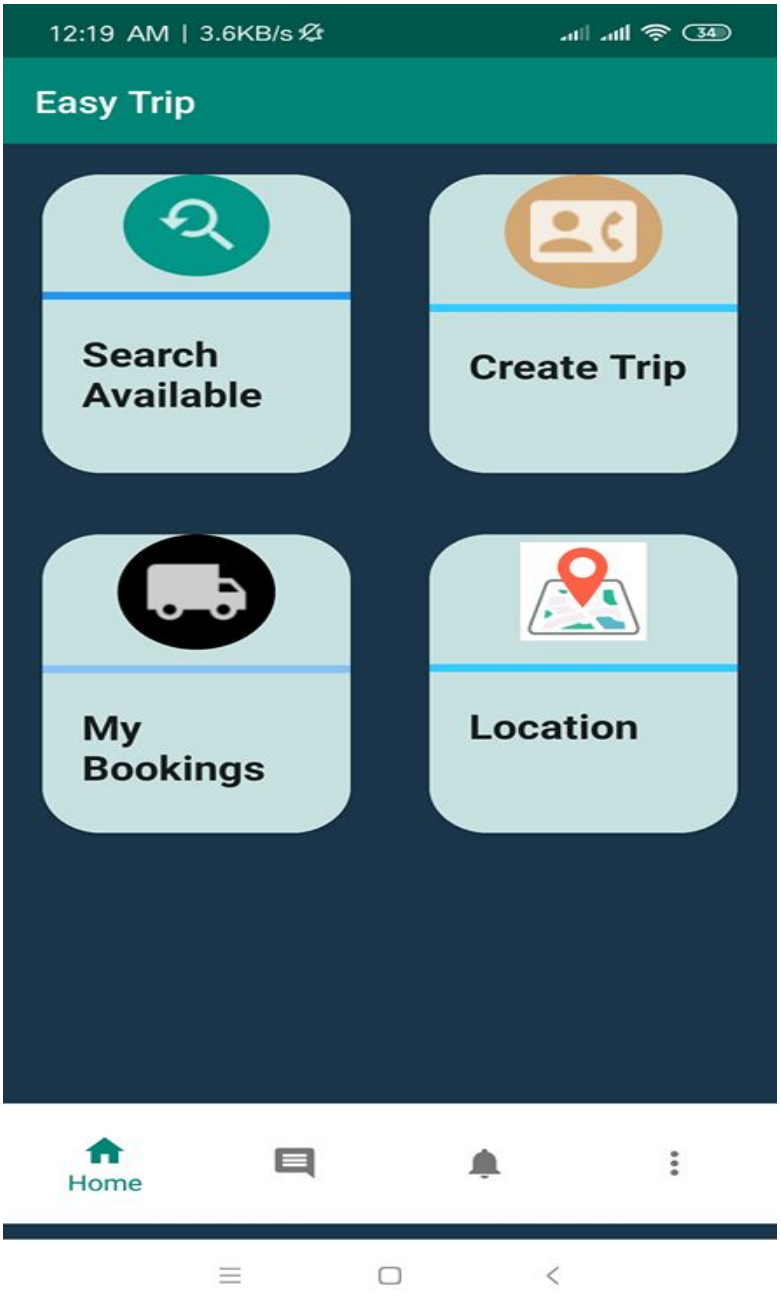
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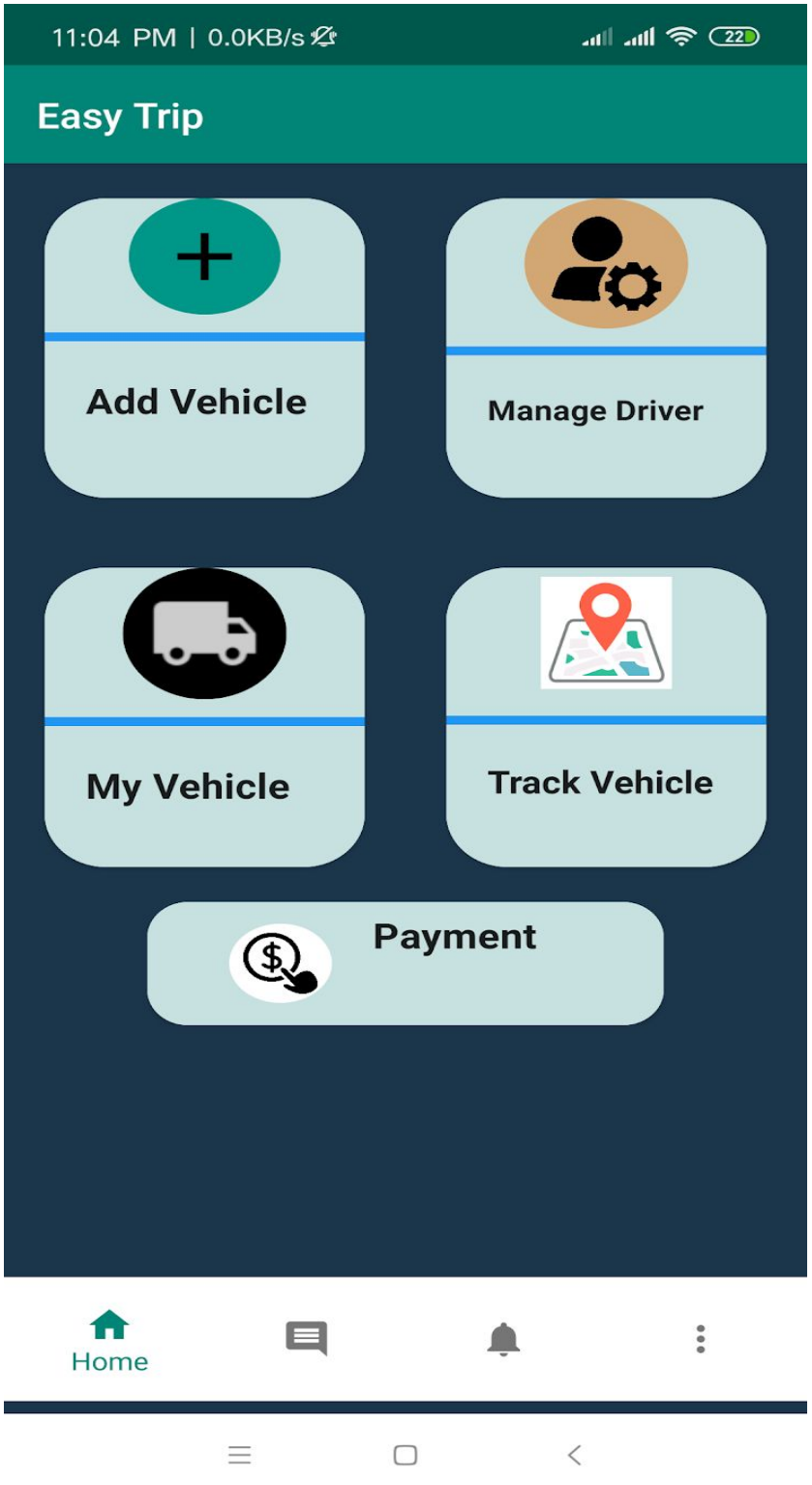
Easy Trip
Search Available
Create Trip
My Bookings
Location
Home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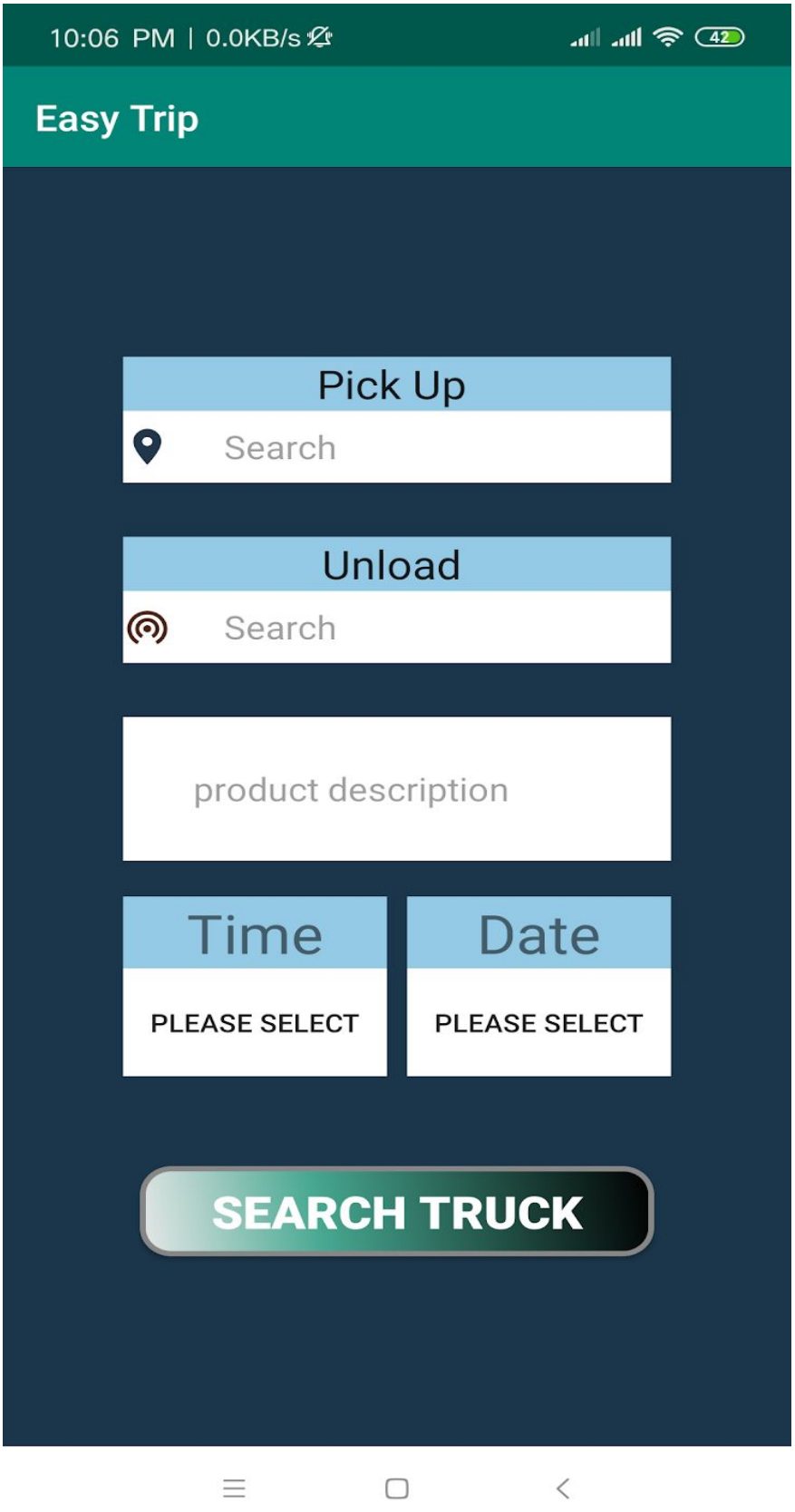
Easy Trip
Add Vehicle
Manage Driver
My Vehicle
Track Vehicle
Payment
Home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Easy Trip
Pick Up
Search
Unload
Search
product description
Time
PLEASE SELECT
Date
PLEASE SELECT
SEARCH TRUCK

Select Vehicles

Fare: 6760 Tk.

VN: #CHI-024686

capacity: 10 ton

Weight Capacity: 100 CBM

Type: mini truck

Fare: 16224 Tk.

VN: #DHA-016411

capacity: 25 ton

Weight Capacity: 220 CBM

Type: covered truck

Fare: 13520 Tk.

VN: #DHA-016422

capacity: 30 ton

Weight Capacity: 250 CBM

Type: opened truck

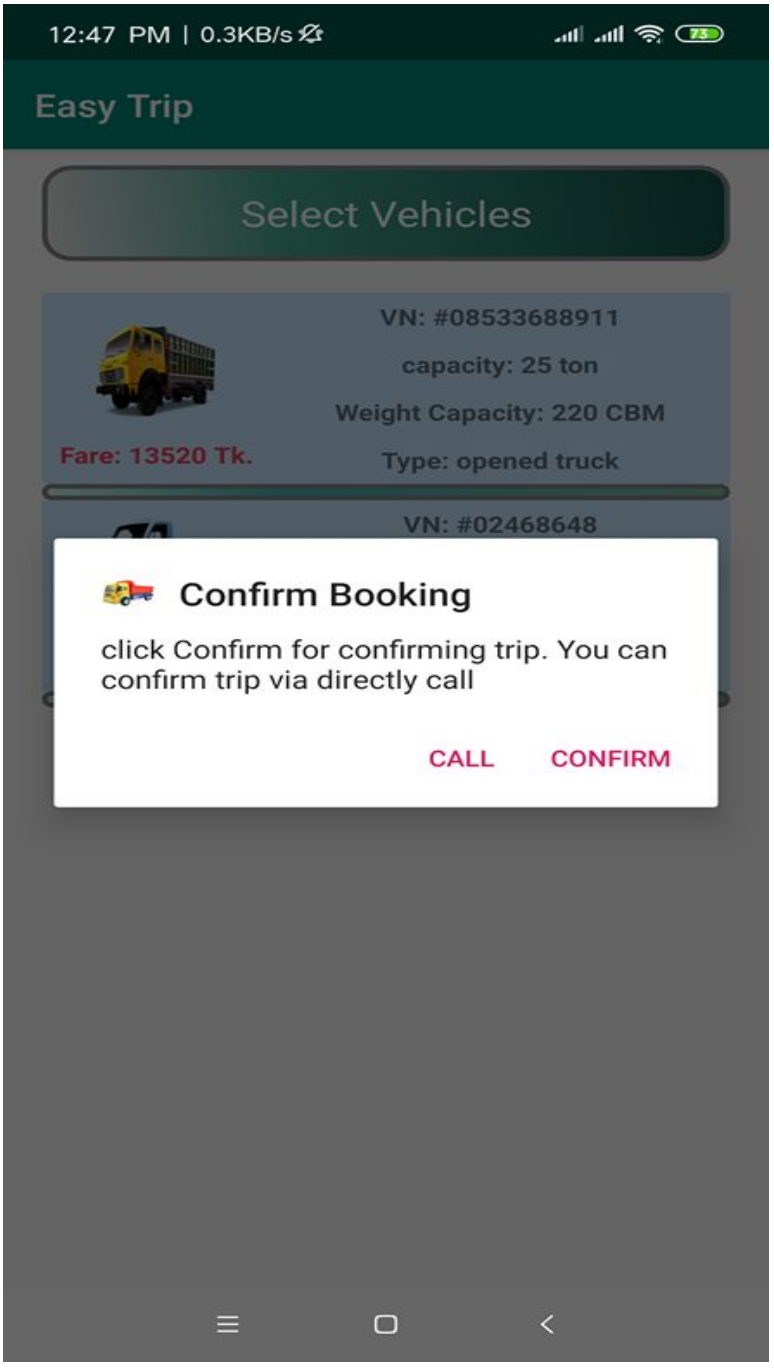
Fare: 6760 Tk.

VN: #RAN-016422

capacity: 10 ton

Weight Capacity: 100 CBM

Type: mini truck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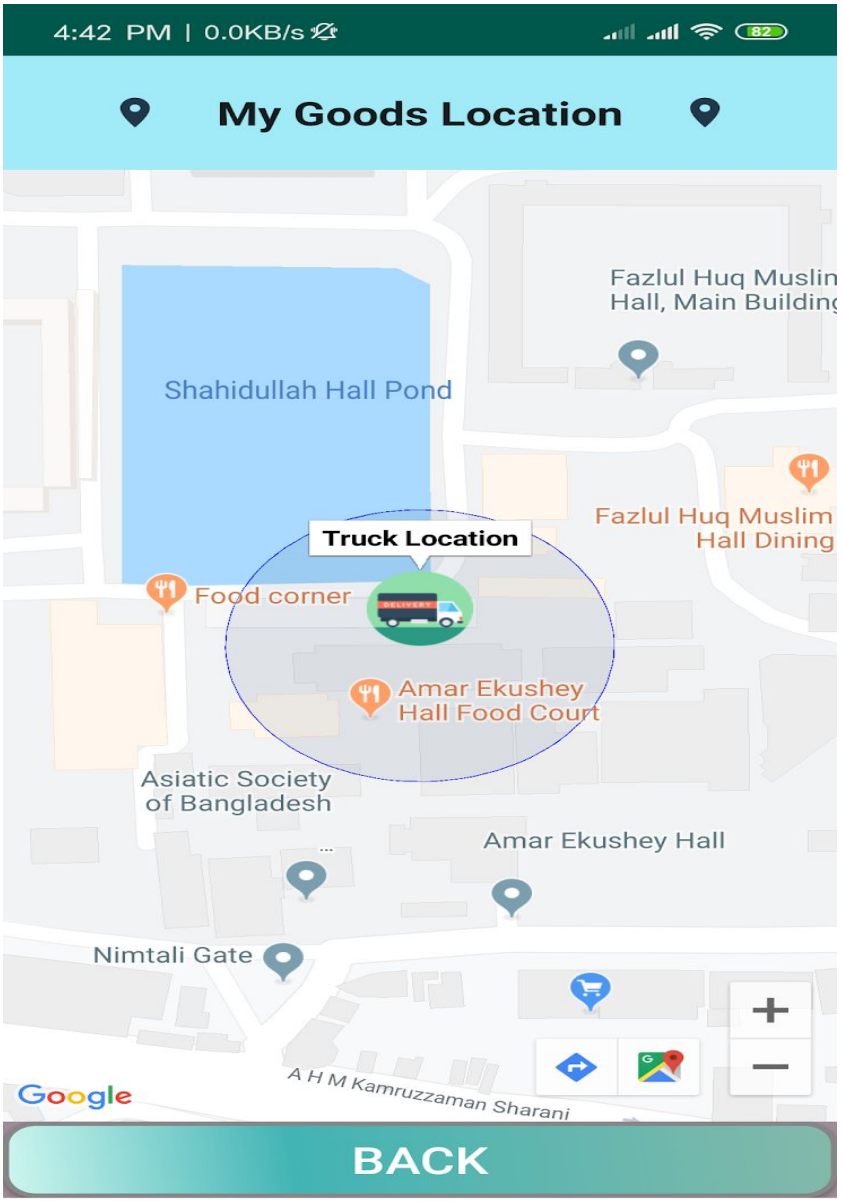
Easy Trip
Select Vehicles
VN: #08533688911
capacity: 25 ton
Weight Capacity: 220 CBM
Fare: 13520 Tk.
Type: opened truck
VN: #02468648
Confirm Booking
click Confirm for confirming trip. You can confirm trip via directly call
CALL
CONFIRM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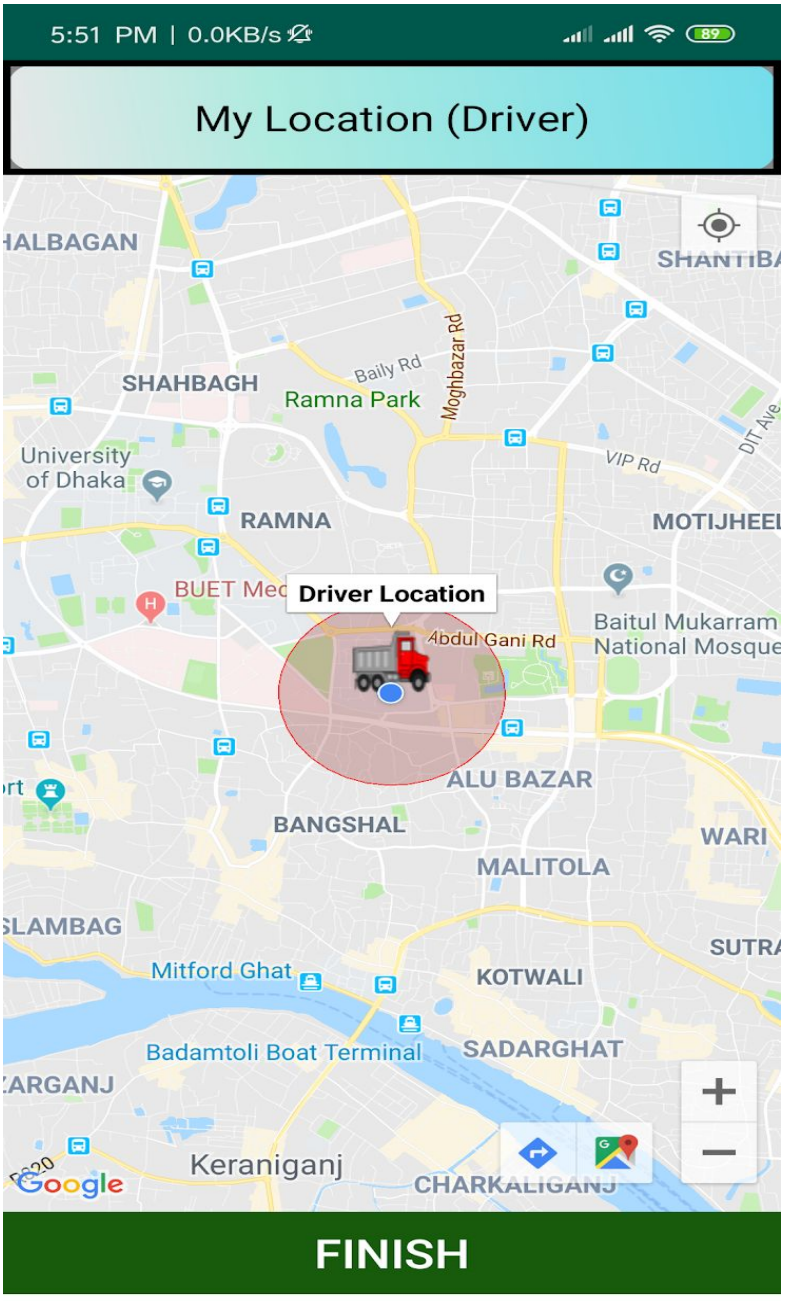
My Goods Location
Fazlul Huq Muslin Hall, Main Building
Shahidullah Hall Pond
Fazlul Huq Muslim Hall Dining
Truck Location
Food corner
Amar Ekushey Hall Food Court
Asiatic Society of Bangladesh
Amar Ekushey Hall
Nimtali Gate
A H M Kamruzzaman Sharani
Google
BACK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My Location (Driver)
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SHANTIBA
SHAHBAGH
Baily Rd
Ramna Park
Moghbazar Rd
University of Dhaka
VIP Rd
DIT Ave
RAMNA
MOTIJHEEL
BUET Med
Driver Location
Abdul Gani Rd
Baitul Mukarram National Mosque
ALU BAZAR
BANGSHAL
WARI
MALITOLA
SLAMBAG
SUTRA
Mitford Ghat
KOTWALI
Badamtoli Boat Terminal
SADARGHAT
ZARGANJ
Keraniganj
CHARKALIGANJ
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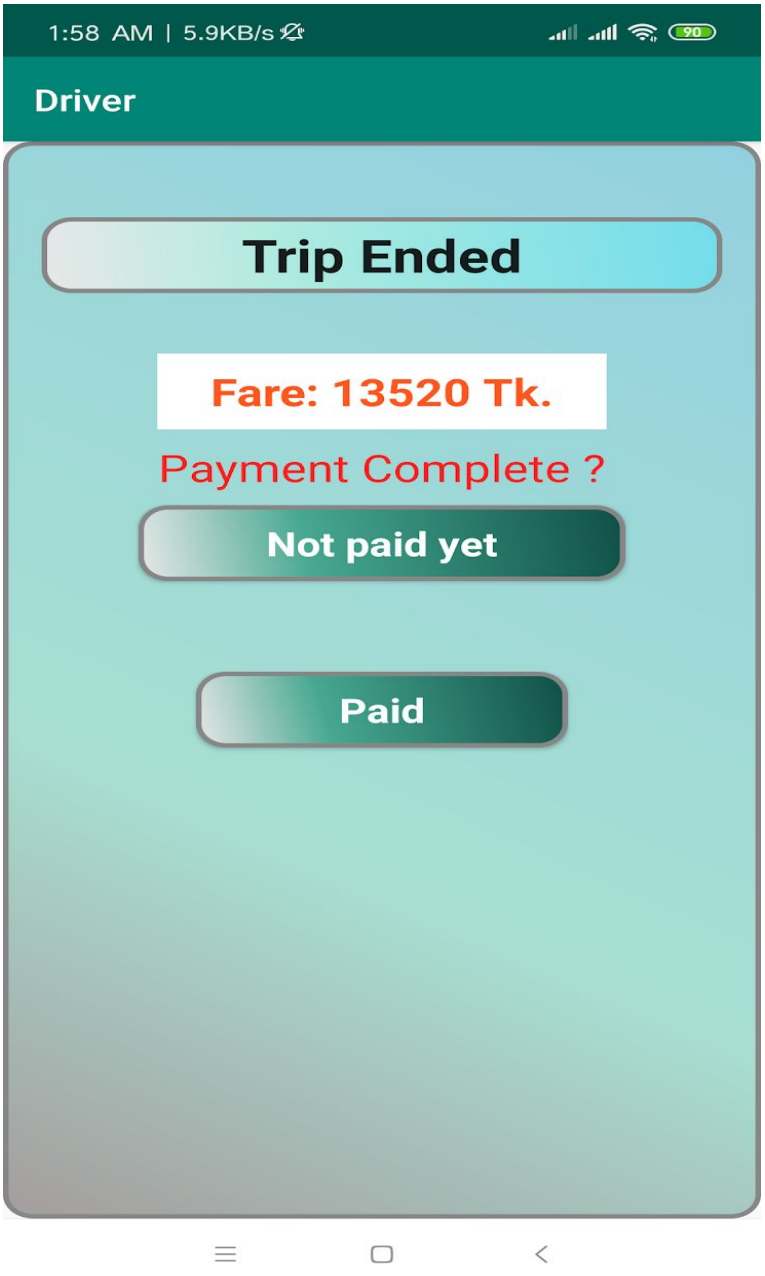
FINISH


1:58 AM | 5.9KB/s
Driver
Trip Ended
Fare: 13520 Tk.
Payment Complete ?
Not paid yet
Paid