

Transportation Network Company

System Analysis Project

ANAS FARAG ALI	- 13	ID: 2166120180100233
MOHAMED KHALED MOHAMED	- 44	ID: 2166120180101280
MARIAM TAREK ABDELGHANY	- 53	ID: 2166120180100823
MAHMOUD KAMAL ALDEEN MAHMOUD	- 55	ID: 2166120180101166
MONA KHALID ABDELGHANY	- 60	ID: 2166120180100871
NIHAL KHALID MOHAMED	- 64	ID: 2166120180100902



Table of content

Section	Page
Event table	2
Account creation subsystem	3
Customer operations subsystem	4
Complain submission subsystem	5
Payment subsystem	6
Driver account subsystem	7
Ride operations subsystem	8
Subsystems sequence diagrams	10
Account Creation Subsystem: Activity Flow Diagram	11
Customer Operations Subsystem: Use Case Description	13
Customer Operations Subsystem: sequence diagram	15
Customer Operations Subsystem: Activity flow diagram	16
Complaint Submission Subsystem: System Sequence diagram	17
Complaint Submission Subsystem: Activity Flow Diagram	19
Payment Subsystem: Use Case Description	20
Payment Subsystem: Sequence Diagram	21
Payment Subsystem: Activity Flow Diagram	22
Driver Account Subsystem: Use Case Description	23
Driver Account Subsystem: Sequence Diagram	25
Driver Account Subsystem: Activity Flow Diagram	26
Ride operations subsystem: Use Case Description	27
Ride operations subsystem: Sequence Diagram	28
Ride operations subsystem: Activity Flow Diagram	29
Account Creation Subsystem: DFD	30
Customer operations Subsystem: DFD	31
Complaint Submission Subsystem: DFD	33
Payment Subsystem: DFD	34
Driver Account Subsystem: DFD	35
Ride operations subsystem	36
Gantt chart	37
System vision document	38
Cost benefit analysis	39
State machine diagram of Vehicle	40
Context Diagram	41

Event Table

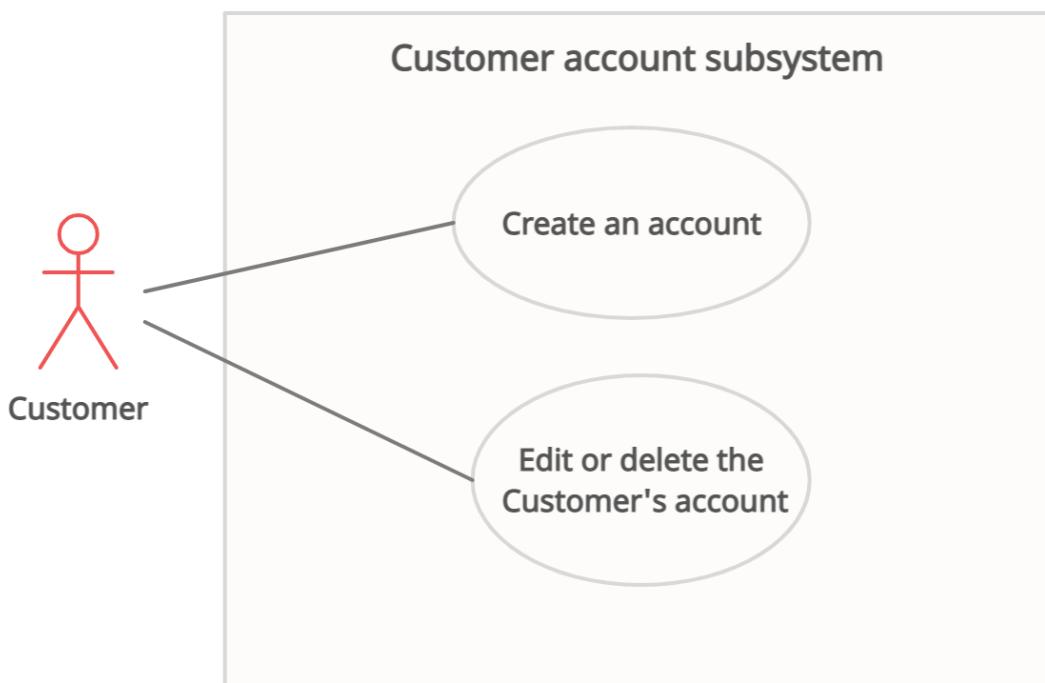
#	Event	Trigger	Source	Use case	Response	Destination
1	Customer wants to create an account	Account creation	Customer	Create an account	Confirmation	Customer
2	Customer wants to edit or delete his account	Account editing or deletion	Customer	Edit or delete account	Notification message	Customer
3	Customer wants to send his destination to driver	Destination sending	Customer	Send destination	<ul style="list-style-type: none"> • Notification message of price of ride • Notification to available nearest drivers 	<ul style="list-style-type: none"> • Customer • Driver
4	Customer wants to change current location	Changing current location	Customer	Change current location	<ul style="list-style-type: none"> • Confirmation • Notification message of the cost of new location 	Customer
5	Customer wants to give a rate to driver, ride and the application	Ride rating	Customer	Rate the ride, driver and the application	Notification of Thanking message	Customer
6	Customer wants to cancel the ride	Ride cancellation	Customer	Cancel the ride	Confirmation	Customer
7	Customer submits a complaint about the driver	Complaint submit	Customer	Submit a complaint about the driver	Confirmation	Customer
8	Customer wants to pay the ride to the driver	Payment of the ride	Customer	Pay the ride to the driver	<ul style="list-style-type: none"> • Confirmation of money transfer • Message of amount of money transferred. 	<ul style="list-style-type: none"> • Customer • Driver
9	Customer wants to use a discount coupon	Discount coupon using	Customer	Use a discount coupon	<ul style="list-style-type: none"> • Confirmation of accepting the coupon • Message of coupon expiration 	Customer
10	Driver wants to create an account	Account creation	Driver	Create an account	Confirmation	Driver
11	Driver wants to update or delete his account	Driver's information update or deletion	Driver	Update or delete the driver's account	Confirmation of the updated information or deletion	Driver
12	Driver wants to accept rides	Waiting ride offers	Driver	Get ready for a ride	Confirmation message	Driver
13	Driver wants to filter the region of incoming ride requests	Filtering the region of rides	Driver	Filter region of rides	Confirmation	Driver
14	Driver submits a complaint about the Customer	Complaint submit	Driver	Submit a complaint about the Customer	Confirmation	Driver

Subsystems

1-Account Creation Subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION
1	Customer wants to create an account	Account creation	Customer	Create an account	Confirmation	Customer
2	Customer wants to edit or delete his account	Account editing or deletion	Customer	Edit or delete account	Notification message	Customer

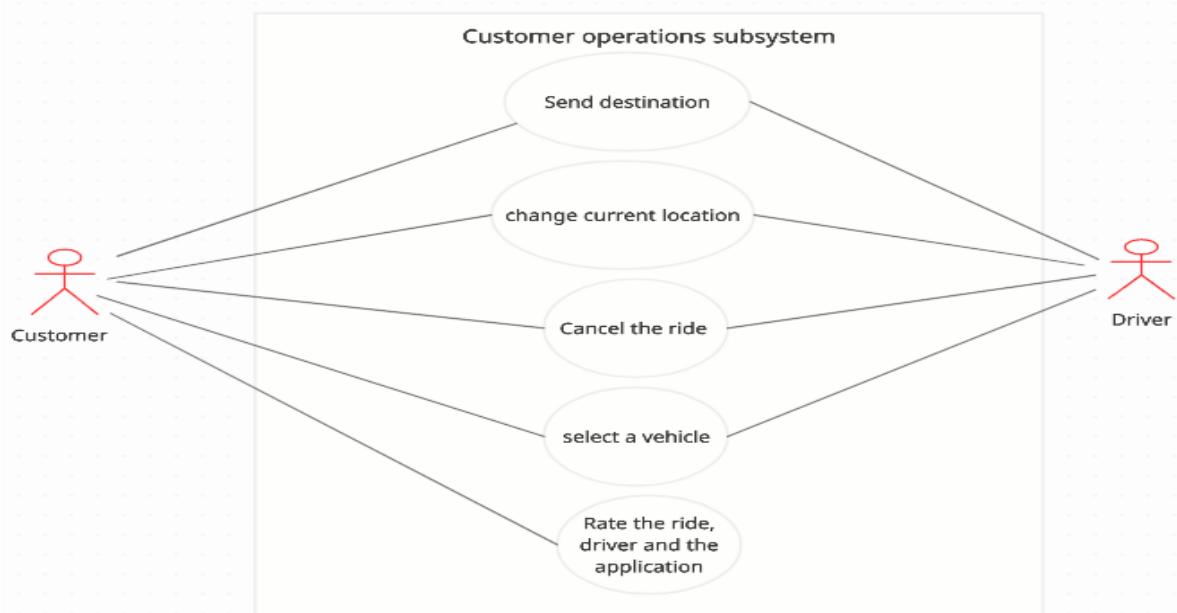
Use Case Diagram



2-Customer operations Subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION
1	Customer wants to send his destination to driver	Destination sending	Customer	Send destination	- Notification message of price of ride. - Notification to available nearest drivers.	- Customer - Driver
2	Customer wants to change current location	Changing current location	Customer	change current location	- Confirmation. - Notification message of the cost of new location.	Customer
3	Customer wants to cancel the ride	Ride cancelation	Customer	Cancel the ride	- Confirmation.	Customer
4	Customer wants to select a vehicle	Vehicle selection	customer	Select a vehicle	- Confirmation (selected successfully). - Message of vehicle unavailability.	Customer
5	Customer wants to give a rate to driver, ride and the application.	Ride rating	customer	Rate the ride, driver and the application	- Thanking message	- Customer

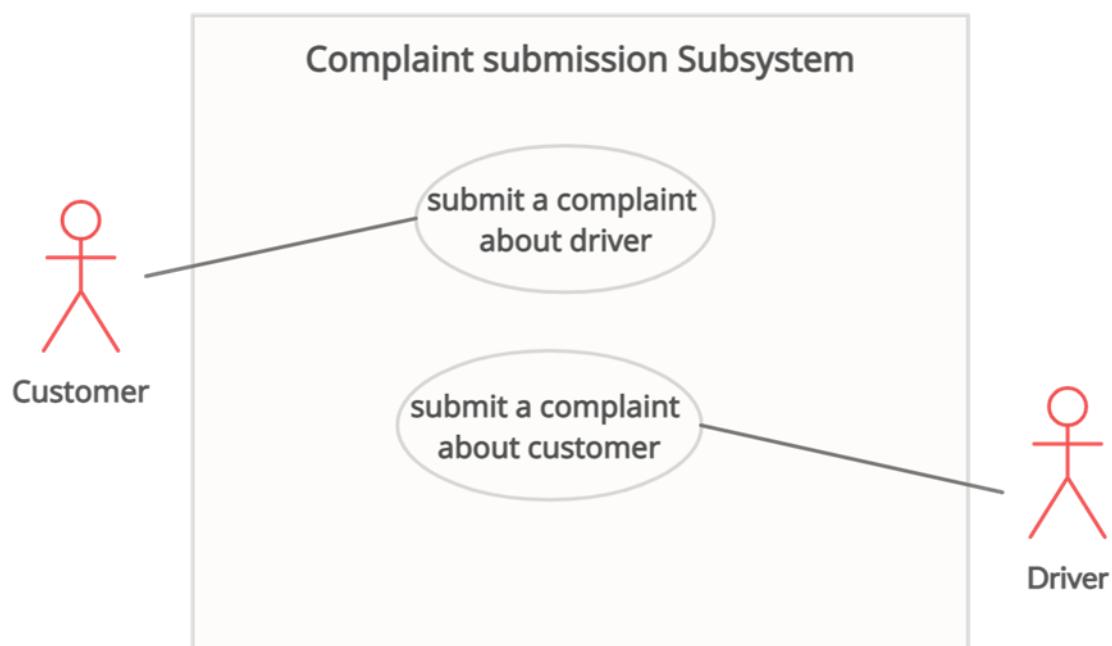
Use case diagram



3- Complaint Submission Subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION
1	Customer submits a complaint about the Driver	Complaint submit	Customer	Submit a complaint about the driver	Confirmation	Customer
2	Driver submits a complaint about the Customer	Complaint submit	Driver	Submit a complaint about the Customer	Confirmation	Driver

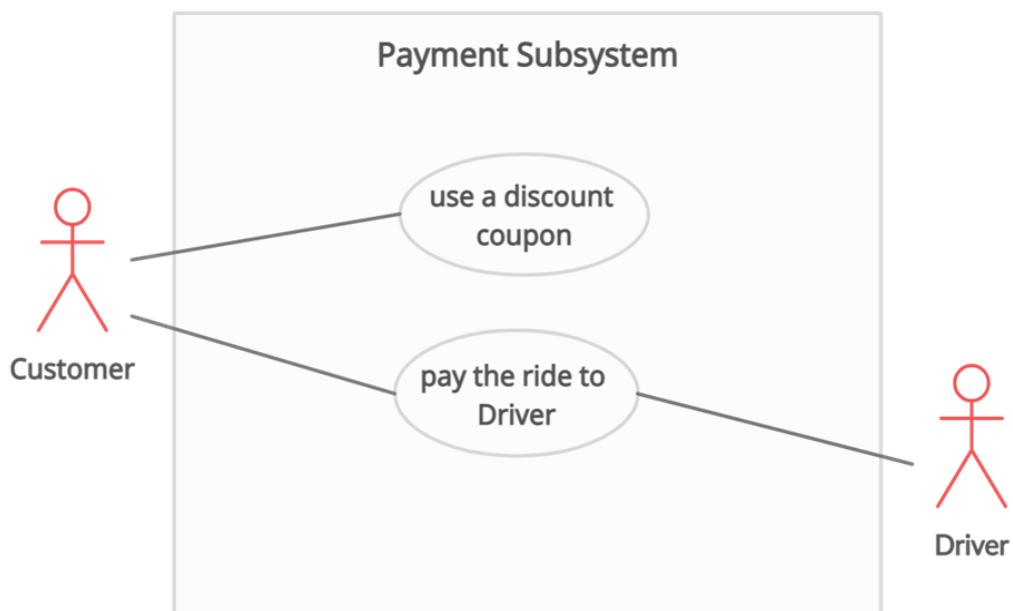
Use Case Diagram



4- Payment Subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION
2	Customer wants to pay the ride to the driver	Payment of the ride	Customer	Pay the ride to the driver	<ul style="list-style-type: none">Confirmation of money transferMessage of amount of money transferred.	<ul style="list-style-type: none">CustomerDriver

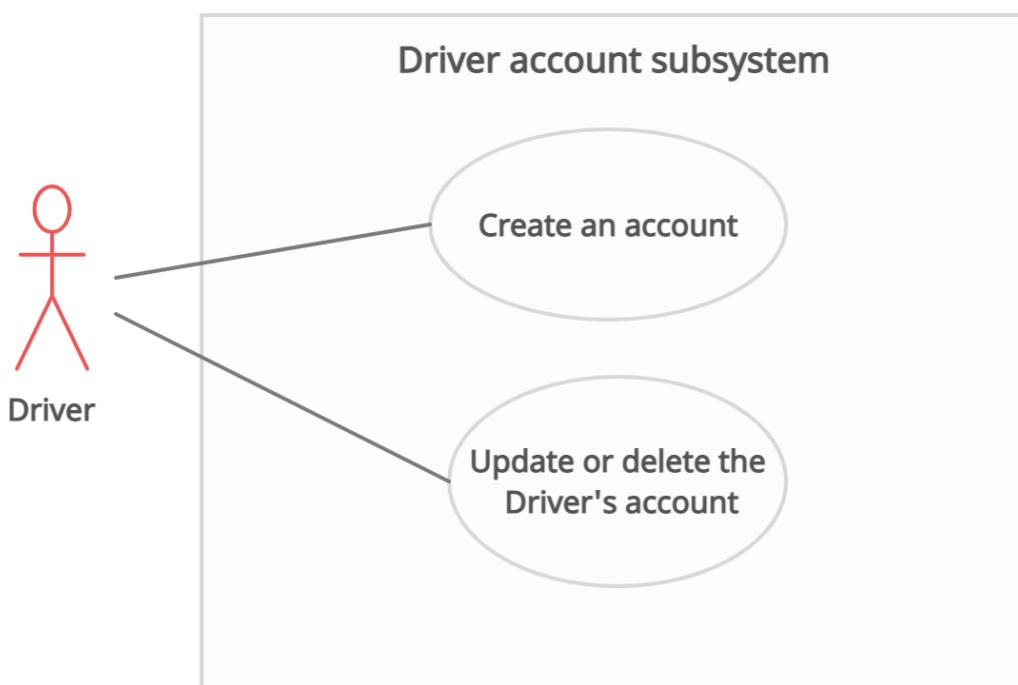
Use Case Diagram



5- Driver Account Subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION
1	Driver wants to create an account	Account creation	Driver	Create an account	Confirmation	Driver
2	Driver wants to update or delete his account	Driver's information update or deletion	Driver	Update or delete the driver's account	Confirmation of the updated information or deletion	Driver

Use Case Diagram

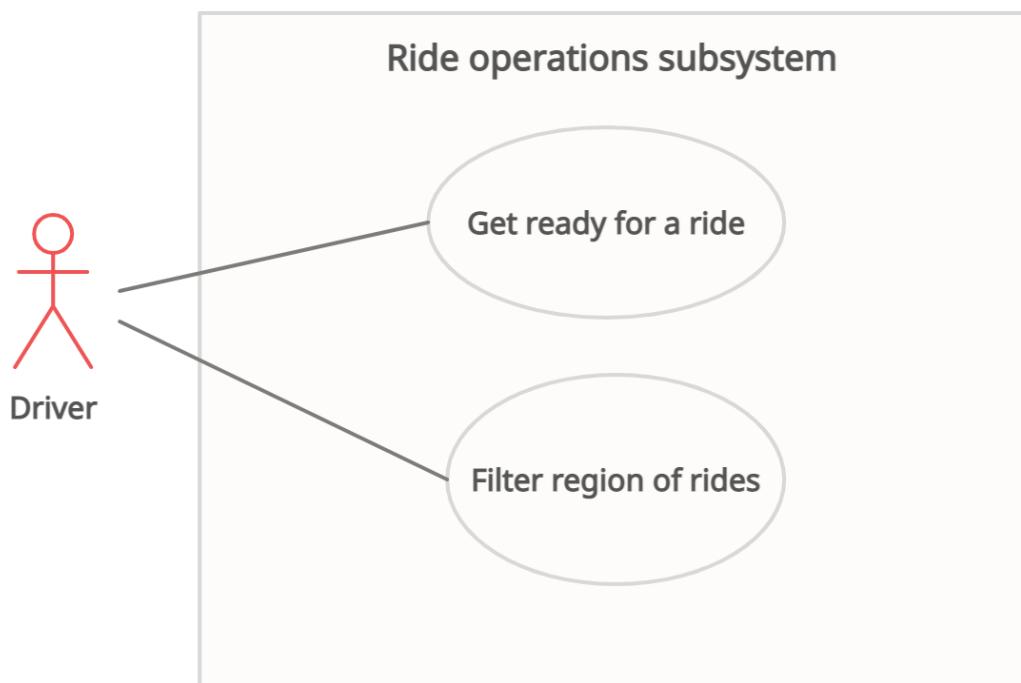


6- Ride operations subsystem

#	EVENT	TRIGGER	SOURCE	USE CASE	RESPONSE	DESTINATION

1	Driver wants to accept rides	Waiting ride offers	Driver	Get ready for a ride	Confirmation	Driver
2	Driver wants to filter the region of incoming ride requests	Filtering the region of rides	Driver	Filter region of rides	Confirmation	Driver

Use Case Diagram

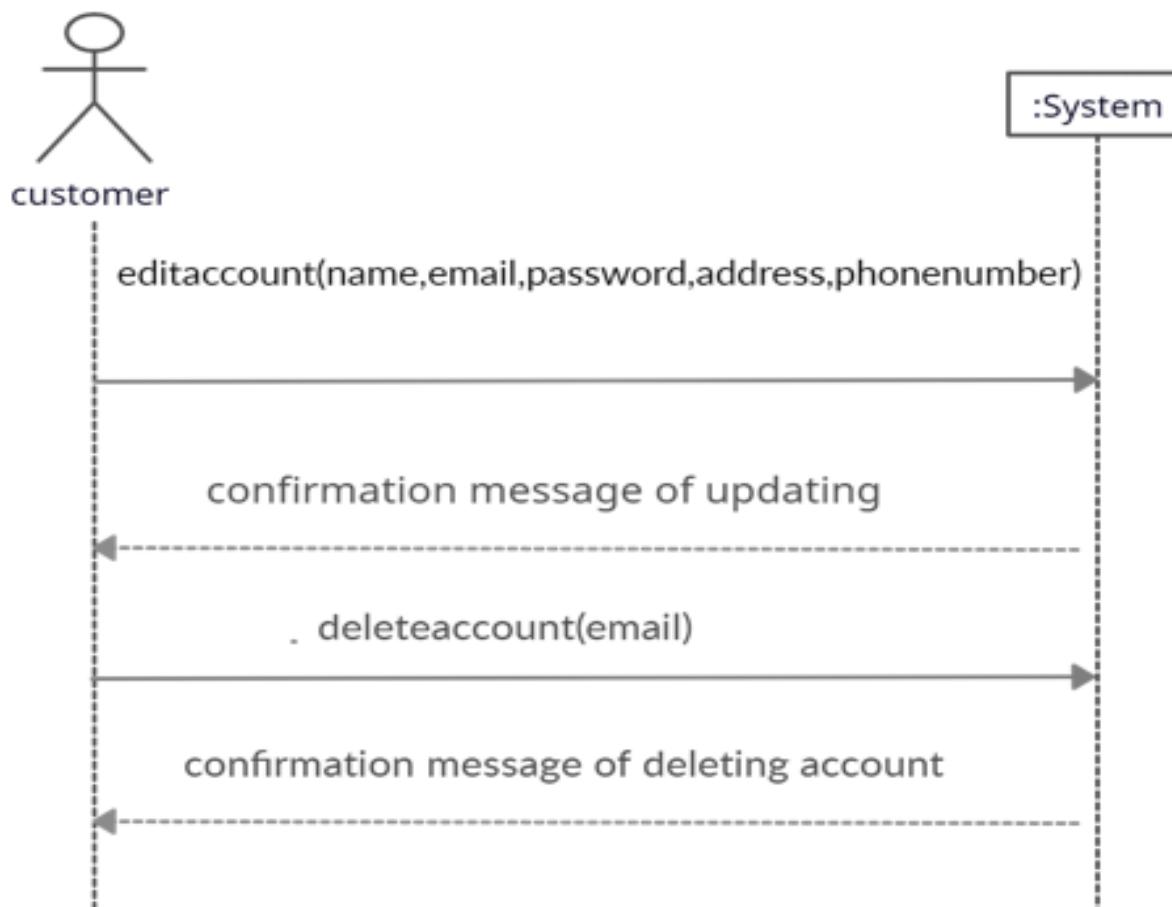
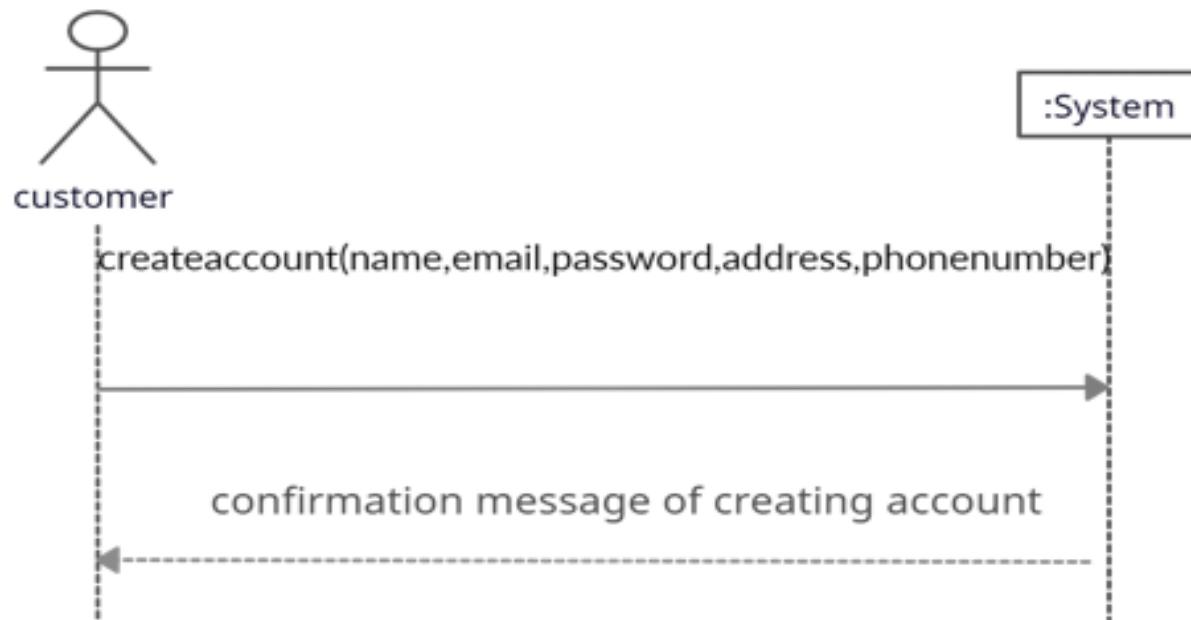


Account Creation Subsystem: Use Case Description.

Use Case Name	Create an account	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - Customer should have the application. 	
Postconditions	<ul style="list-style-type: none"> - Customer has an account 	
Flow Activities	Customer	System
	<ol style="list-style-type: none"> 1. customer wants to create an account 2. customer fill in registration form 	1.1 System displays a registration form. 1.2 System sends a confirmation message
Exceptions	<ul style="list-style-type: none"> - Customer account is suspended 	

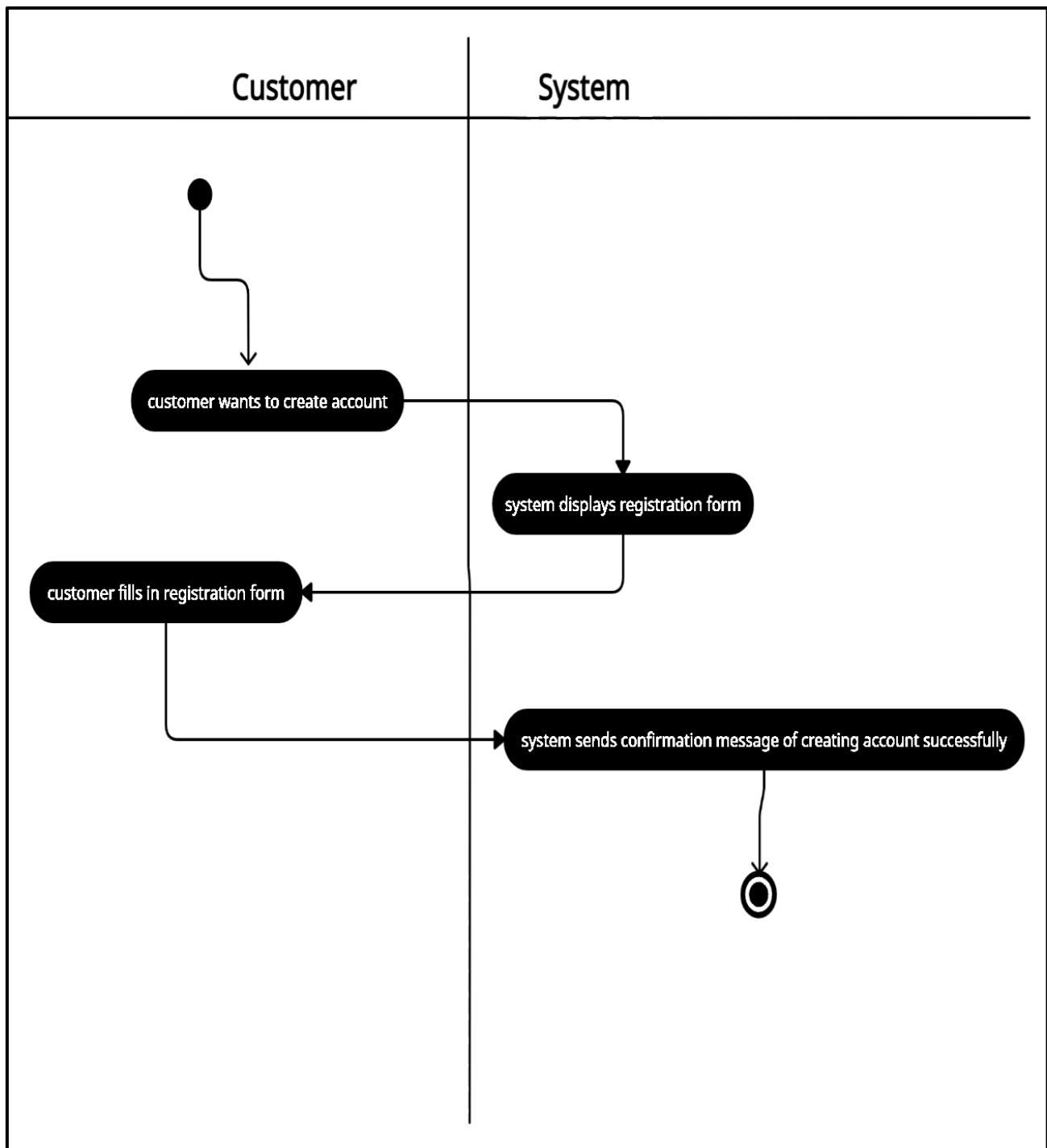
Use Case Name	Edit or delete an account	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - Customer should have an account 	
Postconditions	<ul style="list-style-type: none"> - The account is edited or deleted successfully 	
Flow Activities	Customer	System
	<ol style="list-style-type: none"> 1. customer wants to edit his account. 2. Customer wants to delete his account. 	1.1 System sends confirmation message of updating. 1.2 System sends confirmation message of deleting the account successfully.
Exceptions	<ul style="list-style-type: none"> - If customer hasn't an account he should create a new one. - Customer account is suspended. 	

Account Creation Subsystem: System Sequence Diagram



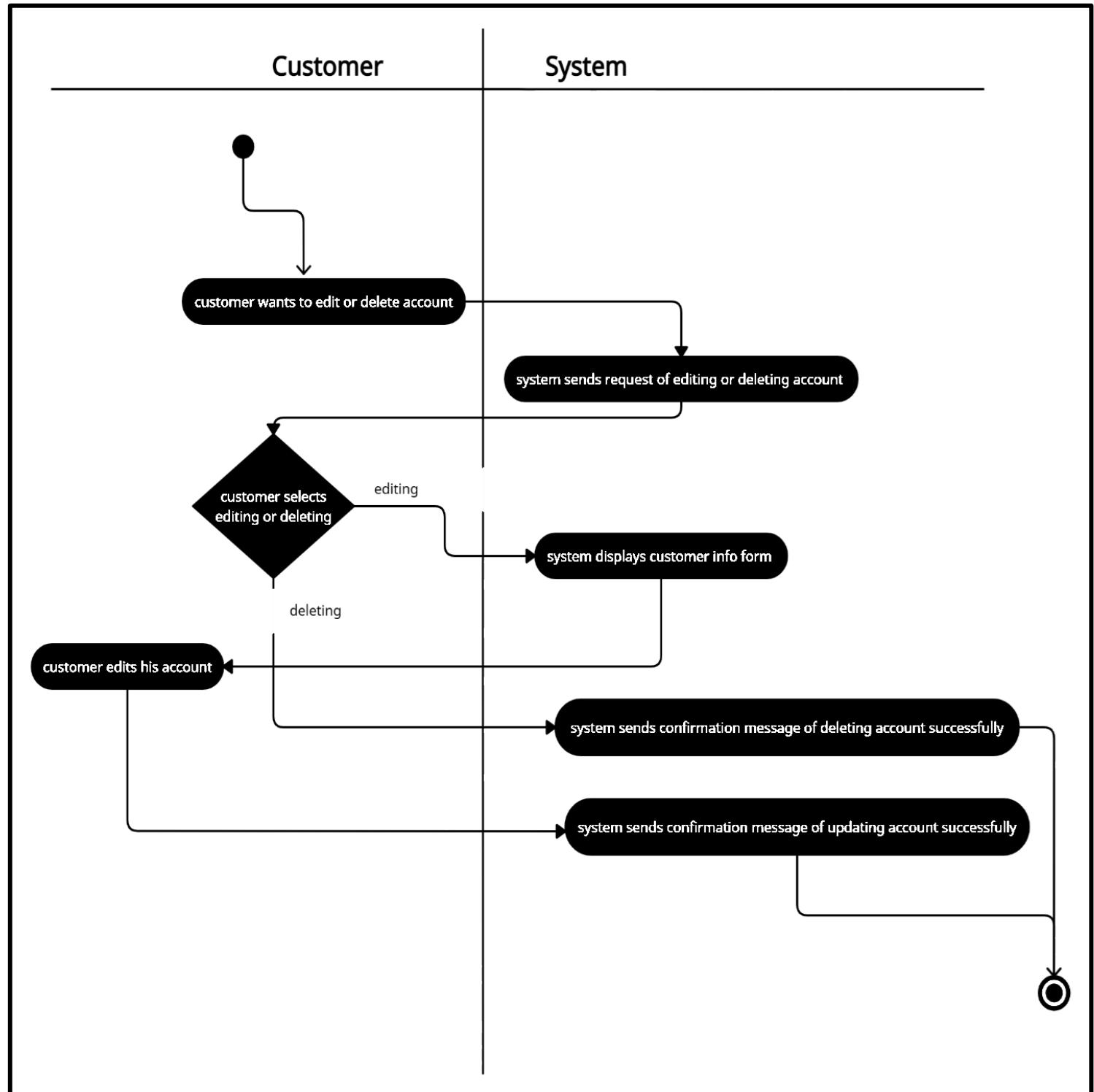
Account Creation Subsystem: Activity Flow Diagram

Create Account



Account Creation Subsystem: Activity Flow Diagram

Edit Account



Customer Operations Subsystem: Use Case Description

Use Case Name	Send destination	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - The customer is ready for the ride. - The customer has enough money. 	
Postconditions	<ul style="list-style-type: none"> - The driver receives the destination. 	
Flow Activities	Actor 1. The customer send his destination.	System 1.1 System send Notification message of price of ride for customer. 1.2 System send Notification to available nearest drivers.
Exceptions	<ul style="list-style-type: none"> - The customer lost his money. 	

Use Case Name	change current location	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - The customer has send the destination. - The customer has enough money. 	
Postconditions	<ul style="list-style-type: none"> - The driver receives the location. 	
Flow Activities	Actor 1. The customer send his new location.	System 1.1 System send Notification to available nearest drivers. 1.2 System send confirmation message
Exceptions	<ul style="list-style-type: none"> - The customer decided to cancel it. 	

Customer Operations Subsystem: Use Case Description

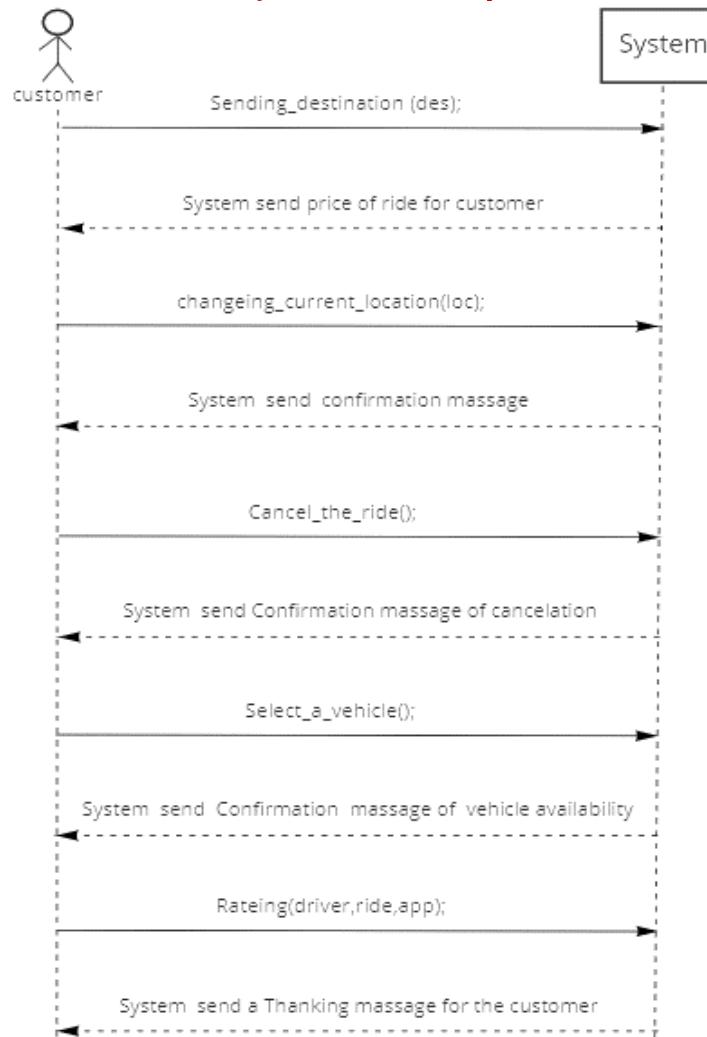
Use Case Name	Cancel the ride	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - The customer is ready for the cancelation. 	
Postconditions	<ul style="list-style-type: none"> - The driver receives the cancelation message. 	
Flow Activities	Actor	System
	1. The customer send Ride cancelation Request.	1.1 System send Confirmation message for customer of cancelation. 1.2 System send Notification message for the drivers.
Exceptions	<ul style="list-style-type: none"> - The customer change his decision. 	

Use Case Name	Select a vehicle	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - The customer has decided the type of vehicle. - The customer has enough money. 	
Postconditions	<ul style="list-style-type: none"> - The vehicle has been selected. 	
Flow Activities	Actor	System
	1. The customer select a vehicle.	1.1 System send Confirmation message of vehicle (available or not)for customer.
Exceptions	<ul style="list-style-type: none"> - There are no available vehicles. 	

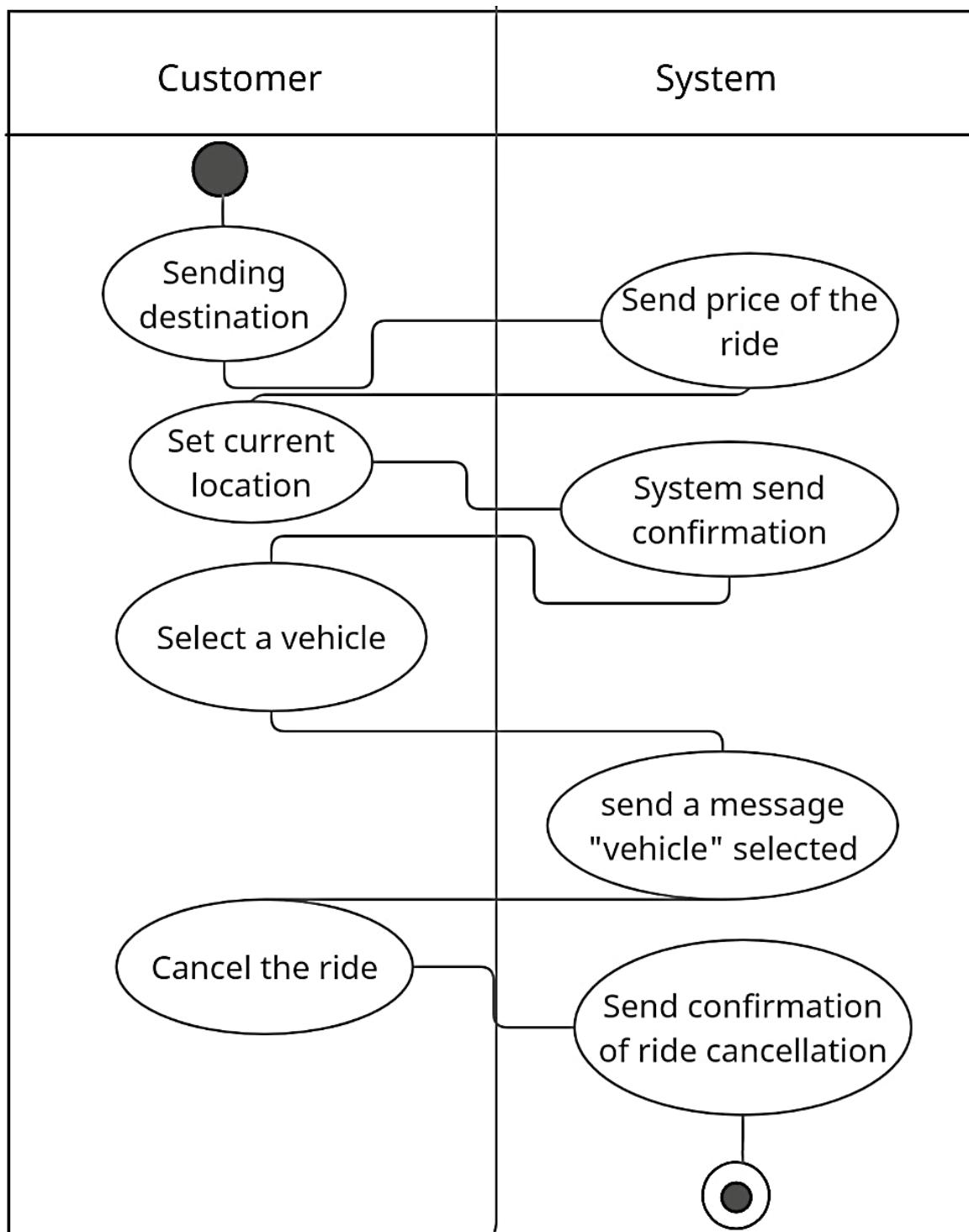
Customer Operations Subsystem: Use Case Description

Use Case Name	Rate the ride, driver and the application	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - The customer has finished the ride. - The customer already has a rate that he wants to share. 	
Postconditions	<ul style="list-style-type: none"> - Rating saved. 	
Flow Activities	Actor	System
	1. The customer send his rate.	1.1 System send the rate for driver. 1.2 System send a Thanking message for the customer.
Exceptions	<ul style="list-style-type: none"> - The customer skip rating. 	

Customer Operations Subsystem: sequence diagram



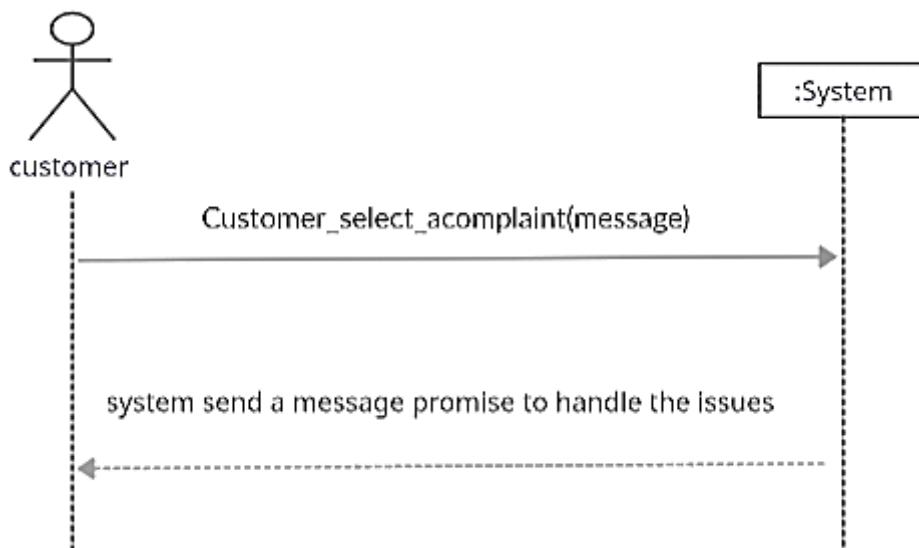
Customer Operations Subsystem: Activity flow diagram



Complaint Submission Subsystem: Use Case Description

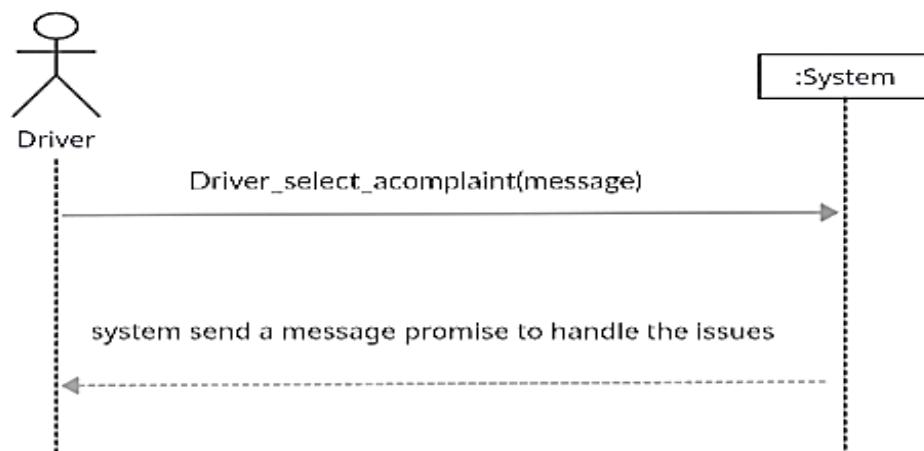
Use Case Name	Submit a complaint about the driver	
Actors	Customer	
Preconditions	<ul style="list-style-type: none"> - Customer goes a ride with the driver before. 	
Postconditions	<ul style="list-style-type: none"> - The complaint sent to the system. - The complaint added to the driver profile. - The driver rate decrease. 	
Flow Activities	Actor	System
	1. Customer submits a complaint about the driver.	1.1 System adds the compliant to the driver profile. 1.2 system sends the customer a message "Promise to handle these issues".
Exceptions	<ul style="list-style-type: none"> - The trip and driver were good. 	

Complaint Submission Subsystem: System Sequence Diagram

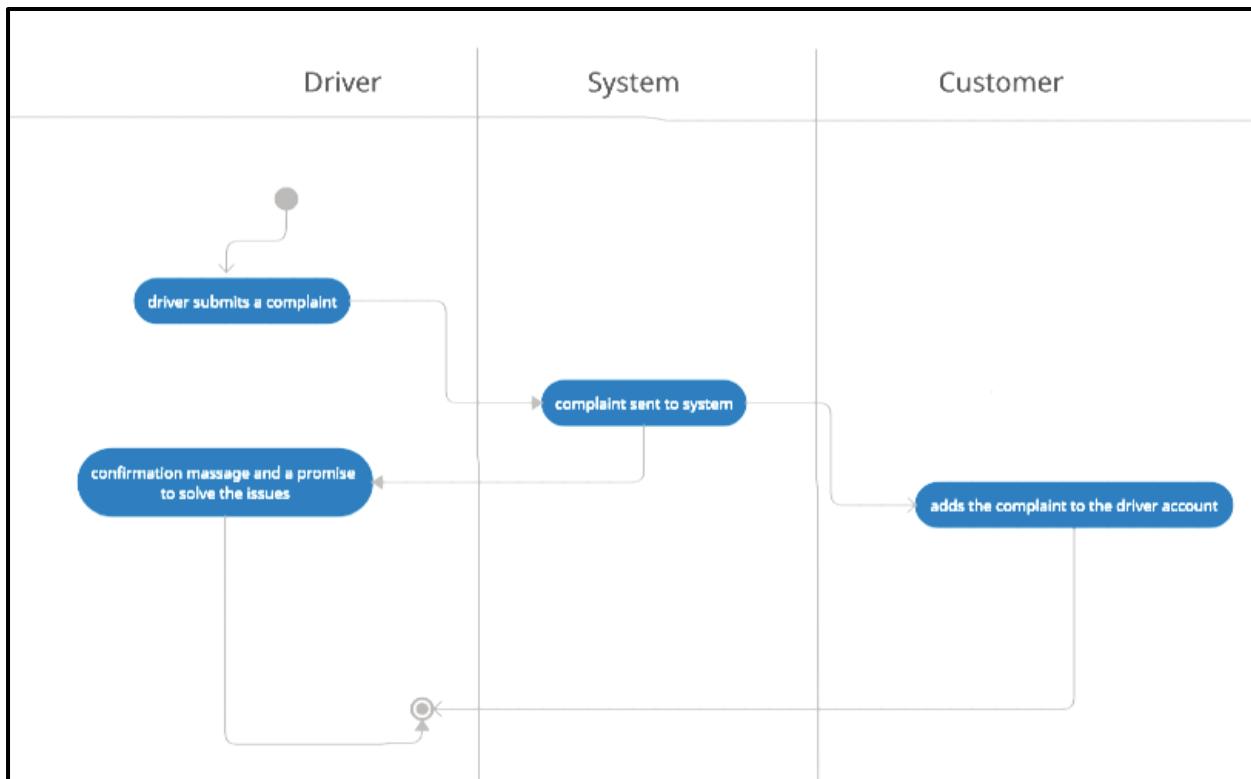
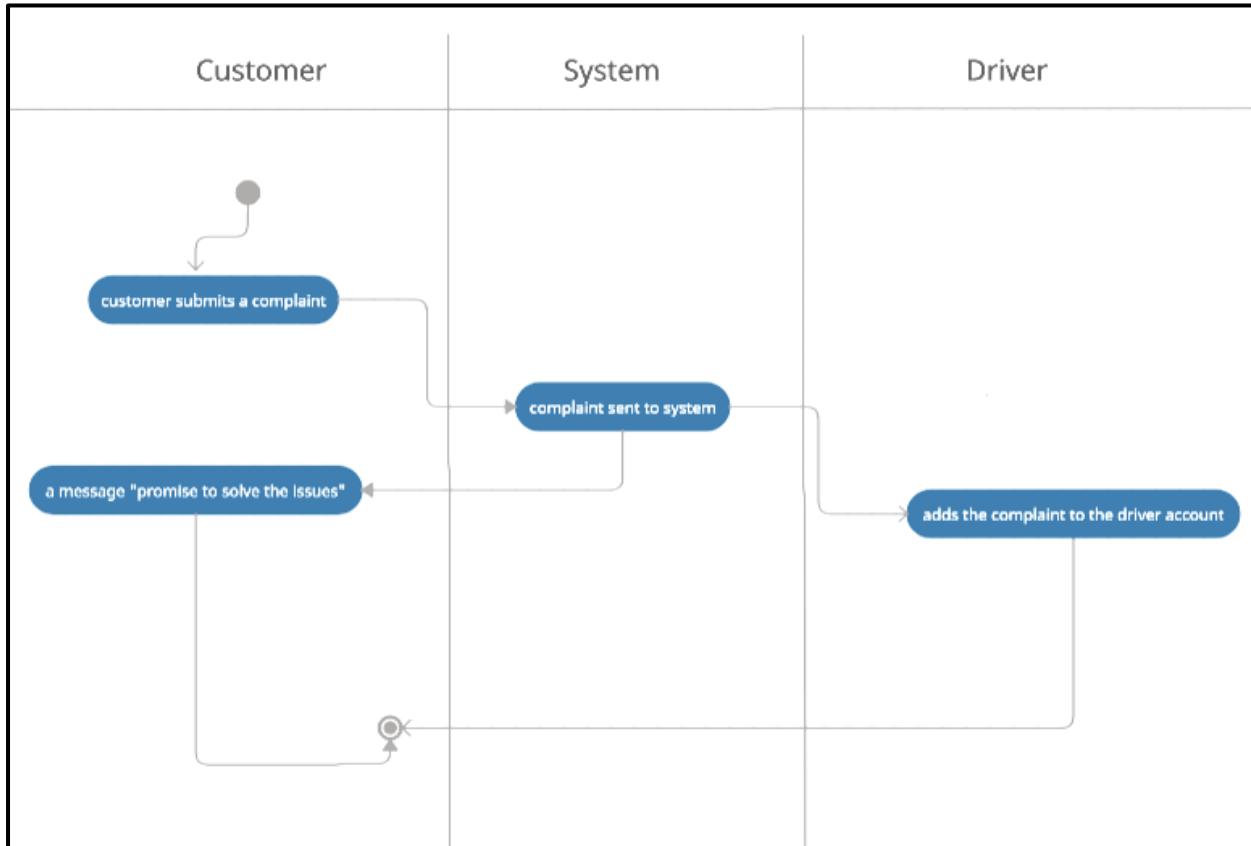


Complaint Submission Subsystem: Use Case Description

Use Case Name	Submit a complaint about the customer.	
Actors	Driver	
Preconditions	<ul style="list-style-type: none"> - Driver goes a ride with the customer before. 	
Postconditions	<ul style="list-style-type: none"> - The complaint sent to the system. - The complaint added to the customer profile. 	
Flow Activities	Actor 1. Driver submits a complaint about the driver.	System 1.1 System adds the compliant to the customer profile. 1.2 system sends the driver a message "Promise to handle these issues".
Exceptions	<ul style="list-style-type: none"> - The trip and customer were good. 	



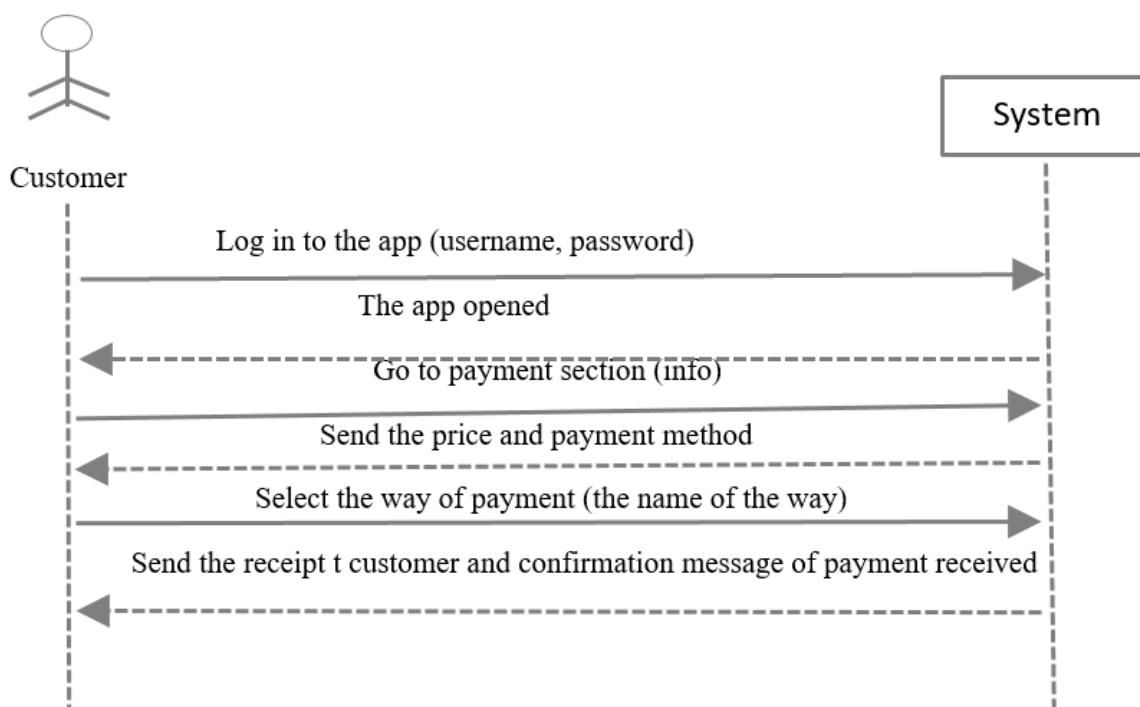
Complaint Submission Subsystem: Activity Flow Diagram



Payment Subsystem: Use Case Description

Use case name	Pay the ride to driver	
Actor	Customer	
Precondition	A valid account	
post condition	The payment method selected for the trip is immediately charged. A receipt is emailed to customer. Account's trip history is updated with details about the route and fare.	
Flow of activities	Customer	System
	1. Log in to the app 2. Go to payment section 3. Select the way of payment	1.1 the app is opened successfully 2.1 send the price of the trip 2.2 send the payment method 3.1 send that uber payment has received. 3.2 A receipt is emailed to customer.
Exception conditions:	1.1 not valid account 3.1 there is not enough charge for payment by the app.	

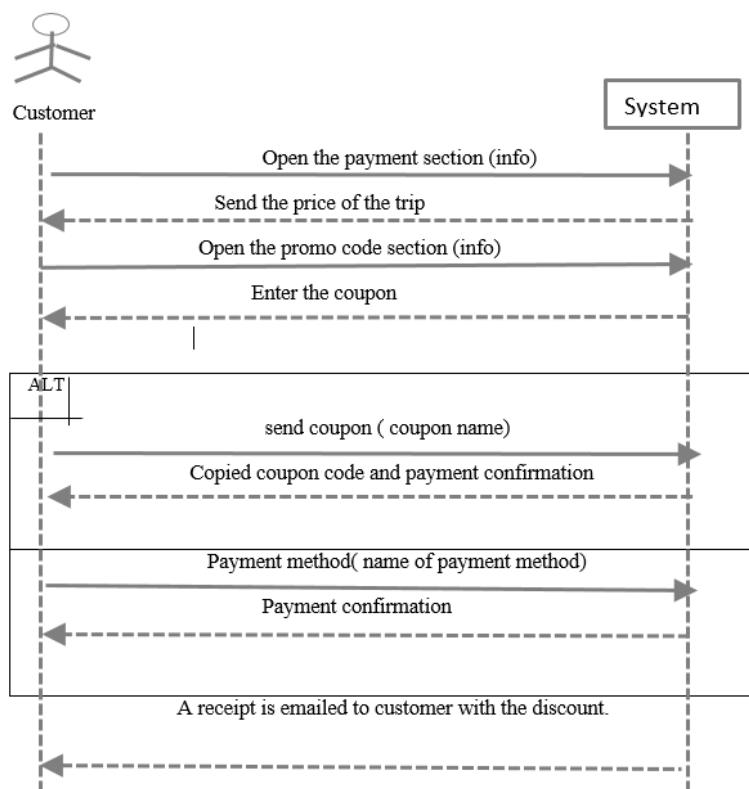
Payment Subsystem: Activity Flow Diagram



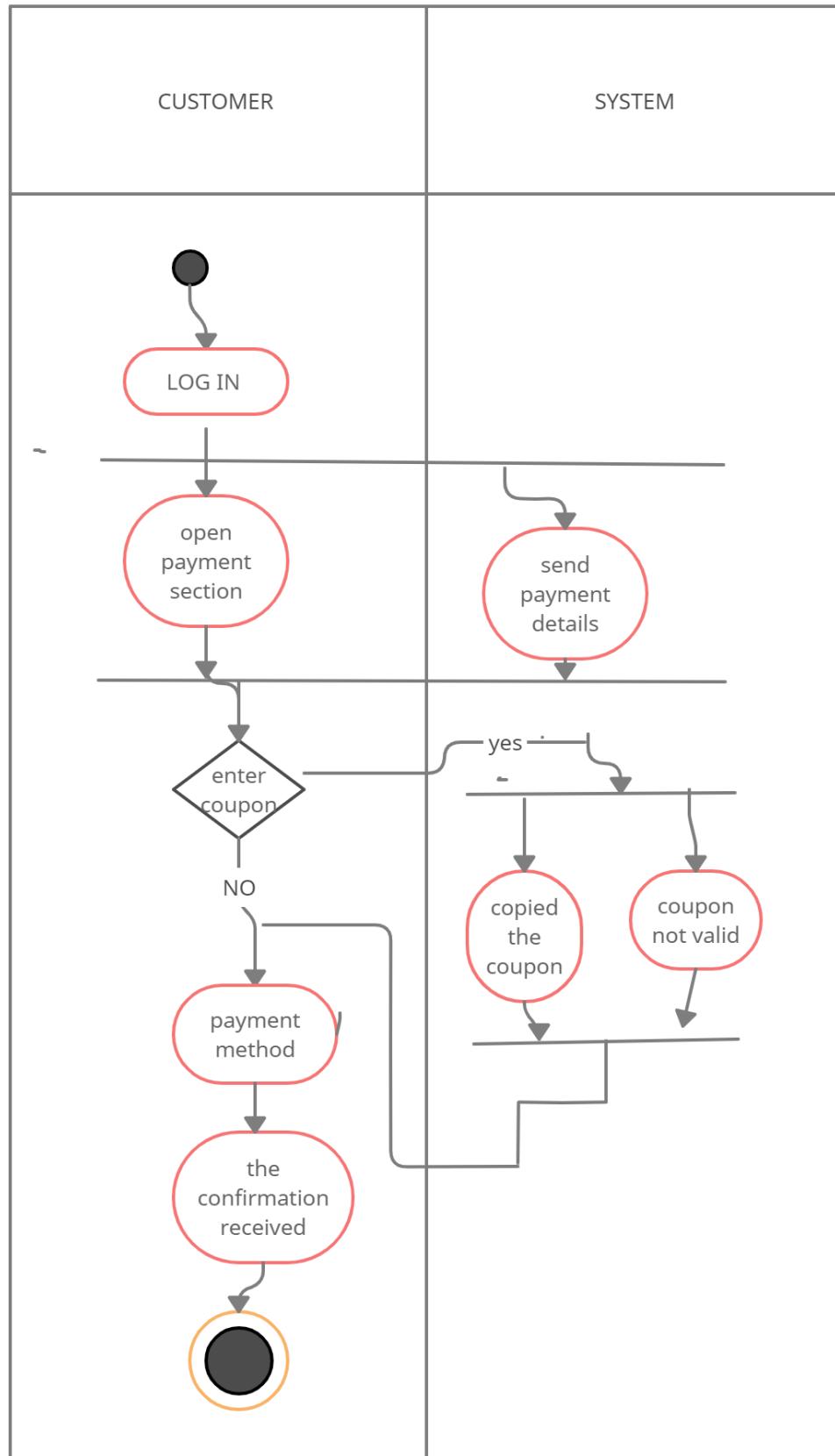
Payment Subsystem: Use Case Description

Use case name	Pay by using discount code	
Actor	Customer	
Preconditions	Valid promo code	
Post conditions	The payment method selected for the trip is immediately charged. A receipt is emailed to customer with the discount.	
Flow activity	Customer 1. go to payment section 2. Open the promo code section for <u>uber</u> 3. Select a promo code.	system 1.1 send the price of the trip. 2.1 show the coupon code options. 3.1 copied coupon code.
Exceptions	The discount code is not valid	

Payment Subsystem: Sequence Diagram



Payment Subsystem: Activity Flow Diagram

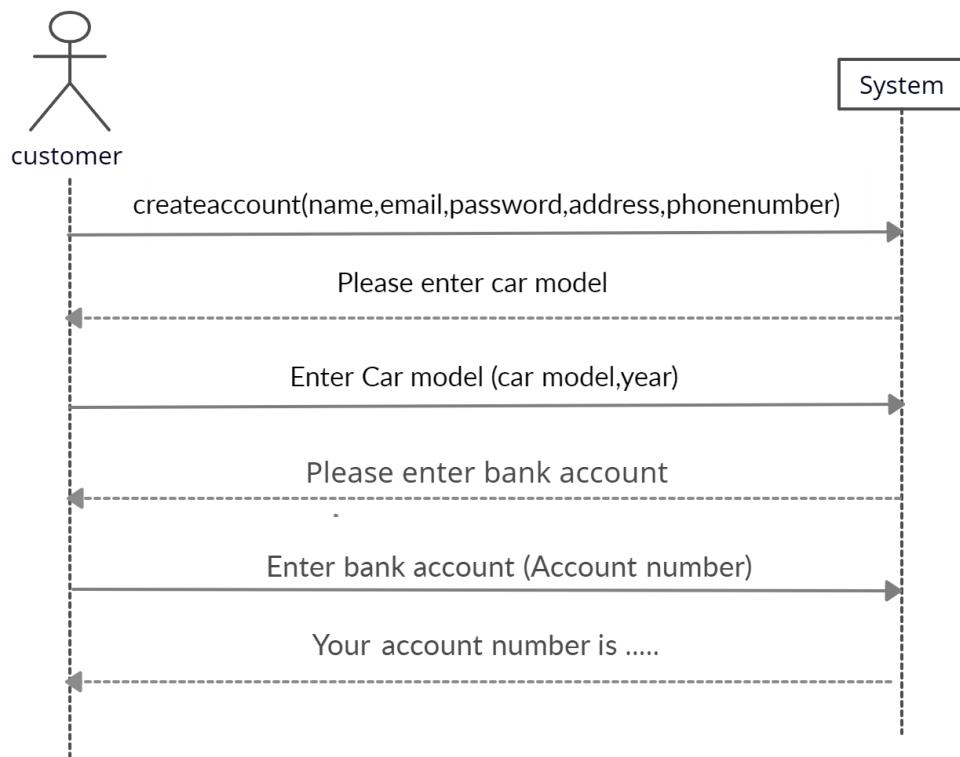
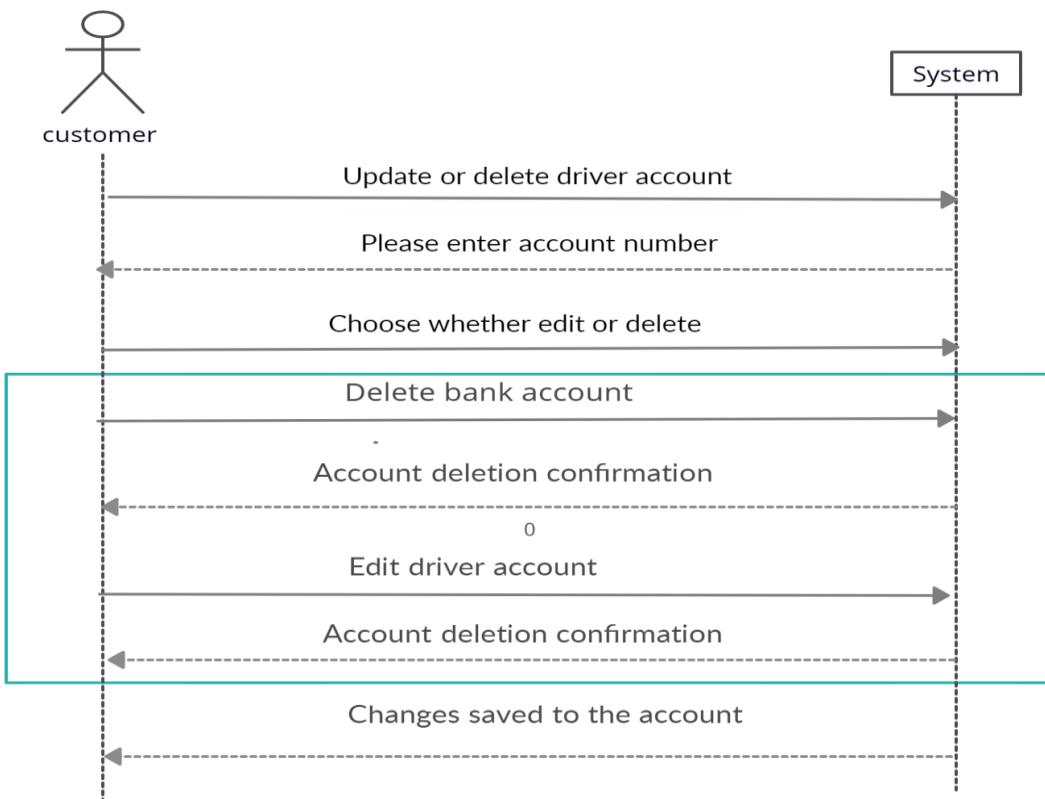


Driver Account Subsystem: Use Case Description

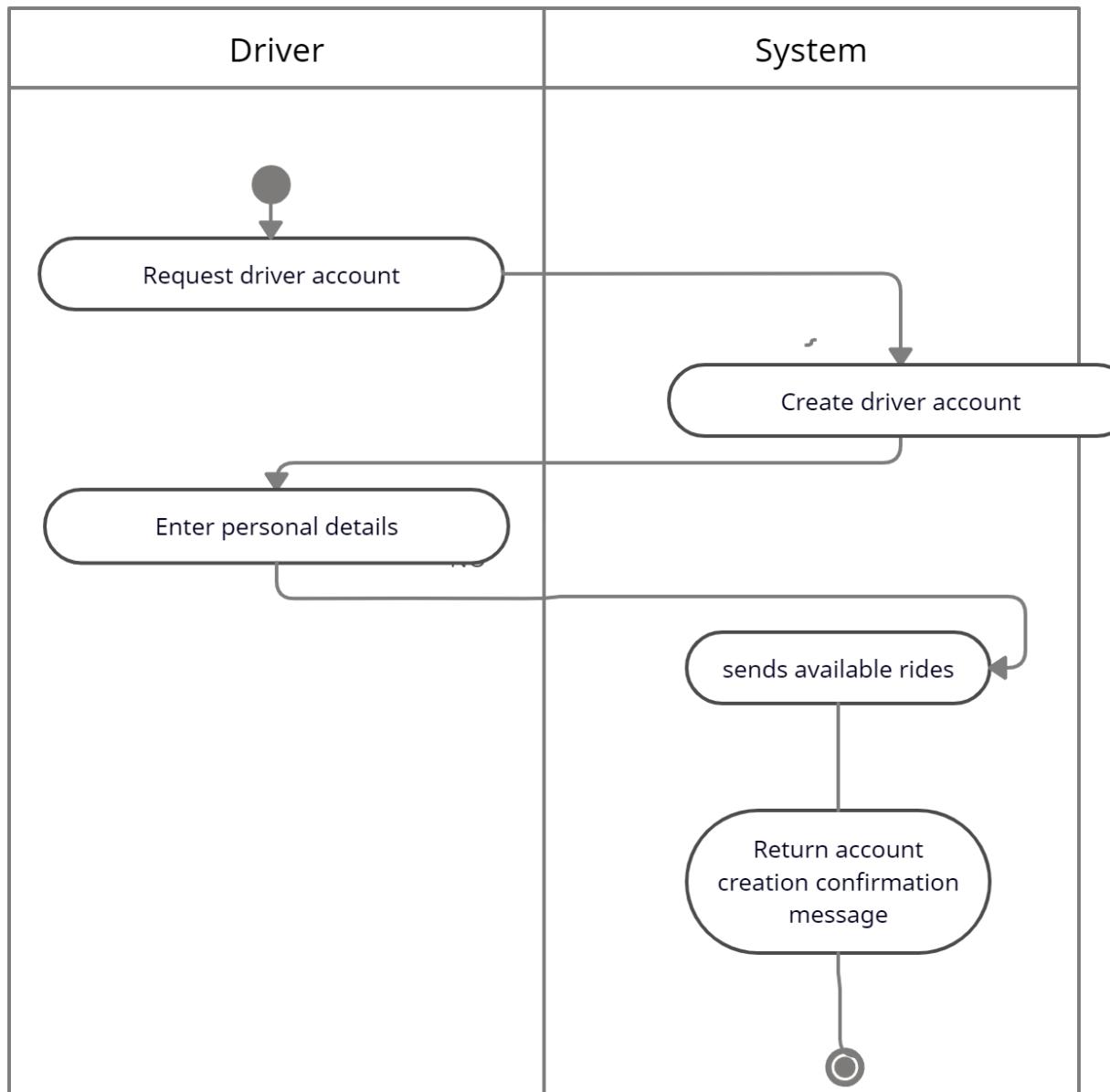
Use Case Name	Create an account					
Actors	Driver					
Preconditions	<ul style="list-style-type: none"> - Driver needs to have a driving license - Driver should provide criminal record 					
Postconditions	<ul style="list-style-type: none"> - Driver should have a bank account 					
Flow Activities	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Actor</th><th style="text-align: center;">System</th></tr> </thead> <tbody> <tr> <td>1. Driver creates an account 2. Driver enters car model 3. Driver enters bank account</td><td>1.1 System asks for car model. 2.1 System asks for bank account. 3.1 System sends confirmation of account creation</td></tr> </tbody> </table>	Actor	System	1. Driver creates an account 2. Driver enters car model 3. Driver enters bank account	1.1 System asks for car model. 2.1 System asks for bank account. 3.1 System sends confirmation of account creation	
Actor	System					
1. Driver creates an account 2. Driver enters car model 3. Driver enters bank account	1.1 System asks for car model. 2.1 System asks for bank account. 3.1 System sends confirmation of account creation					
Exceptions	<ul style="list-style-type: none"> - Driver account is suspended 					

Use Case Name	Update or delete the driver's account					
Actors	Driver					
Preconditions	<ul style="list-style-type: none"> - Driver should already have an account 					
Postconditions	<ul style="list-style-type: none"> - Driver needs to take all his money 					
Flow Activities	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Actor</th><th style="text-align: center;">System</th></tr> </thead> <tbody> <tr> <td>1. Driver updates or delete his account 2. Driver enters account number 3. Driver chooses update or delete</td><td>1.1 System asks for account number 2.1 System asks whether driver wants to update or delete his account 3.1 System sends Process confirmation 3.2 System saves changes to account</td></tr> </tbody> </table>	Actor	System	1. Driver updates or delete his account 2. Driver enters account number 3. Driver chooses update or delete	1.1 System asks for account number 2.1 System asks whether driver wants to update or delete his account 3.1 System sends Process confirmation 3.2 System saves changes to account	
Actor	System					
1. Driver updates or delete his account 2. Driver enters account number 3. Driver chooses update or delete	1.1 System asks for account number 2.1 System asks whether driver wants to update or delete his account 3.1 System sends Process confirmation 3.2 System saves changes to account					
Exceptions	<ul style="list-style-type: none"> - Bank account or driving license is expired 					

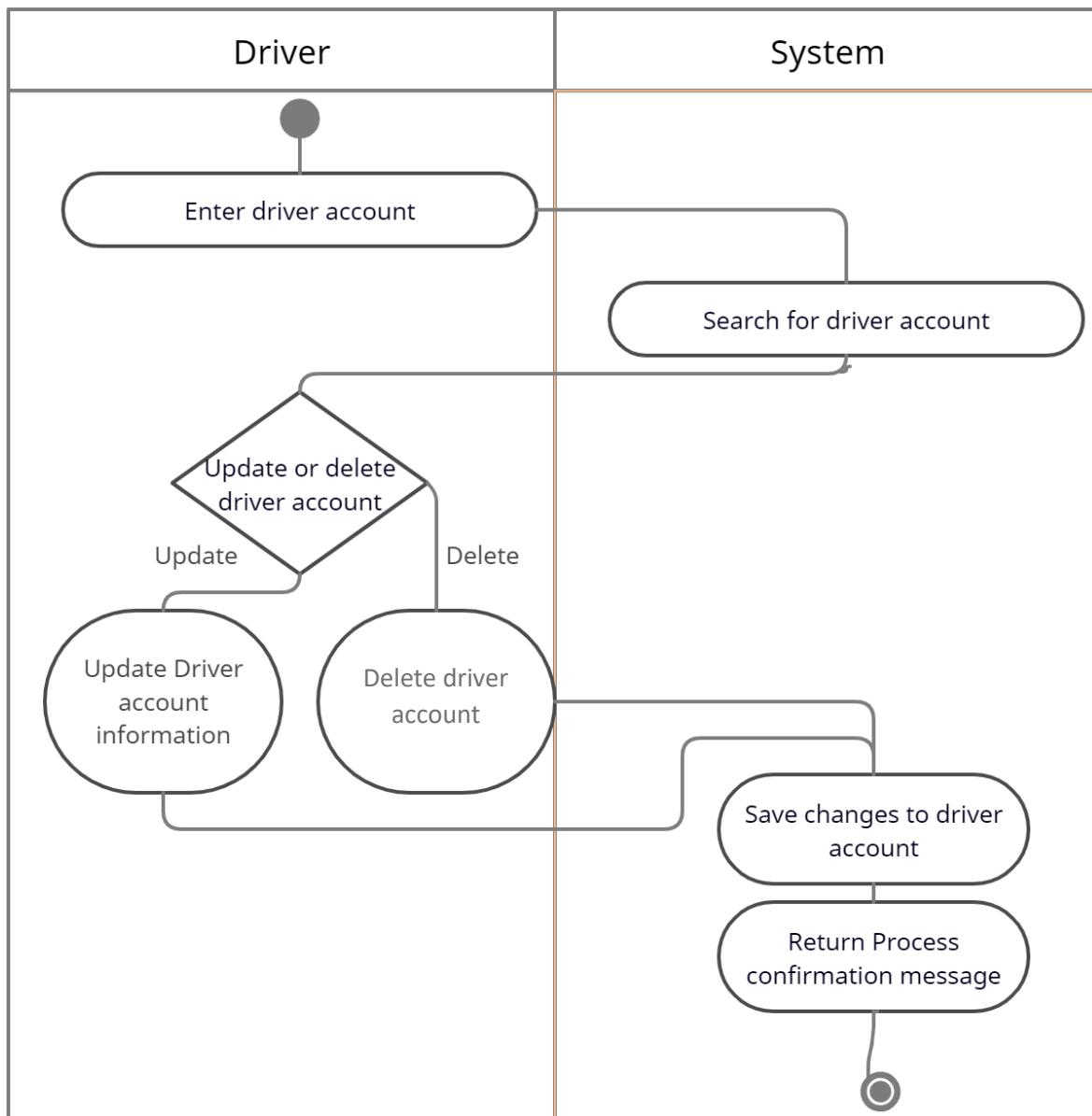
Driver Account Subsystem: Sequence Diagram



Driver Account Subsystem: Activity Flow Diagram



Driver Account Subsystem: Activity Flow Diagram

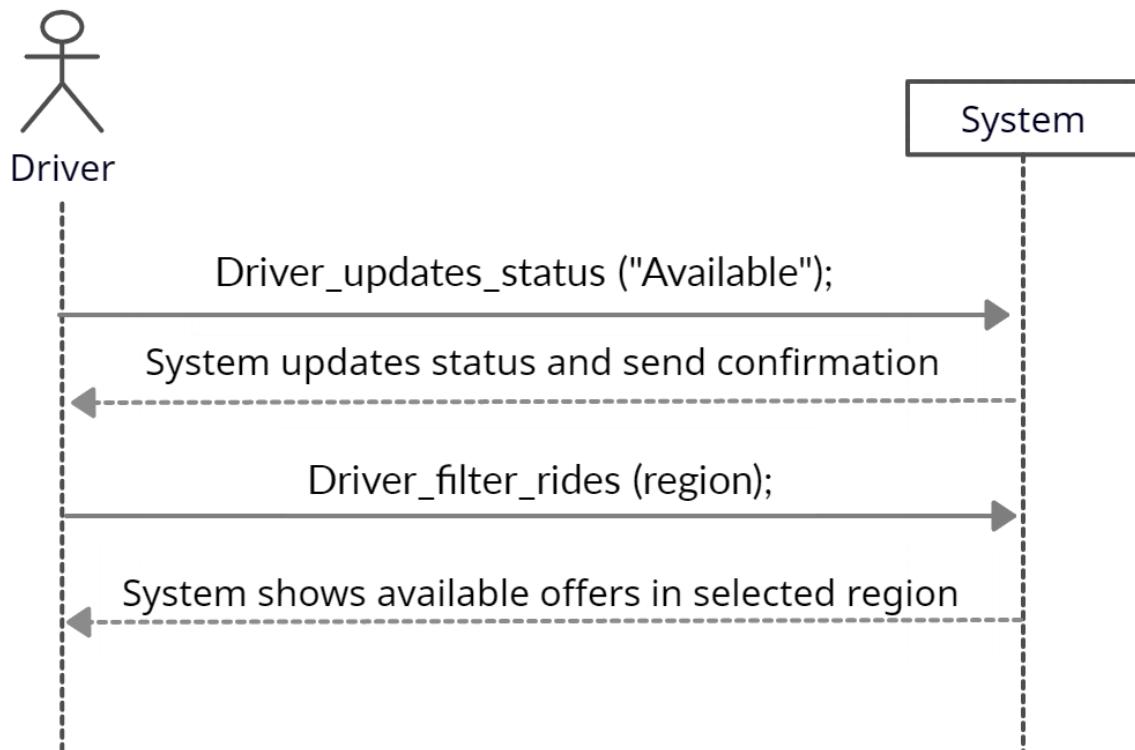


Ride operations subsystem: Use Case Description

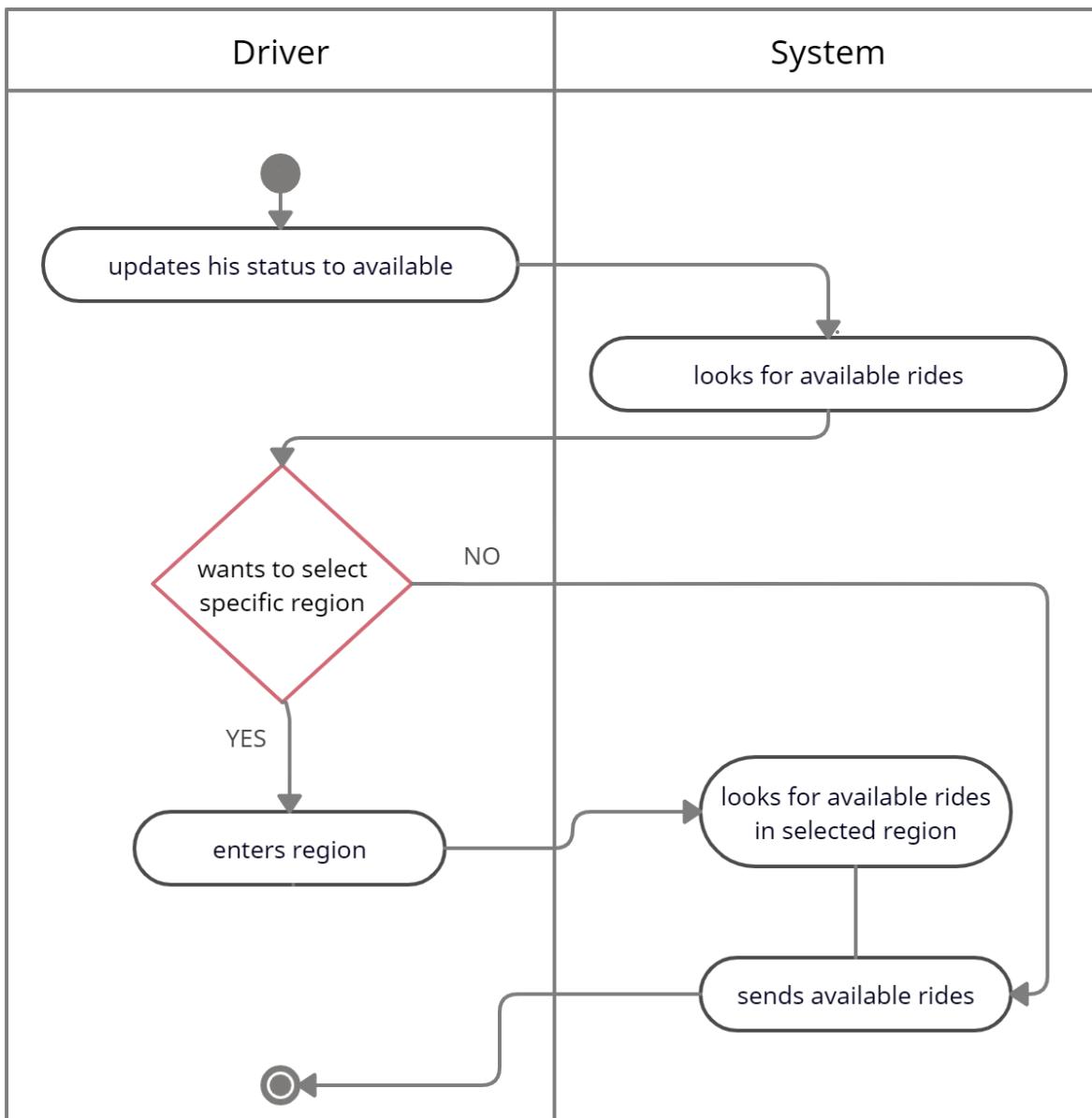
Use Case Name	Get ready for a ride	
Actors	Driver	
Preconditions	<ul style="list-style-type: none"> - Driver is available and ready to take rides. - The driver's vehicle is ready for the ride. 	
Postconditions	<ul style="list-style-type: none"> - Driver accepted a ride. - Ride has been registered. 	
Flow Activities	Actor	System
	1. Driver updates his status to "Available".	1.1 System looks for nearby rides.
Exceptions	<ul style="list-style-type: none"> - Vehicle broke down during waiting for offer. 	

Use Case Name	Filter region of rides	
Actors	Driver	
Preconditions	<ul style="list-style-type: none"> - There are available offers from different regions. - The driver's vehicle is ready for the ride. 	
Postconditions	<ul style="list-style-type: none"> - Driver selected a specific region of incoming offers. - Current ride offers in this region are sent to him. 	
Flow Activities	Actor	System
	1. Driver filters incoming offers.	1.1 System looks for offers in the selected region. 1.2 System send available rides in the selected region to the driver.
Exceptions	<ul style="list-style-type: none"> - There are no available offers in the selected region. 	

Ride operations subsystem: Sequence Diagram

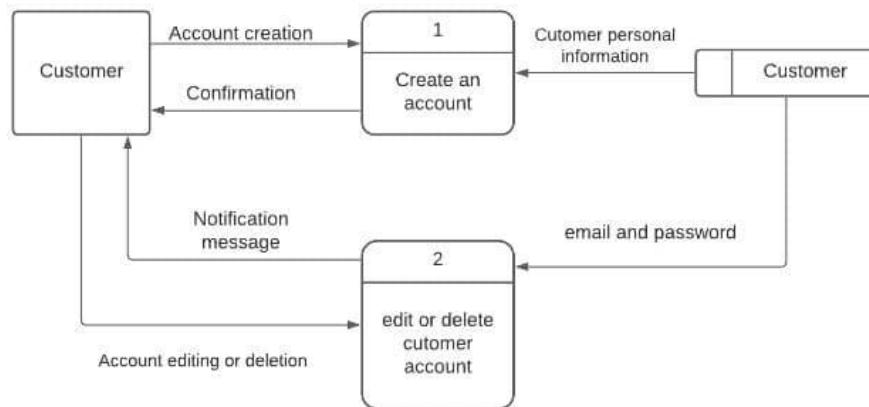


Ride operations subsystem: Activity Flow Diagram

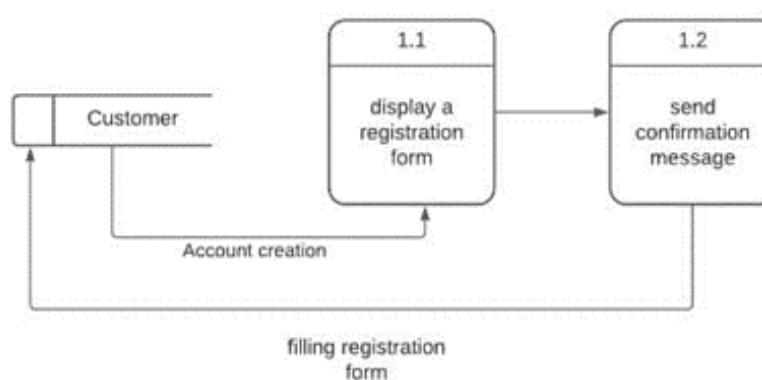


Account Creation Subsystem

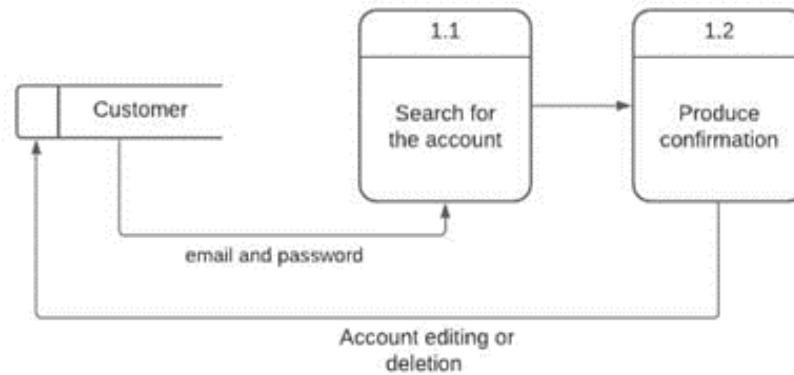
DFD of Customer account



Detailed DFD of use case: create customer account

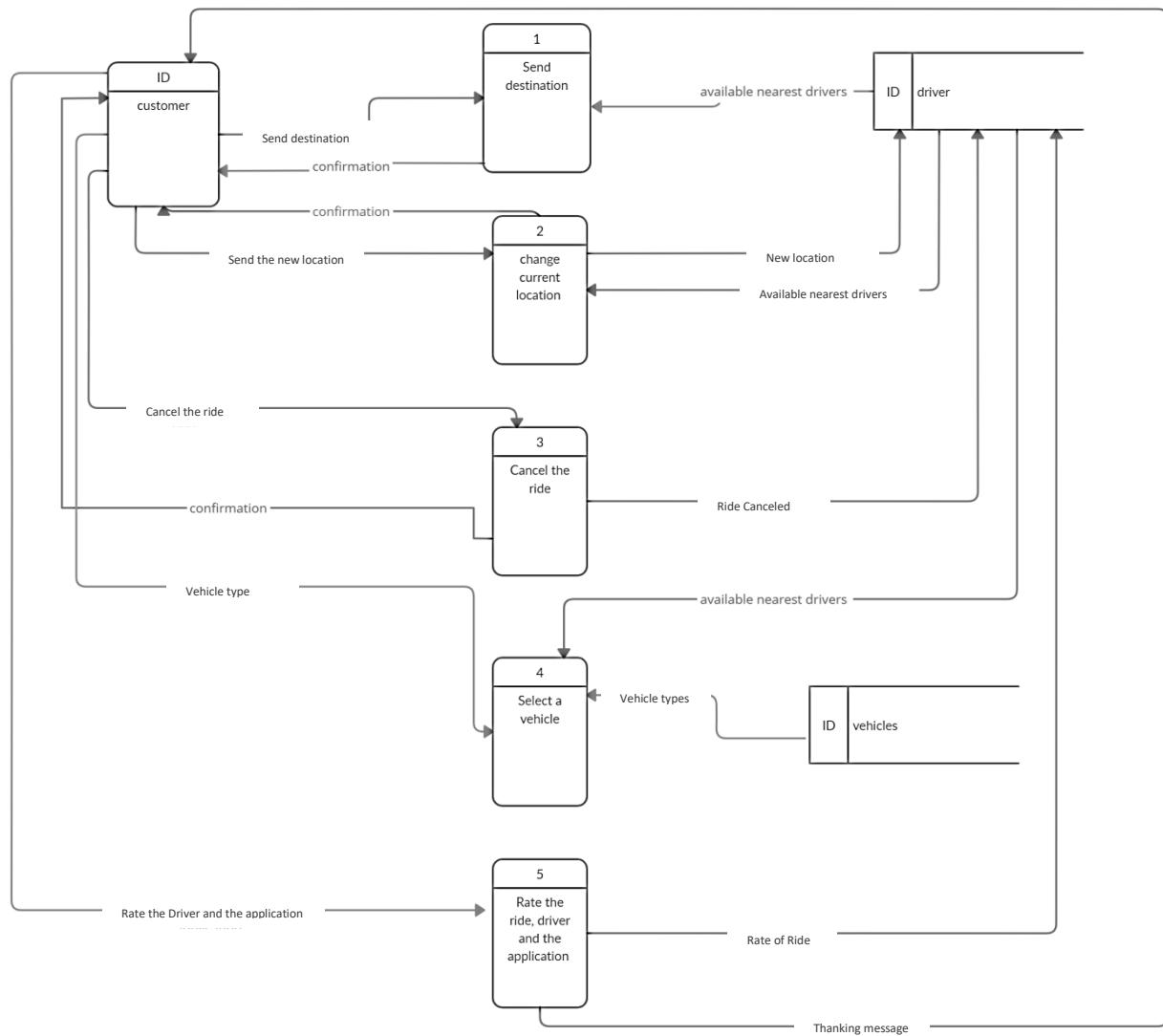


Detailed DFD of use case: edit or delete customer account

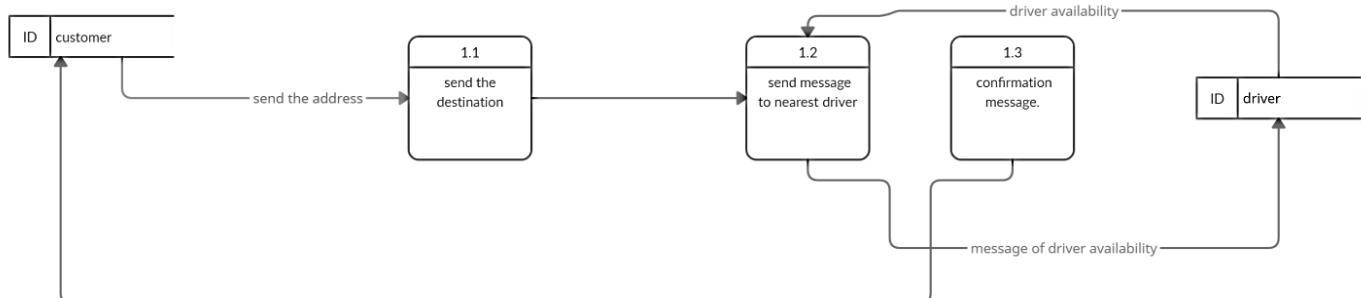


Customer operations Subsystem

Dataflow diagram for customer operations system:

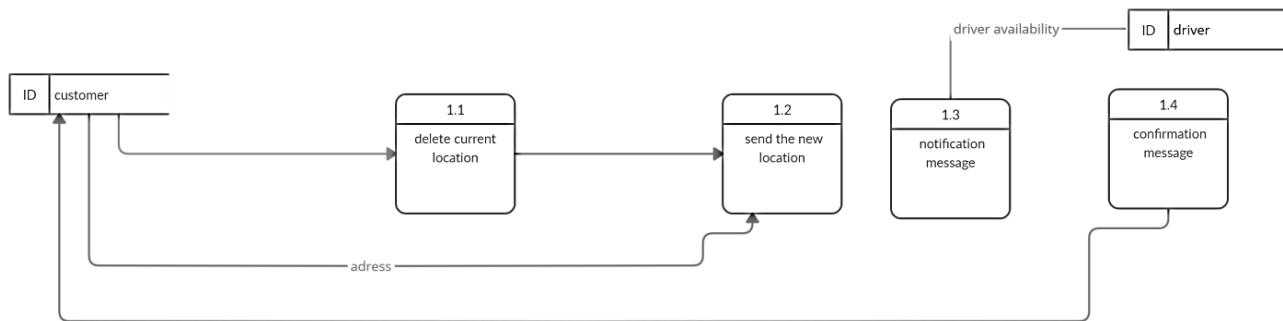


Detailed DFD for use case: Send destination

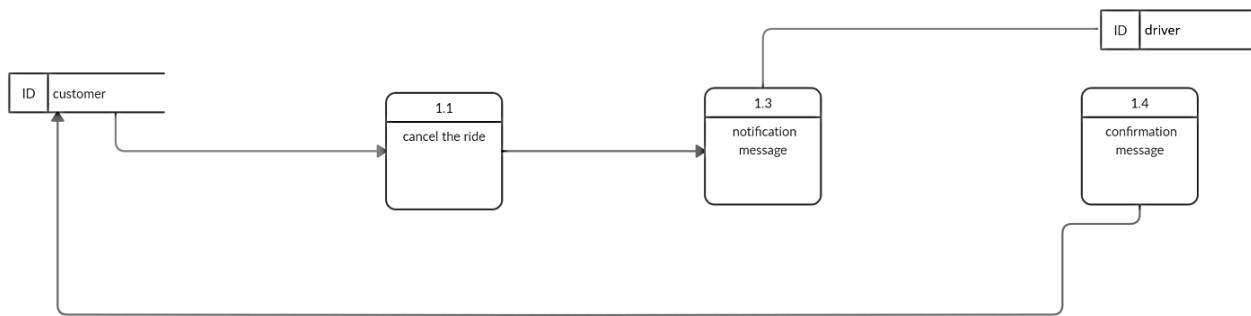


Customer operations Subsystem

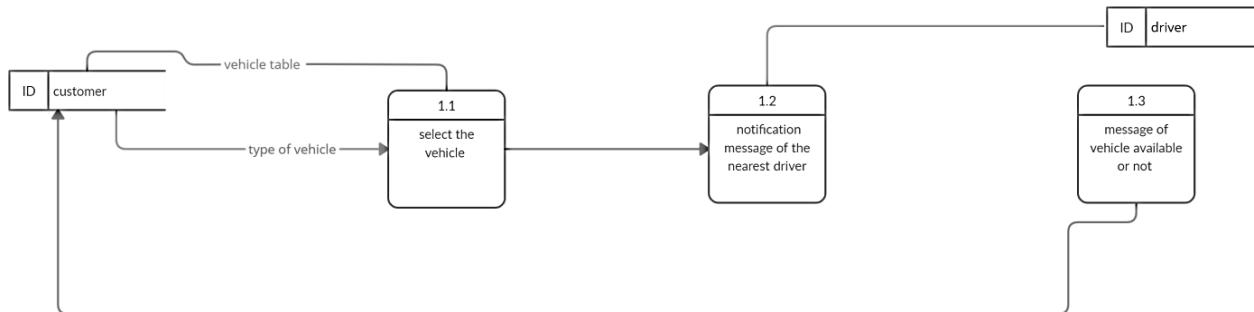
Detailed DFD for use case: change current location



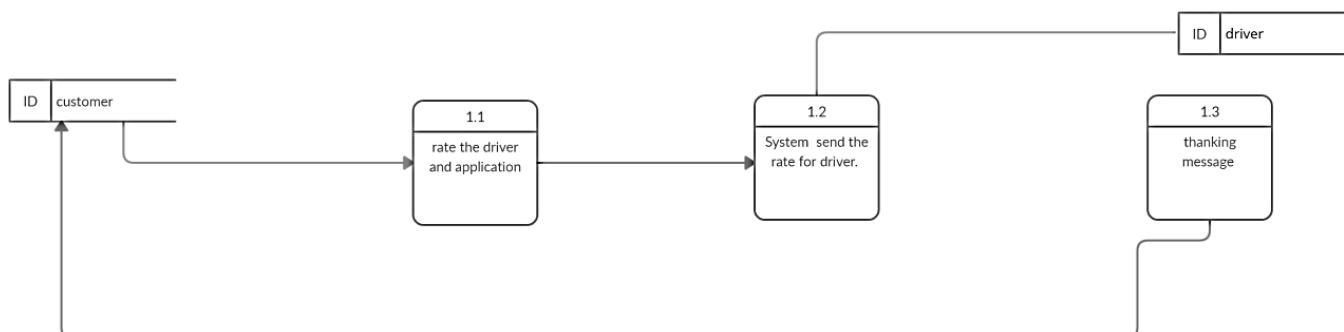
Detailed DFD for use case: Cancel the ride



Detailed DFD for use case: Select a vehicle

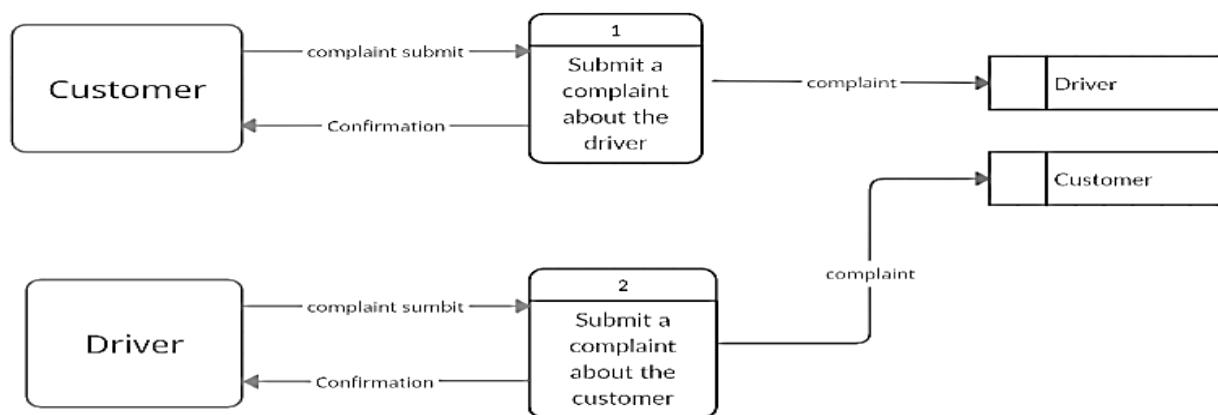


Detailed DFD for use case: Rate the ride, driver and the application

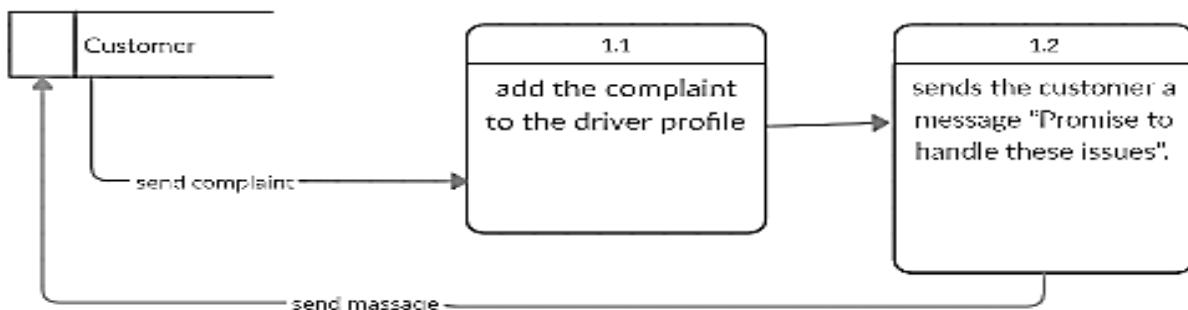


Complaint Submission Subsystem

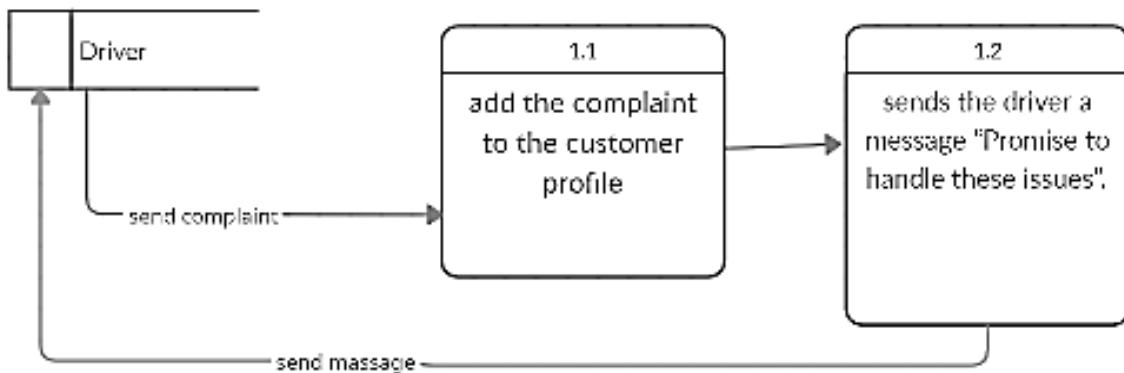
Dataflow diagram for complaint submission subsystem:



Detailed DFD for use case: Submit a complaint about the drive

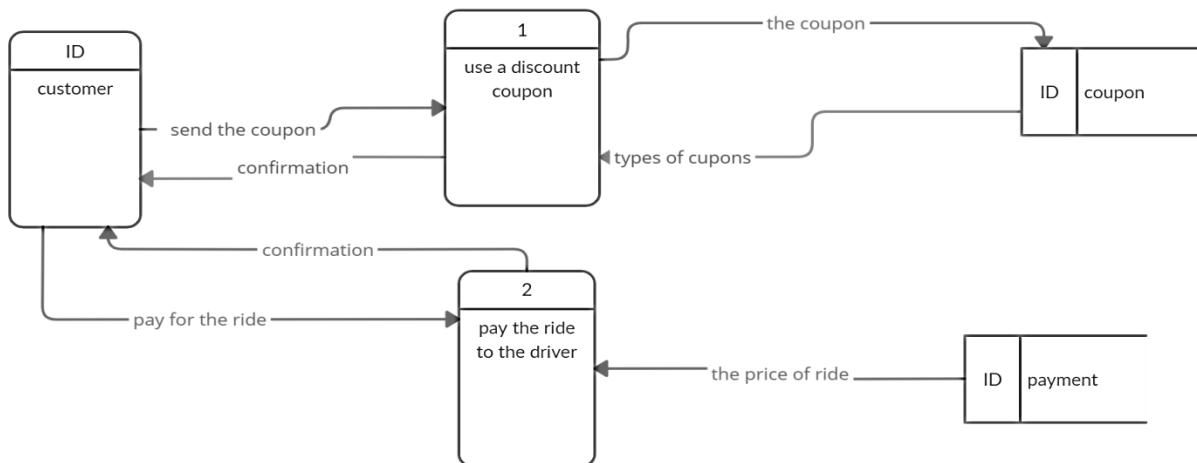


Detailed DFD for use case: Submit a complaint about the customer

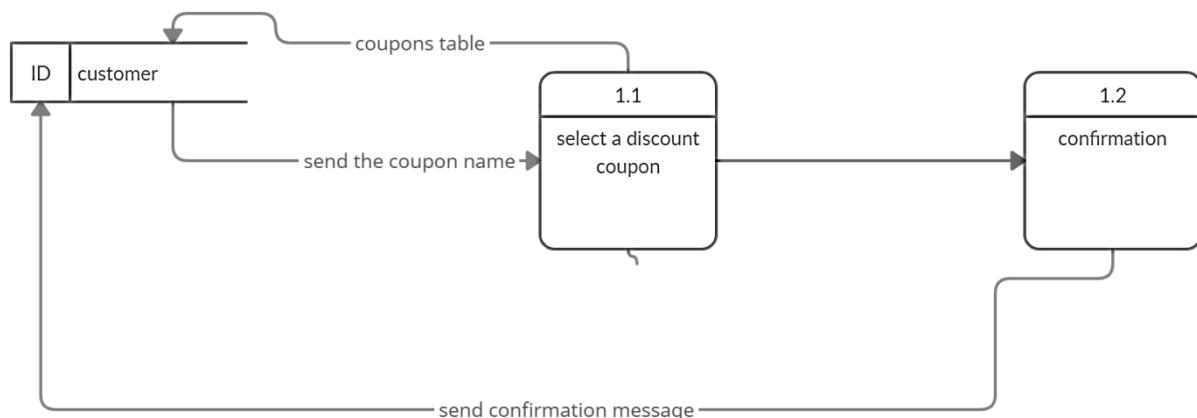


Payment Subsystem

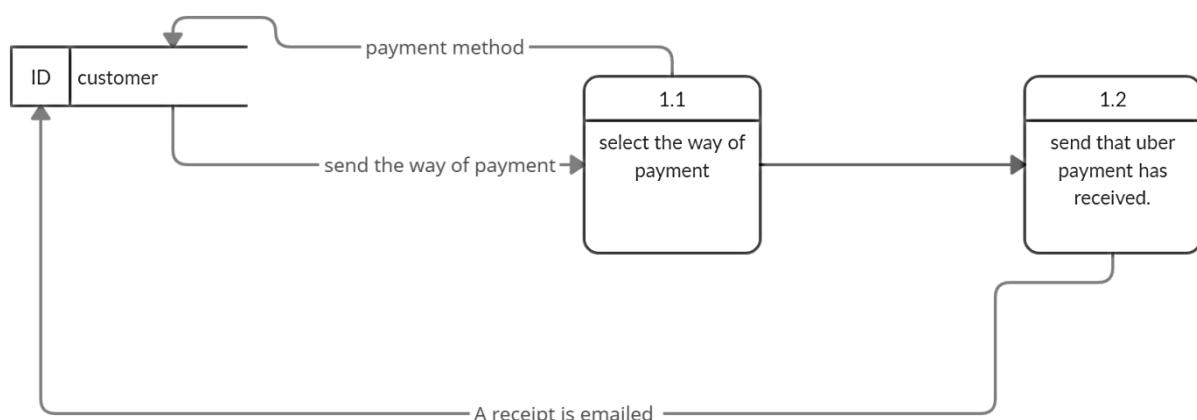
Dataflow diagram for payment system:



Detailed DFD for use case: use a discount coupon:

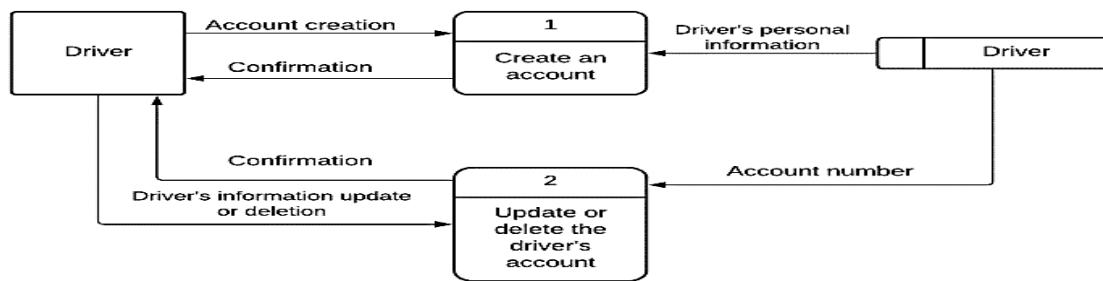


Detailed DFD for use case: pay the ride to the driver:

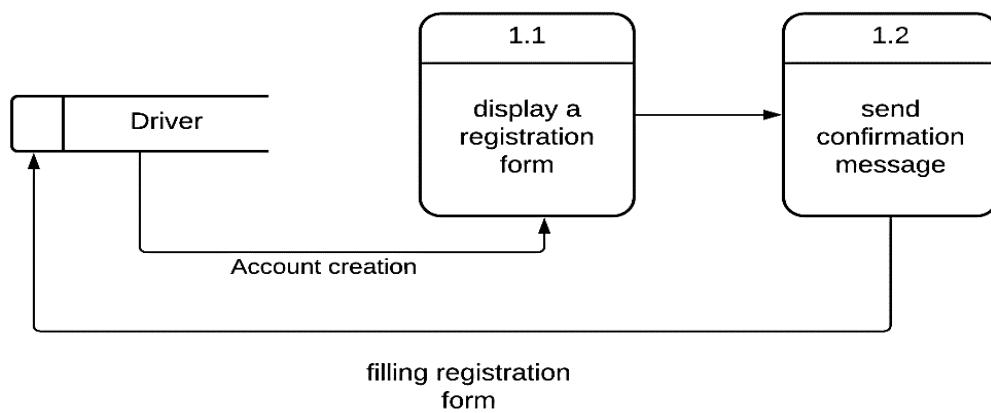


Driver Account Subsystem

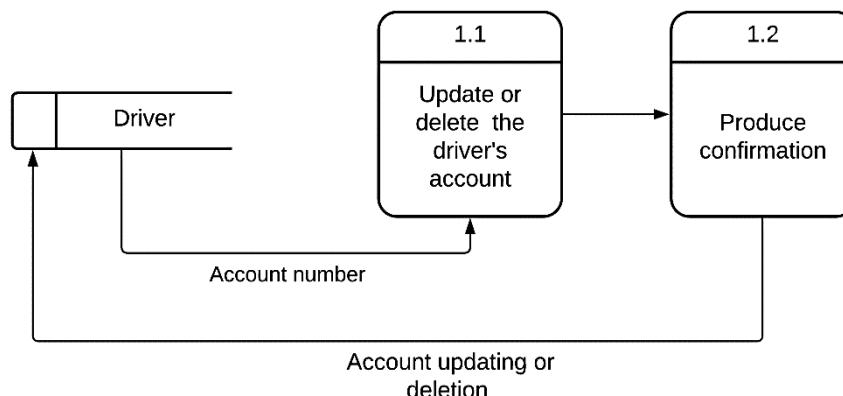
Dataflow diagram for driver account subsystem:



Detailed DFD for use case (Create driver account):

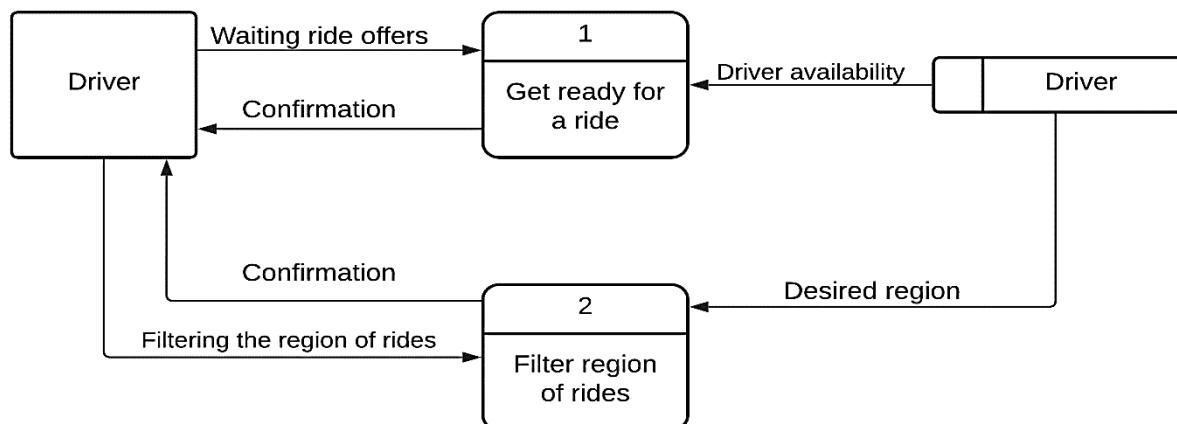


Detailed DFD for use case (Update or delete the driver's account):

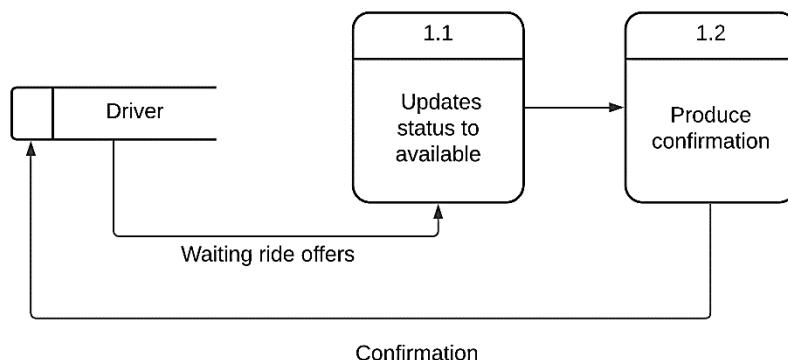


Ride operations subsystem

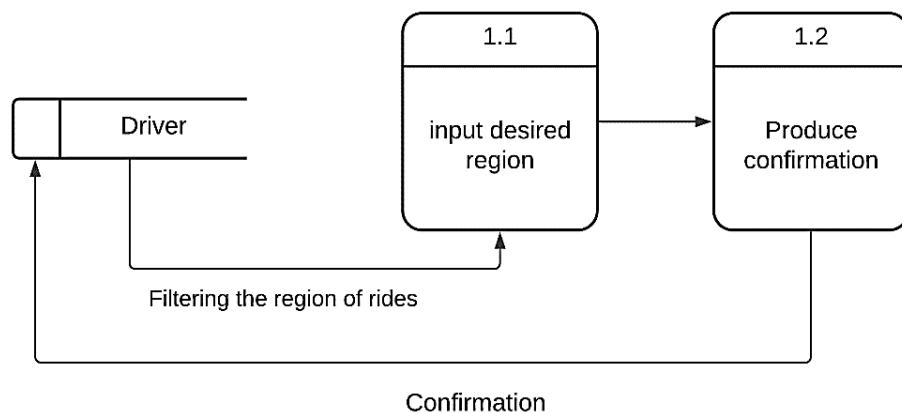
Dataflow diagram for Ride operations subsystem



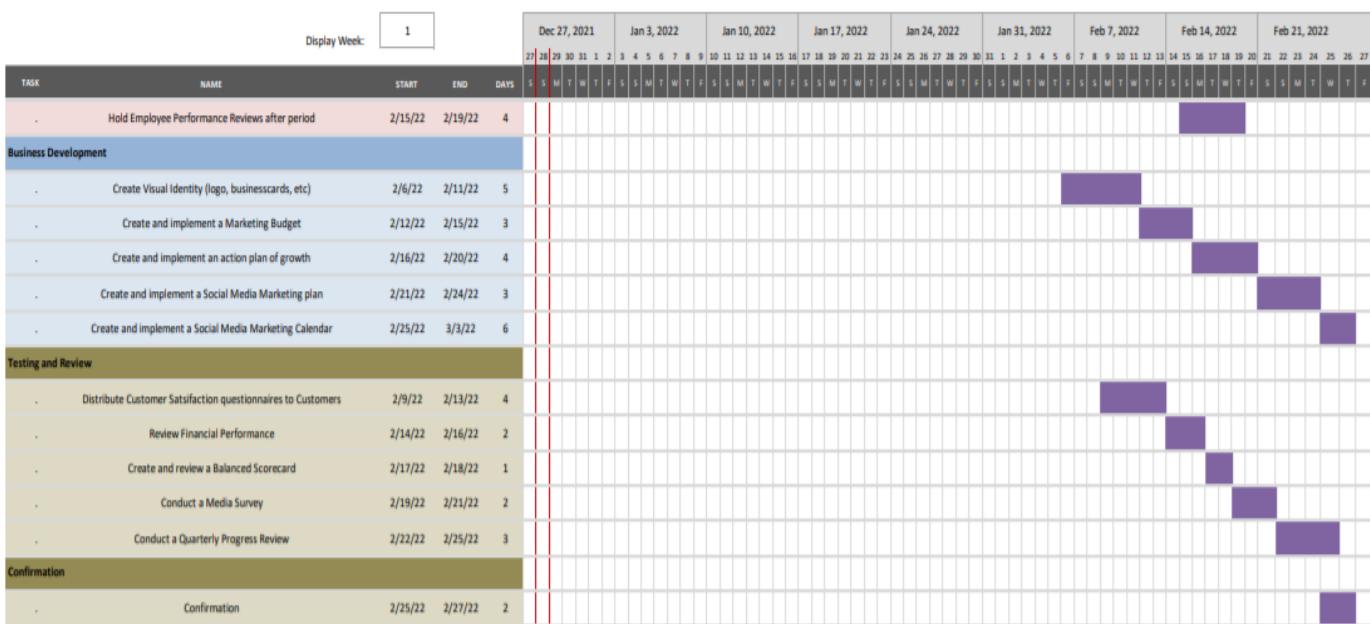
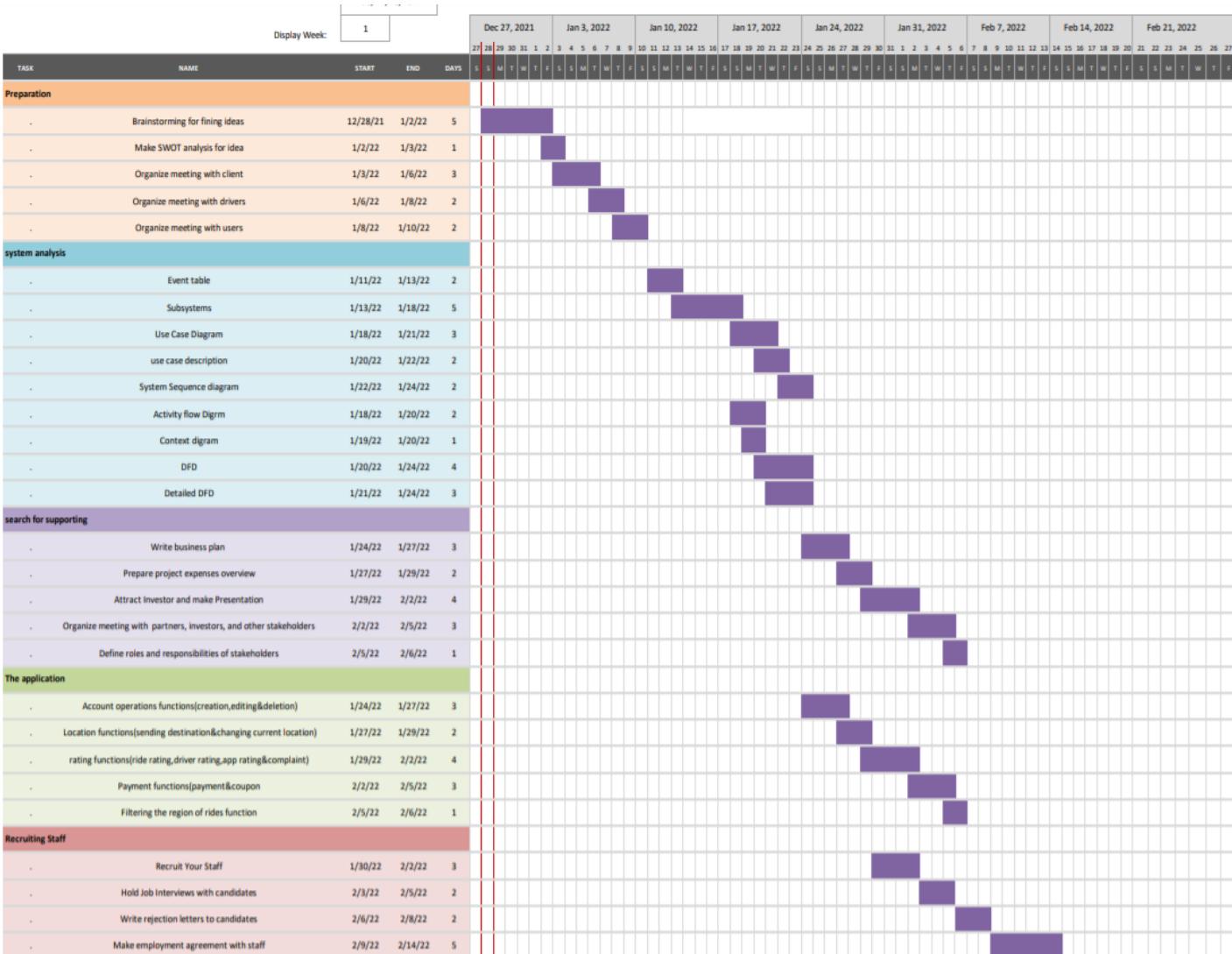
Detailed DFD for use case: Waiting ride offers



Detailed DFD for use case: Filter region of rides



Gantt chart



System vision document

Problem description

The transportation sector of any economy is always its backbone. This is the network that connects every part of a country together, it connects homes to religious gatherings, connects farms to markets and even connects students' accommodation to schools. Public transportation has many problems. The main problem of public transportation is its comfortability and time. Sometimes the customer wants to have a car to just pick up him from his home or wherever he is. Instead of going to the transportation parking, then waiting the car to be full. Sometimes it costs much to go to the parking if you are far and it may cost you more than your trip costs. Customer also may need to be more comfortable in his trip with little additional cost and it's mandatory to find a transportation car at any time. On the other side, there is another problem which is working as drivers can work any time they want and it's not mandatory to work all working hours continuously. This transportation network system helps the customer be more comfortable like it is his car with his own driver.

System capabilities

Transportation network system has 8 main capabilities:

- 1- Registering of customers or drivers
- 2- Booking features
- 3- The ability to identify a customer's location
- 4- Price calculator
- 5- Add multiple drop-off points
- 6- Easy payment options
- 7- Scheduled rides
- 8- Trip tracking
- 9- Reports
- 10- Coupons

Business benefits

Transportation network system has some business benefits which makes a good profit. One of the main benefits is that it makes money by running a ride-hailing service and takes a cut of the fares. It also gets paid by sponsors for advertising and earn money by increasing the company's reputation which can be sold posteriorly.

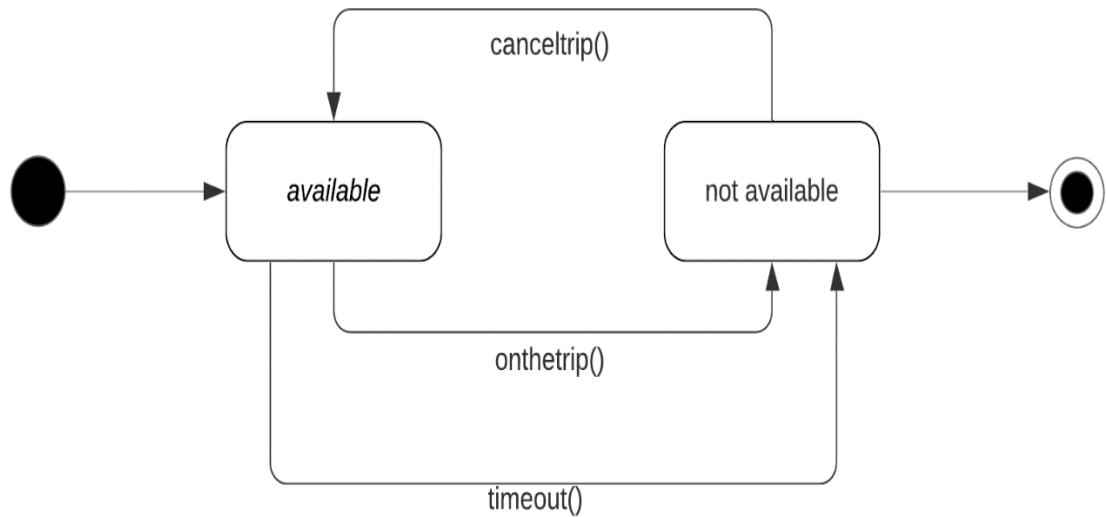
Cost benefit analysis

Cost Benefit Analysis

	Current Year (CY)	CY +1	CY +2	CY +3	CY +4	CY +5
Established Development Cost						
Salaries	\$800,000	\$920,000	\$1,074,460	\$1,288,800	\$1,399,455	\$1,745,785
Training	\$355,000	\$187,000	\$169,000	\$370,000	\$183,000	\$200,990
Equipment	\$60,000	\$33,000	\$19,000	\$55,000	\$17,000	\$19,340
Facilities	\$390,000	\$166,000	\$123,000	\$450,000	\$177,000	\$195,876
Utilities	\$76,000	\$97,000	\$100,000	\$119,000	\$99,00	\$116,750
Licenses	\$22,000	\$13,000	\$12,576	\$35,098	\$25,000	\$27,878
	Current Year (CY)	CY +1	CY +2	CY +3	CY +4	CY +5
Established Support Cost						
Conductivity/Hosting	\$100,176	\$133,320	\$154,266	\$230,008	\$260,086	\$290,889
programming	\$88,000	\$98,000	\$120,050	\$167,354	\$199,878	\$243,564
Help desk	\$88,000	\$97,100	\$120,987	\$167.43	\$196,868	\$234,686
Total Costs (Future Value)	\$1,820,300	\$1,416,000	\$1,498,036	\$2,317,898	\$1,801,455	\$2,306,619
Total Costs (Present Value)	\$1,820,200	\$1,409,588	\$1,387,634	\$2,254,211	\$1,604,353	\$2,165,768
						\$10,641,754
Benefits						
Increase revenues	\$674,000	\$965,500	\$1,187,879	\$1,476,988	\$2,645,976	\$5,387,876
Increase user interest	\$315,000	\$478,000	\$567,799	\$694,864	\$1,286,976	\$2,565,976
Improve team morale	\$44,000	\$61,500	\$73,920	\$96,096	\$172,976	\$365,946
New investors	\$276,000	\$387,400	\$430,076	\$579,109	\$1,009,366	\$2,016,709
Increase efficiency in trips	\$56,000	\$78,000	\$94,000	\$122,304	\$220,147	\$440,276
Total Benefits (Future Value)	\$1,365,000	\$1,970,400	\$2,353,674	\$2,969,361	\$5,335,441	\$10,783,776
Total Benefits (Present Value)	\$1,360,000	\$1,886,668	\$2,198,867	\$2,798,923	\$4,939,277	\$9,684,987
						\$22,868,722
Net Benefits/cost	(\$460,200)	\$359,078	\$612,444	\$427,613	\$2,918,112	\$7,430,354
Net present value	(\$460,200)	\$351,897	\$600,195	\$419,061	\$2,859,750	\$7,281,747
Cumulative NV	(\$460,200)	(\$101,122)	\$511,323	\$938,939	\$3,857,048	\$11,287,402
Payback Period	1.1651					
Present Value Discount Rate	2%					

Cost Benefit Analysis	cost
Total PV Benefits	\$22,868,722
Total PV Costs	\$10,641,754
NET BENEFIT	12,226,968.00

State machine diagram of Vehicle



Context Diagram

