sd Print names of all the passengers for a given bus

Question 1 Part 1

| b : Bus | r : Reservation | p: Passenger |

PrintPassengerNames(_)

loop For Each 'r' in 'b'

getPassengerName(_)

getPassengerName( )
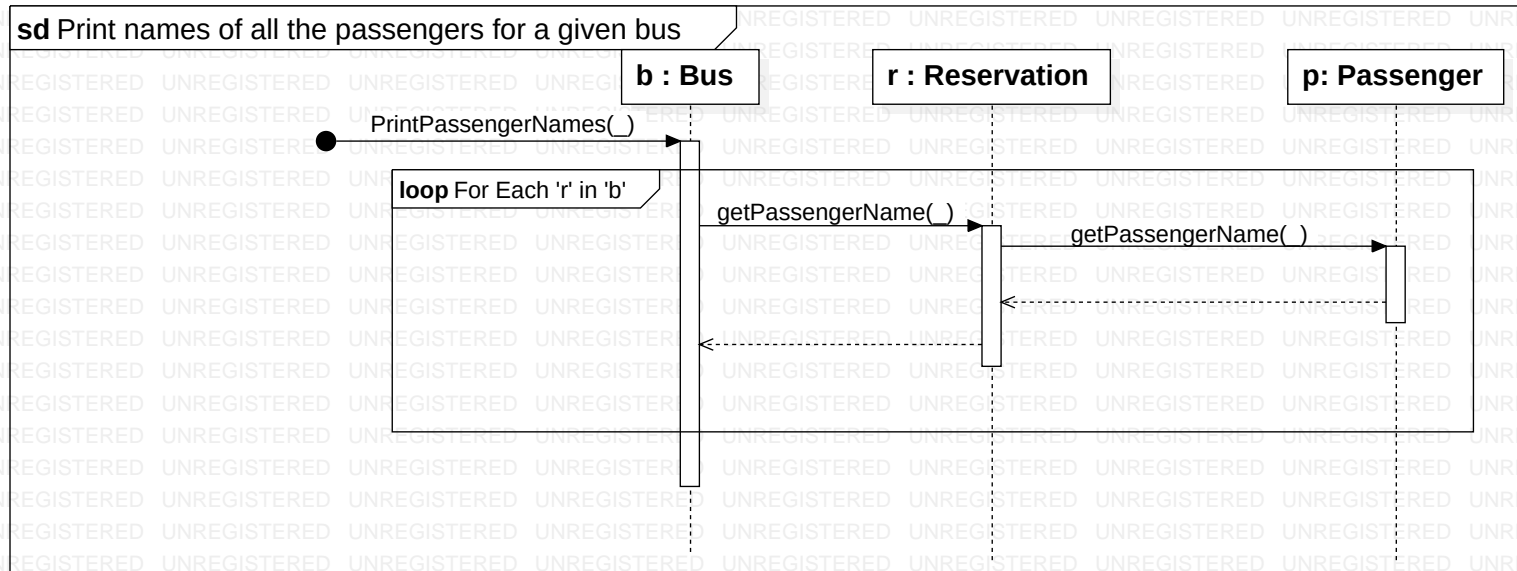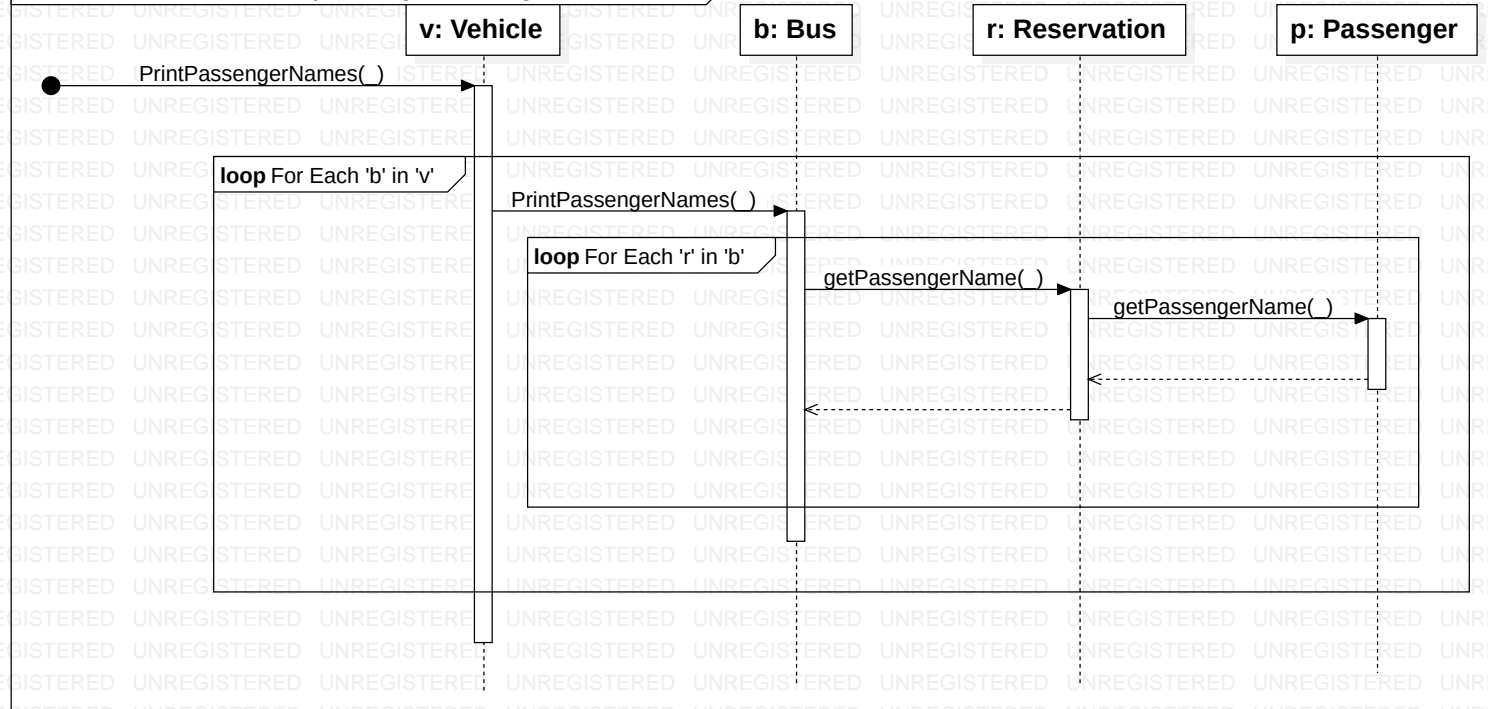
Explanation: The PrintPassengerNames(_) function is in the Bus object which is called. There is a loop in that function that iterates over each reservation object pointed to by the Bus object. In the loop, a call is made to a function getPassengerName(_) in the Reservation object. This function further calls a function getPassengerName(_) in the Passenger object. The function in Passeger object returns the name to the function in Reservation object and the function in the Reservation object returns the name in the Bus object where it is printed.
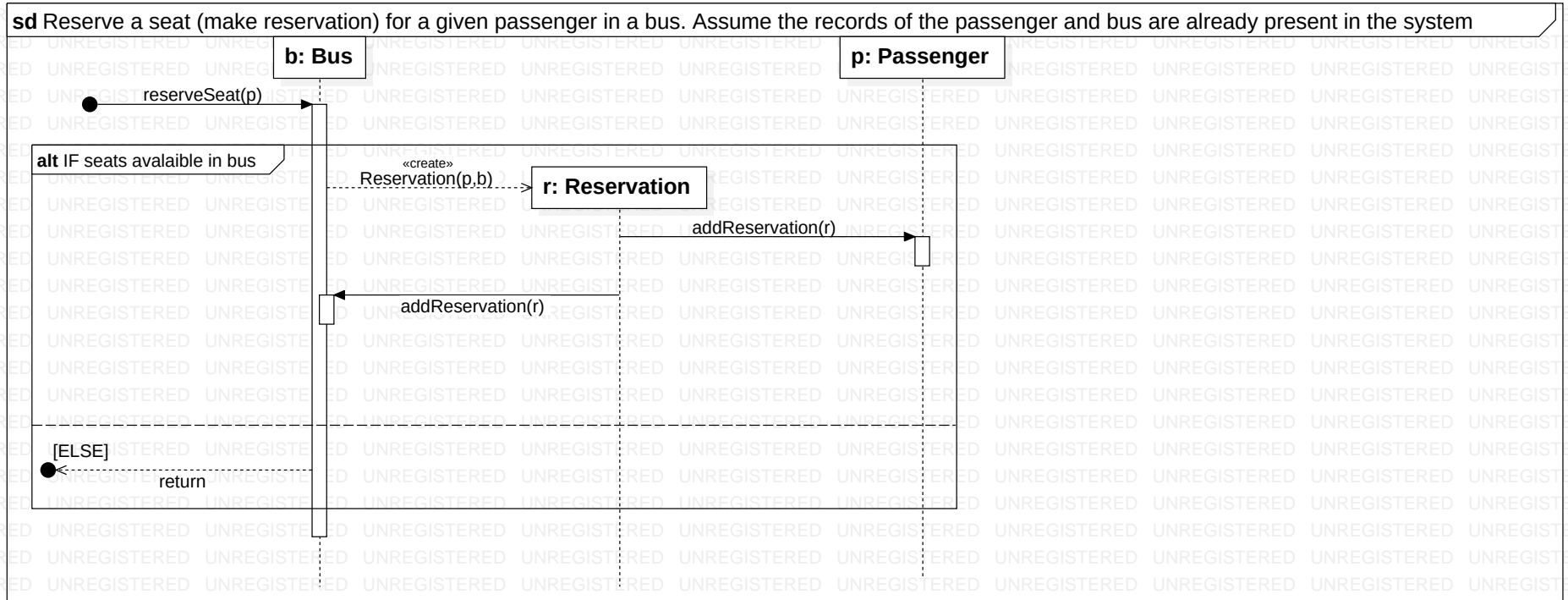
sd Print names of all the passengers for a given vehicle

Question 1 Part 2

| v: Vehicle | b: Bus | r: Reservation | p: Passenger |

PrintPassengerNames( )

loop For Each 'b' in 'v'

PrintPassengerNames( )

loop For Each 'r' in 'b'

getPassengerName( )

getPassengerName( )

Explanation: The PrintPassengerNames(_) function is in the Vehicle object which is called. There is a loop in that function which iterates over each Bus object pointed to by the Vehicle object. In the loop a call is made to the PrintPassengerNames(_) function of the Bus object. The PrintPassengerNames(_) function of the Bus object is the same function shown in Part 1 of this question.
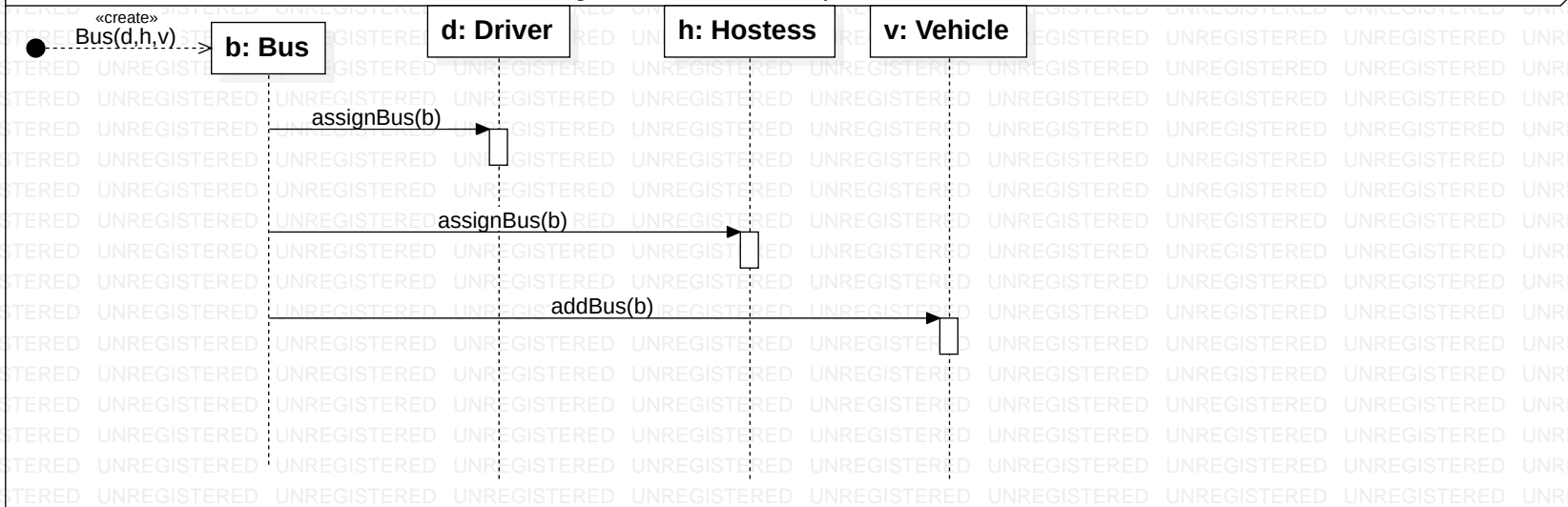
Question
1 Part 3

sd Reserve a seat (make reservation) for a given passenger in a bus. Assume the records of the passenger and bus are already present in the system

b: Bus

p: Passenger

reserveSeat(p)

alt IF seats avalaible in bus

«create»
Reservation(p,b)

r: Reservation

addReservation(r)

addReservation(r)

[ELSE]

return

Explanation: There is a function reserveSeat(p) in Bus object which is called. This function takes Passegner object as an argument. The function checks if seats are available in the bus. If the seats are availabe, a call is made to the Constructor of Reservation Class which creates a new Reservation object. The Constructor of Reservation Class is passed with two arguments, the Passenger object and the Bus object. The Reservation object sets its pointers to the Bus object and Passenger object and also calls the addReservation(r) function in both the Passenger object and the Bus object so that both the Bus object and the Passenger object can point to the Reservation object. If seats are not available in the Bus object, the reserveSeat(p) function simply returns.

sd Add a new Bus record. Assume the following information is also provided: bus driver, the hostess, and the vehicle to use

Question 1 Part 4

«create»
Bus(d,h,v) → **b: Bus**

d: Driver

h: Hostess

v: Vehicle

assignBus(b)

assignBus(b)

addBus(b)

Explanation: To add a new Bus, a call to the Constructor of the Bus Class is made with the Driver object, Hostess object and Vehicle Object passed as arguments. The Constructor of the Bus Class sets its pointers to its Driver object, Hostess Object and its Vehicle Object. The Constructor then calls assignBus(b) function of the Driver object so that the Driver object can point to the Bus object. The Constructor then calls assignBus(b) function of the Hostess object so that the Hostess object can point to the Bus object. The Constructor then calls the addBus(b) function of the Vehicle object so that the Vehicle object can point to the Bus object.

Question 2

Part 1

Use Case Name: Withdraw cash from ATM

Actor/User: Customer

Preconditions:

- The customer has a valid ATM card that is not expired.
- The customer has a valid and active back account associated with the ATM card.
- The ATM machine is operational and connected to the bank's system.

Steps:

1. The customer inserts their ATM card in the ATM machine's card reader.

2. The ATM reads the card and asks the Customer to enter their PIN.

3. The customer enters their PIN.

4. The ATM machine displays a menu with multiple options including cash withdrawal.

5. The customer chooses cash withdrawal option from the menu.

6. The ATM asks the customer to enter the desired withdrawal amount.

7. The customer enters desired withdrawal amount.

8. The ATM ejects customer's card and asks the customer to collect it. (assuming that ATM first ejects the card and then the cash)

9. The customer collects the ATM card.

10. The ATM outputs the cash and asks the user to collect it.

11. The customer collects the cash.

12. The ATM updates customer's bank balance and prints a receipt for the transaction.

13. The customer collects the receipt.

14. The ATM returns to the state where it asks to enter ATM card again into the card reader.

15. The customer leaves the ATM machine.

Alternate Paths:

2B. If the customer inserts the card in the wrong direction, the ATM machine asks the customer to remove the card and insert again.

4B. If the customer enters incorrect PIN, the ATM asks the customer to enter the PIN again. If the customer fails to enter the correct PIN more than 3 times, the ATM will not eject the card and the customer will have to contact the bank staff to resolve the issue.

8B. If the customer enters withdrawal amount greater than their current account balance, the ATM asks the user to enter amount less than or equal to the current bank balance of the customer.

10B. If the customer does not collect the ejected ATM card within a certain time period (e.g. 2 mins), the card is pulled back into the machine and the customer will have to consult the bank staff to retrieve their ATM card.

12B. If the customer does not collect the ejected cash within a certain time period (e.g. 2 mins), the cash is pulled back into the machine and the transaction is cancelled.

Part 2

Use Case Name: Record sale at a POS terminal
Actor/User: Cashier, Customer
Preconditions:
- The POS terminal is operational and connected to the store's database.
- The cashier is logged into the POS system.

Steps:

1. The cashier receives items that the customer wants to purchase.

2. The cashier scans the barcode on the items.

3. The system displays the details of all the items including the quantity of each item, the price of each item and grand total.

4. The cashier applies any discounts the customer can avail if the customer has a coupon code or a customer loyalty card.

5. The system displays the updated grand total after applying discount.

6. The cashier asks the customer to make payment for the due amount using either hard-cash or credit/debit card.

7. The customer makes payment using the desired payment method.

8. For hard-cash the cashier enters the amount received from the customer into the system. For credit/debit card the system automatically processes the transaction.

9. The system saves the sale record, updates the inventory, prints a receipt and displays any change that must be returned to the customer if the customer made payment using hard-cash.

10. The cashier hands over the receipt, the change and the items to the customer and the customer leaves.

11. The system enters the state where it is ready to be used by the cashier to service the next customer at the POS terminal.

Alternate Paths:

2B. If the barcode on the item is damaged and can't be scanned, the cashier manually enters the item into the system.

9B. If the customer pays using credit/debit card and the card is declined, the customer is asked to make payment using either hard-cash or an operational credit/debit card.