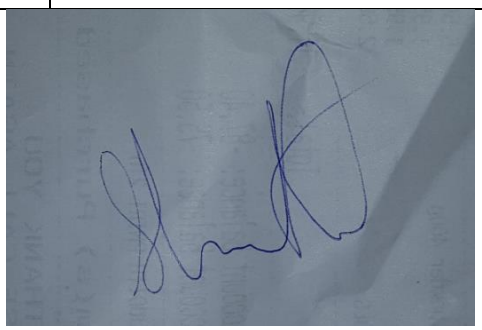
Assessment Brief/Cover Sheet

Class Group:	062CS		
Assessor:	Maura O'Halloran		
Component Title and Code:	Object Oriented Programming, 6N2108		
Assessment Technique:	Skills Demo	**Weighting:**	30%
Title:	Skills Demo #2		
Issue Date:	8th March 2021	**Submission Date:**	25th March 2021
Learning Outcomes Assessed:	LO2, LO4, LO5, LO6, LO8		

Guidelines: Fully address each point in the requirements section of this brief.

Assessment Criteria	Available Marks
Program design	8
Program implementation	12
Quality of application	6
Testing of application	4

Learner Name:	Shelton Ngwenya 

I confirm that:

1. I have been provided with information about Cork ETB's assessment and appeals procedures and my responsibilities with regard to assessment.
2. The assessment work produced by me is all my own original work.

Note to Learners:

- Plagiarism is the presentation of someone else's ideas, arguments, concepts or work as your own by failing to reference or acknowledge it properly. All such work must be acknowledged. Any learner, who presents another's work as their own, will be investigated in line with Cork ETB Assessment Malpractice procedures and may be awarded a zero grade.
- Learners should keep copies of all assessment submitted, where applicable.

CALLOUT DISPATCH SERVICES

CallOut Dispatch Services has five taxis, two buses and three minibuses. The registration number, make, model, kilometres driven, and the people capacity are held on each vehicle. All the cars can carry a wheelchair in the boot. Some of the buses and minibuses are wheelchair accessible. Details of the vehicles are stored in *vehicles.txt*.

The company currently has six drivers. Each driver has an ID number, a name, address, phone number, the amount of mileage that they have done for the company to date, a start date and the type of license that they have. A B licence allows them to drive a taxi only, a D1 licence allows them to drive a minibus and a taxi, a D licence allows them to drive all three types of vehicles. Details are stored in *drivers.txt*.

When a customer contacts CallOut Dispatch Services to arrange a fare, they give their name, telephone number, source, destination and the number of people that will be travelling. They also indicate if any of the passengers use a wheelchair.

The dispatcher views the details on all vehicles to see if there is a suitable vehicle available for the fare. If so, he/she then views the details on all drivers to see if there is an available driver with a suitable licence. If a driver and vehicle are available, the dispatcher checks google maps to determine how long the journey will take (you will just enter this value). The dispatcher then schedules the fare consisting of the customer's details, the vehicle details and the journey details and these details are given to the chosen driver.

The dispatcher should be able to view a list of all active fares at any time. This should include details on the vehicle, driver and customer.

If a driver and/or vehicle are not available, the dispatcher tells the customer that there is no driver available at that time.

After each fare, a driver goes to the dispatcher and tells them that the fare is complete. The driver is marked as free and the fare details are added to the daily log. These details include the fare details that were in the driver's schedule and the cost of the fare (€5 call-out charge + € 6.50 per kilometre). The number of kilometres is updated for both the driver and the vehicle.

At the end of the day, a report is to be generated. For each vehicle and for each driver, it will show the number of kilometres driven and the revenue generated from fares.

You are required to design, code and test an Object Oriented application that will meet the requirements of Callout Dispatch Services. You are to implement a menu with (at least) the following options:

- Display all details on all vehicles (including whether the vehicle is free or not).
- Display all details on all drivers (including whether the driver is free or not).
- Display all active fares.

- Log return from fare.
- Allocate fare.
- Print daily report.
- Exit.

Furthermore, you are to use inheritance as effectively as possible and will have the final code as separate files .h and .cpp files.

SUBMIT TO MOODLE

1. **Full documentation of your algorithm:** This will include the preparatory work that you did before coding. It should contain details on the classes that you intend to implement and the members and methods that you intend including in each class. You are to include a diagram of the hierarchy of the classes that you are using and any inheritance that exists between them with any virtual inheritance marked clearly on the diagram. Specify the data type of each member and detail an algorithm for each of the methods and the main program. Include any other documentation that you consider relevant.

2. **Testing of your program**

   This should show how you tested your program. This should include at least four journeys that between them test all aspects of your program. In each case indicate the test that you are carrying out and the result of that test.

   Include 1. and 2. And the source code in one document, and upload that to **Skills Demo #2 – Documentation** on Moodle.

3. **The source code zipped.**

   Submit your source code (zipped) to **Skills Demo #2 – Source Code** on Moodle.

Marks will be allocated as shown on the following page.

Cork Education and Training Board

Object-Oriented Programing 6N2108	Learner Marking Sheet 2 Skills Demonstration #2 (Practical) 30%

Learner's Name:_____ Learner's PPSN:_____

Skills Demonstration 2		
Program design, to include at least: • Class design (with awareness of data abstraction and appropriate use of member and methods). • A hierarchy of the classes depicting the inheritance used to solve the devised problem. • Documentation of any issues that might result from the designed hierarchy and how such issues will be resolved. • Identification of any parts of the designed solution that might be reused. • Overall program design.	8	
Program implementation to include at least: • A parallel between design and implementation. • A final product with no syntax errors. • An attempt at each of the individual requirements of the devised brief.	12	
Quality of application to include at least: • A final product that meets all specifications in the brief. • A final product with no run-time errors. • A final product that adheres to industry standard best practices. • Robust data verification and validation with appropriate feedback. • Effective use of object oriented concepts to include inheritance. • Reusable parts of the programs saved as separate entities and linked to from within the source code.	6	
Testing of application to include at least: • A comprehensive set of test data (and expected results) that tests the program for correct input and incorrect input.	4	
Total Mark:	**30**	

Assessor's Signature:_____ Date:_____

External Authenticator's Signature:_____ Date:_____

SKILLS DEMO 2: OO PROGRAMMING

Shelton Ngwenya 1 April 2021

Contents

Classes

Person

Customer

Fare

Report

Vehicle

Driver

Variables

Person

String: name, phone number, address

Customer

String: source, destination;

Monetary value: travellerNum, wheelChairNum;

Fare

Monetary Value: charge per Kilometer = 6.50

Monetary Value callOutCharge = 5

Boolean: validInput

Report

Monetary Value: totalKMDriven

Monetary Value: totalRevenue

Vehicle

String: registrationNum, vehicleMake, vehicleModel, vehicleType

Monetary Value: vehicleMileage;

Boolean: wheelChair

Monetary Value: vehicleCapacity

Boolean isAvailable

Driver

String: driverIdNum, startDate, driverLicenseType

Monetary Value: driverKMDriven

Boolean driverIsAvailable;

Methods

IMPORTANT! EVERY OUTPUT MUST BE TAB'ed

Customer

CHECK IF ARRAY IS EMPTY

```
    IF (input is empty)
        OUTPUT  "That one is empty."
        OUTPUT blank line
    RETURN false
    ELSE
    RETURN true
    END IF
```

END CHECK IF ARRAY IS EMPTY

PRINT CUSTOMER DETAILS

```
    OUTPUT "Name: " + customer name
    OUTPUT blank line
    OUTPUT "Phone Number: " + customer phone number
    OUTPUT blank line
    OUTPUT "No. Travellers: " + travellerNum
    OUTPUT blank line
    OUTPUT "No. wheel chairs: " + wheelChairNum
    OUTPUT blank line

    OUTPUT "Source: " +  customer journey source
    OUTPUT blank line
    OUTPUT "Destination: " + customer journey destination
    OUTPUT blank line
    OUTPUT "Journey Length: " +  journey length
```

```
        OUTPUT blank line


        OUTPUT "Driver ID No.: " + driver ID num
        OUTPUT "Vehicle Registration No.: " + vehicle registration Num
        OUTPUT "Travel cost: " + cost
END PRINT CUSTOMER DETAILS


SCHEDULE FARE
        OUTPUT "Enter fare details
        OUTPUT blank line
        OUTPUT "Name: "
        INPUT customer full name
        OUTPUT "Telephone Number:  "
        INPUT customer telephone number
        OUTPUT “Source: "
        INPUT travel source
        OUTPUT  “Destination: "
        INPUT travel destination

        DO
                OUTPUT “Number of people travelling: "
                INPUT travellerNum
                Validate input
                IF (Input IS NOT valid)
                        OUTPUT “Please try again”
                        OUTPUT blank line
                END IF
        WHILE input IS NOT valid
```

```
        DO
                OUTPUT “Number of people using a wheelchair: "
                INPUT wheel Chair number
                Validate input
                IF (Input IS NOT valid)
                        OUTPUT “Please try again”
                        OUTPUT blank line
                END IF
        WHILE input IS NOT valid

        GET JOURNEY LENGTH
        CALCULATE FARE
END SCHEDULE FARE

GET CUSTOMER FARE DETAILS
        OUTPUT “Enter fare details”
        OUTPUT blank line
        OUTPUT “First name: ”
        INPUT first name
        OUTPUT blank line
        OUTPUT “Last name: ”
        INPUT last name
        OUTPUT blank line
        OUTPUT “Telephone number: ”
        INPUT telephone number
        OUTPUT blank line
        OUTPUT “Source: ”
        INPUT source
        OUTPUT blank line
        OUTPUT “Destination: ”
        INPUT destination
```

OUTPUT blank line

DO

OUTPUT “Number of people traveling: ”

INPUT number of people traveling

CHECK number of people traveling IS NUMBER

WHILE number of people traveling = IS NUMBER

OUTPUT blank line

DO

OUTPUT “Number of passengers using a wheelchair: ”

INPUT passengers using a wheelchair

CHECK Number of passengers using a wheelchair IS NUMBER

WHILE Number of passengers using a wheelchair = IS NUMBER

OUTPUT blank line

END GET CUSTOMER FARE DETAILS

Person Class

OUTPUT WELCOME MESSAGE

OUTPUT
”_____”

OUTPUT blank line

OUTPUT "Welcome to CallOut Dispatch Services"

OUTPUT blank line

OUTPUT
“_____”

OUTPUT blank line

END OUTPUT WELCOME MESSAGE

INPUT IS MONETARY VALUE CHECK

IF user input is not a monetary value

OUTPUT blank line

OUTPUT “Error: Input is not a number”

OUTPUT blank line

RETURN false

ELSE

RETURN true

END IF

END INPUT IS MONETARY VALUE CHECK

CHECK USER INPUTTED ARRAY INDEX

IF (user input > sizeOfArray OR input < 0)

OUTPUT “Error: Input is out of bounds”

RETURN false

ELSE

RETURN true

END IF

END CHECK USER INPUTTED ARRAY INDEX

SLIGHT PAUSE

FOR **LOOP**

OUTPUT "." 3 times per ouput In 1 second intervals

END FOR LOOP

END SLIGHT PAUSE

PRINT CONDITIONAL EXECUTION SEPERATOR

OUTPUT black line

OUTPUT "_" 120 times

END PRINT CONDITIONAL EXECUTION SEPERATOR

OUTPUT MENU

DO

OUTPUT “Would you like to:”

OUTPUT blank line

OUTPUT “1. Display all vehicle details”

OUTPUT blank line

OUTPUT “2. Display all driver details”

OUTPUT blank line

OUTPUT “3. Display all active fares”

OUTPUT blank line

OUTPUT “4. Log return from fares”

OUTPUT blank line

OUTPUT “5. Allocate fares”

OUTPUT blank line

OUTPUT “6. Print daily report”

OUTPUT blank line

OUTPUT “7. Exit”

INPUT option

Validate option AND check is number

WHILE valid option = false

END OUTPUT MENU

VALIDATE OPTION

IF option < 1 **OR** option >7 **THEN**

OUTPUT option + “is an invalid option.”

OUTPUT blank line

SET valid option = FALSE

ELSE

SET valid option = TRUE

END IF

END VALIDATE OPTION

VALIDATE INPUT IS NUMBER

IF input IS NOT number

OUPUT “Input is not a number”

SET valid option = FALSE

ELSE

SET valid option = TRUE

END IF

END VALIDATE INPUT IS MONETARY VALUE

Driver class

CHECK IF DRIVER IS AVAILABLE

IF (Driver is not available) {

OUTPUT "Error: Driver is not available."

OUTPUT blank line

RETURN false

ELSE IF

RETURN true

END IF

END CHECK IF DRIVER IS AVAILABLE

PRINT DRIVER DETAILS

OUTPUT Driver ID Number Driver Name Driver Address Driver Phone Number Driver Kilometer Driven Driver Is Available

OUTPUT blank line

NB! Do this for the rest of the other drivers (6 times)

END PRINT DRIVER DETAILS

Vehicle class

PRINT VEHICLE DETAILS

OUTPUT Vehicle Type Vehicle Registration Number Vehicle Make Vehicle Model Vehicle Mileage Vehicle Capacity Vehicle WheelChair Capability Vehicle is Available

OUTPUT blank line

NB! Do this for the rest of the other vehicles (11 times)

CHECK IF VEHICLE IS AVAILABLE

IF (Vehicle is not available) {

OUTPUT "Error: Vehicle is not available."

OUTPUT blank line

RETURN false

ELSE IF

RETURN true

END IF

END CHECK IF VEHICLE IS AVAILABLE

Fare Class

CALCULATE FARE

```
DO
        OUTPUT "What is the expected journey length in kilometres: "
        INPUT journey length
IF (input IS NOT valid)
        OUTPUT "Please try again"
        OUTPUT blank line
ELSE
        OUTPUT "Journey Length: "
        OUTPUT blank line
END IF
WHILE input IS NOT valid

fareCost = (journeyLength * kmCharge) + callOutCharge;
OUTPUT "Fare Cost = E" + fareCost
OUTPUT blank line
```

END CALCULATE FARE

MAIN CLASS

CREATE a vehicles array of 11 objects with this information:

("Taxi", "12 C 4956", "Hyundai", "i30 Tourer", 65172, 4, IsWheelChairAccessible = true, IsAvailable = true),

("Taxi", "14 C 89365", "Ford", "Mondeo", 33892, 4, IsWheelChairAccessible = true, IsAvailable = true),

("Taxi", "15 C 46046", "VW", "Passat", 23897, 4, IsWheelChairAccessible = true, IsAvailable = true),

("Taxi", "14 C 38492", "Nissan", "Primera", 29418, 4, IsWheelChairAccessible = true IsAvailable =, true),

("Taxi", "10 C 99393", "Skoda", "Octavia", 89678, 4, IsWheelChairAccessible = true, IsAvailable = true),

("Taxi", "15 C 2379", "Seat", "Toledo", 12812, 4, IsWheelChairAccessible = true, IsAvailable = true),

("Bus", "10 C 37209", "Ace", "Cougar", 28786, 48, IsWheelChairAccessible = true, IsAvailable = true),

("Bus", "11 C 882", "Daimler", "Fleetline", 68893, 48, IsWheelChairAccessible = false, IsAvailable = true),

("Minibus", "14 C 23908", "Ford", "Transit", 18827, 16, IsWheelChairAccessible = true, IsAvailable = true),

("Minibus", "10 C 831", "Fiat", "Ducato", 32986, 16, IsWheelChairAccessible = true, IsAvailable = true),

("Minibus", "13 C 82677", "Mercedes-Benz", "Vario", 18567, 20, IsWheelChairAccessible = false, IsAvailable = true)

CREATE an array of drivers with 6 objects with this information:

("1234567A", "Tom Daly", "14 Green St., Cork", "087-6543210", 23231, "12/08/2008", "B", IsAvailable = true),

("2345678B", "Anne O'Brien", "Beach View, Kinsale", "086-5432109", 11980, "09/12/2011", "D", IsAvailable = true),

("3456789B", "James Twomey", "14, French St., Cork", "085-4321098", 18414, "14/11/2010", "D1", IsAvailable = true),

("4567890C", "Mary O'Neill", "23 Castle Road, Youghal", "089-8765432", 12669, "11/02/2014", "B", IsAvailable = true),

("5678901D", "Brendan Brown", "98 Nuns Walk, Cork", "083-2109876", 23864, "01/04/2007", "D", IsAvailable = true),

("6789012E", "Vincent Coy", "Green Valley, Cobh", "087-8901234", 34196, "03/04/1998", "D1", IsAvailable = true),

};

CREATE an array of customers with of 6 objects

Display welcome message

CREATE a loop ID jump MENU

Display menu

IF (1.Display all active fares)

END IF

PRINT CONDITIONAL SEPERATOR

IF(2.Scheduling fares")

DO

SCHEDULE FARE

WHILE fares/customer LESS THAN 6

END IF

Go to MENU loop ID;

PRINT CONDITIONAL SEPERATOR

IF(3.Display all vehicle details)

Display vehicle details

END IF

Go to MENU loop ID;

PRINT CONDITIONAL SEPERATOR

IF(4.Display all driver details)

DISPLAY DRIVER DETAILS

END IF

Go to MENU loop ID;

PRINT CONDITIONAL SEPERATOR

PRINT CONDITIONAL SEPERATOR

goto MENU;

IF(5.Log return from scheduled fares)

LOG RETURN

END IF

Go to MENU loop ID;

PRINT CONDITIONAL SEPERATOR

IF(6: Printing daily report)

PRINT DAILY REPORT

END IF

Go to MENU loop ID;

PRINT CONDITIONAL SEPERATOR

IF (7.Exit Program)

EXIT PROGRAM

Testing

Test Data Sample

1)

Name	Phone No.	Source	Destination	Number of Travelers	Wheelchair No.
Heather Regan	089-0120207	98 Main, Mallow County Cork	42 Main, Midlelton, County Cork	2	0

Journey Length	Driver ID No.	Vehicle Reg No.	Cost
56.8km	1234567A	0)12 C 4956	€374.20

2)

Name	Phone No.	Source	Destination	Number of Travelers	Wheelchair No.
Martin Abbott	089-1319873	42 Woodberry, Ballincollig, County Cork	Blossom Grove, Glanmire, County Cork	5	0

Journey Length	Driver ID No.	Vehicle Reg No.	Cost
28.3 km	2)3456789B	8)14 C 23908	€188.95

3)

Name	Phone No.	Source	Destination	Number of Travelers	Wheelchair No.
Derek Murphy	089-1719541	7 Mc Curtain, Fermoy, County Cork	17 Oliver Plunkett, County Cork	18	1

Journey Length	Driver ID No.	Vehicle Reg No.	Cost
33.5 km	4)5678901D	6)10 C 37209	€222.75

4)

Name	Phone No.	Source	Destination	Number of Travelers	Wheelchair No.
Jim Smith	089-5112991	9 Kealties, Durrus, County Cork	2 Grand Parade Market, County Cork	3	1

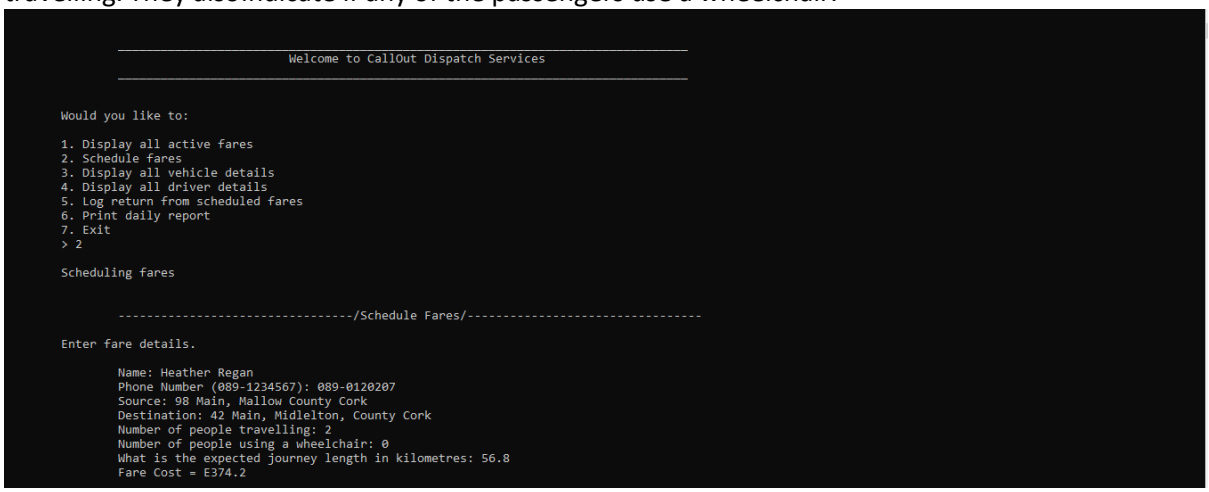
Journey Length	Driver ID No.	Vehicle Reg No.	Cost
92.9 km	1)2345678B	9)10 C 831	€608.85

Test Data Results

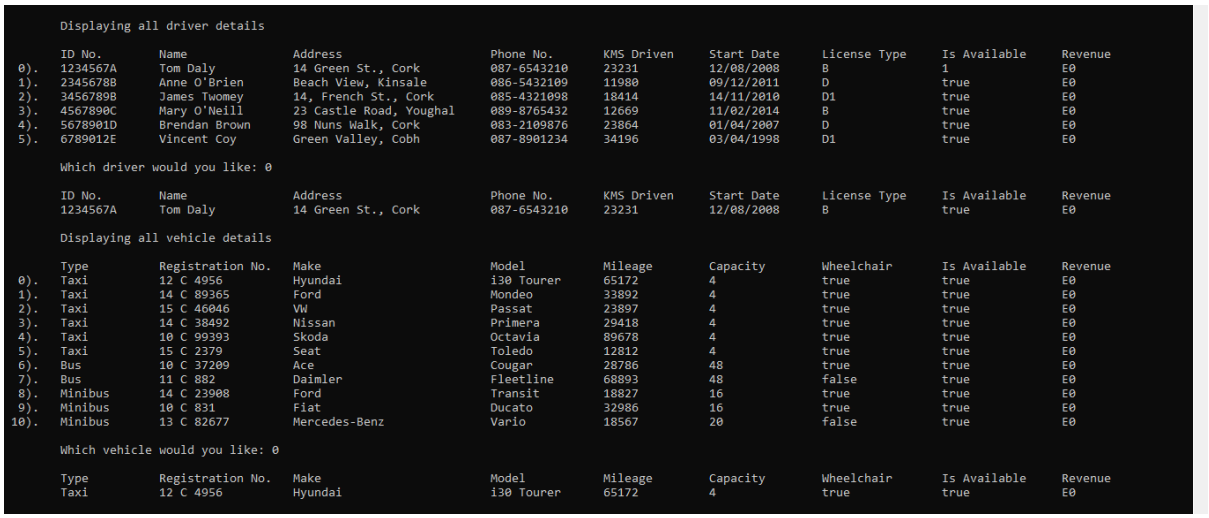
Test Type	Test Description	Expected result	Testing result	Actual result
Calculate customer fare	After a customer contacts CallOut Dispatch Services and has given the details to arrange we should calculate the fare. Take expected journey length (km) and multiply by fare cost(6.5) and then add call out fee (5)	**Test data sample 1:** Fare cost = (56.8*6.5) + 5= €374.20 **Test data sample 2:** Fare cost = (28.3*6.5) + 5 = €188.95 **Test data sample 3:** Fare cost = (33.5*6.5) + 5 = €222.75 **Test data sample 4:** Fare Cost = (92.9*6.5) + 5 = €608.85	**Test data sample 1:** Fare cost = (56.8*6.5) + 5= €374.20 **Test data sample 2:** Fare cost = (28.3*6.5) +5 = €188.95 **Test data sample 3:** Fare cost = (33.5*6.5) + 5 = €222.75 **Test data sample 4:** Fare Cost = (92.9*6.5) + 5 = €608.85	**Test data sample 1:** Fare cost = (56.8*6.5) + 5= €374.20 **Test data sample 2:** Fare cost = (28.3*6.5) +5 = €188.95 **Test data sample 3:** Fare cost = (33.5*6.5) + 5 = €222.75 **Test data sample 4:** Fare Cost = (92.9*6.5) + 5 = €608.85
Generated daily overall revenue report	For each fare log return an overall fare revenue should be generated by adding the different fare costs Total fare = fare 1 + fare 2 + fare 3 + fare 4	Total fare = €374.20 + €188.95 + €222.75 + €608.85 = €1394.74	Total fare = €374.20 + €188.95 + €222.75 + €608.85 = €1394.74	Total fare = €374.20 + €188.95 + €222.75 + €608.85 = €1394.74

Working Programme Screenshots

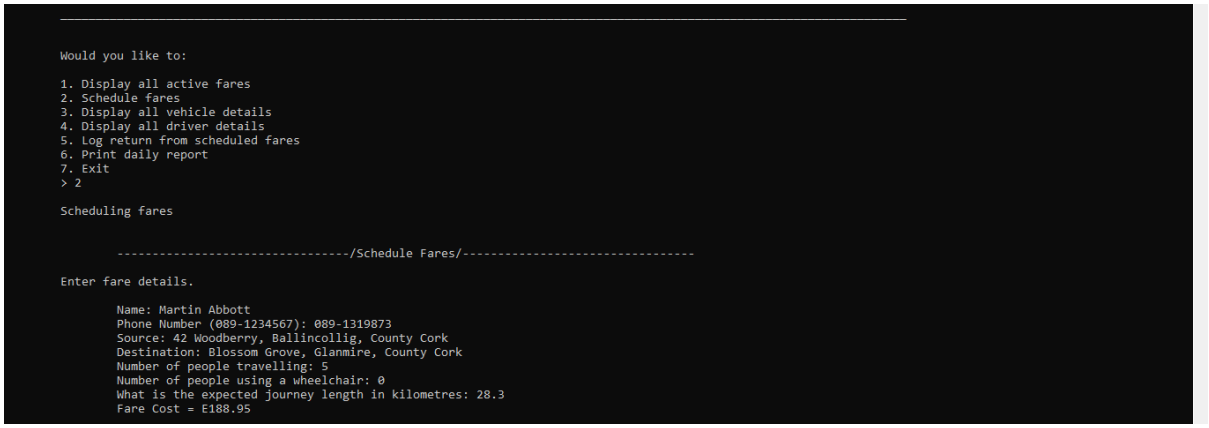
Schedule fare, from here the customer contacts CallOut Dispatch Services and arranges a fare, they give their name, telephone number, source, destination and the number of people that will be travelling. They alsoindicate if any of the passengers use a wheelchair.



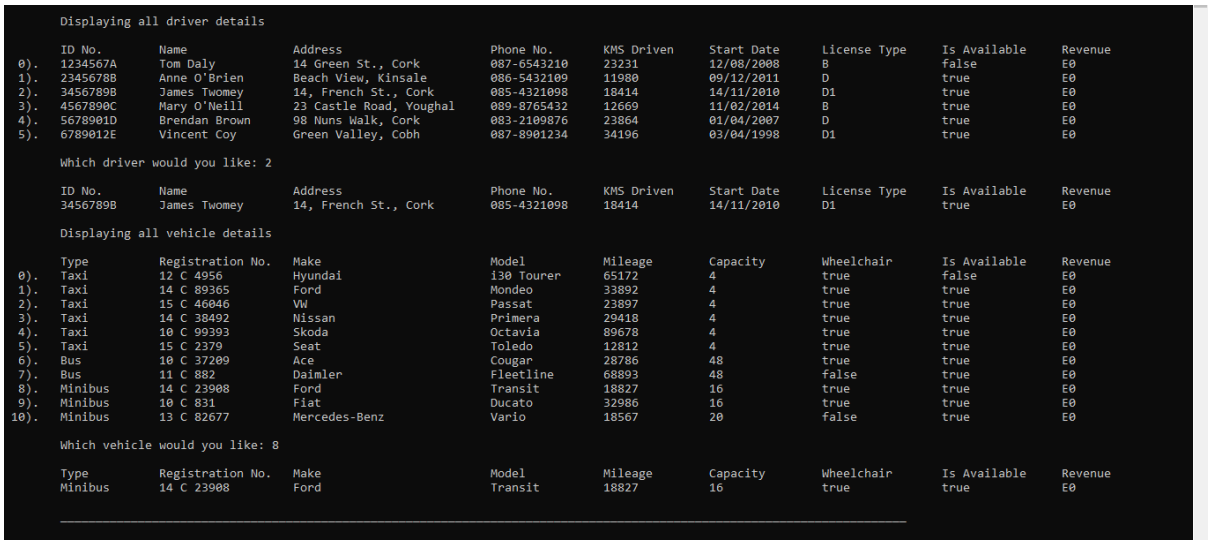
the dispatcher enters the expected journey length. The dispatcher then views the details on all vehicles to see if there is a suitable vehicle available for the fare. If so, he/she then views the details on all drivers to see if there is an available driver with a suitable licence. They need to only enter the index of both the drivers and vehicles they need.



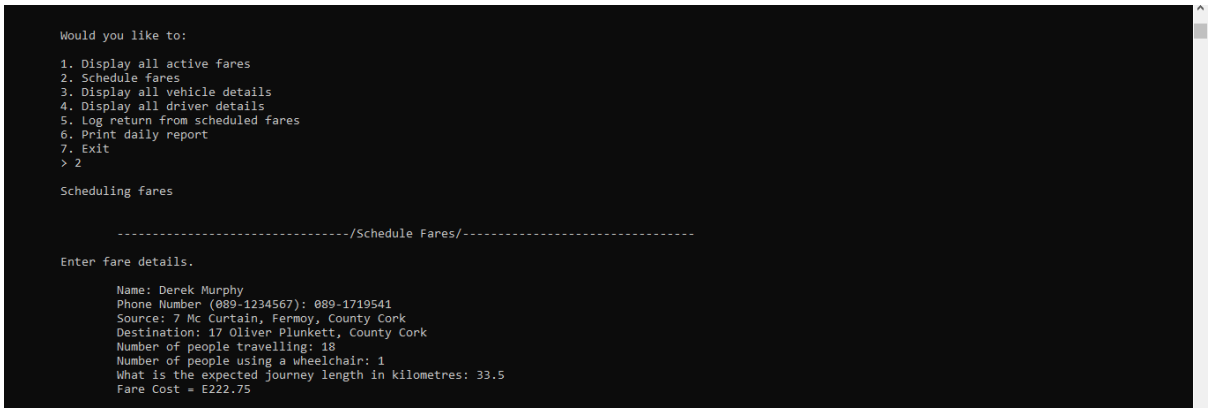
Ive entered all 4 fare at once to make testing more easier to understand.



```
_____________________________________________________________________________________________

Would you like to:

1. Display all active fares
2. Schedule fares
3. Display all vehicle details
4. Display all driver details
5. Log return from scheduled fares
6. Print daily report
7. Exit
> 2

Scheduling fares


        --------------------------------/Schedule Fares/--------------------------------

Enter fare details.

        Name: Martin Abbott
        Phone Number (089-1234567): 089-1319873
        Source: 42 Woodberry, Ballincollig, County Cork
        Destination: Blossom Grove, Glanmire, County Cork
        Number of people travelling: 5
        Number of people using a wheelchair: 0
        What is the expected journey length in kilometres: 28.3
        Fare Cost = E188.95
```



```
Displaying all driver details

    ID No.      Name            Address                 Phone No.       KMS Driven      Start Date      License Type    Is Available    Revenue
0).  1234567A    Tom Daly        14 Green St., Cork      087-6543210     23231           12/08/2008      B               false           E0
1).  2345678B    Anne O'Brien    Beach View, Kinsale     086-5432109     11980           09/12/2011      D               true            E0
2).  3456789B    James Twomey    14, French St., Cork    085-4321098     18414           14/11/2010      D1              true            E0
3).  4567890C    Mary O'Neill    23 Castle Road, Youghal 089-8765432     12669           11/02/2014      B               true            E0
4).  5678901D    Brendan Brown   98 Nuns Walk, Cork      083-2109876     23864           01/04/2007      D               true            E0
5).  6789012E    Vincent Coy     Green Valley, Cobh      087-8901234     34196           03/04/1998      D1              true            E0

Which driver would you like: 2

    ID No.      Name            Address                 Phone No.       KMS Driven      Start Date      License Type    Is Available    Revenue
    3456789B    James Twomey    14, French St., Cork    085-4321098     18414           14/11/2010      D1              true            E0

Displaying all vehicle details

    Type        Registration No.    Make            Model           Mileage     Capacity    Wheelchair      Is Available    Revenue
0).  Taxi       12 C 4956           Hyundai         i30 Tourer      65172       4           true            false           E0
1).  Taxi       14 C 89365          Ford            Mondeo          33892       4           true            true            E0
2).  Taxi       15 C 46046          VW              Passat          23897       4           true            true            E0
3).  Taxi       14 C 38492          Nissan          Primera         29418       4           true            true            E0
4).  Taxi       10 C 99393          Skoda           Octavia         89678       4           true            true            E0
5).  Taxi       15 C 2379           Seat            Toledo          12812       4           true            true            E0
6).  Bus        10 C 37209          Ace             Cougar          28786       48          true            true            E0
7).  Bus        11 C 882            Daimler         Fleetline       68893       48          false           true            E0
8).  Minibus    14 C 23908          Ford            Transit         18827       16          true            true            E0
9).  Minibus    10 C 831            Fiat            Ducato          32986       16          true            true            E0
10).  Minibus   13 C 82677          Mercedes-Benz   Vario           18567       20          false           true            E0

Which vehicle would you like: 8

    Type        Registration No.    Make            Model           Mileage     Capacity    Wheelchair      Is Available    Revenue
    Minibus     14 C 23908          Ford            Transit         18827       16          true            true            E0

_____________________________________________________________________________________________
```



```
Would you like to:

1. Display all active fares
2. Schedule fares
3. Display all vehicle details
4. Display all driver details
5. Log return from scheduled fares
6. Print daily report
7. Exit
> 2

Scheduling fares


        --------------------------------/Schedule Fares/--------------------------------

Enter fare details.

        Name: Derek Murphy
        Phone Number (089-1234567): 089-1719541
        Source: 7 Mc Curtain, Fermoy, County Cork
        Destination: 17 Oliver Plunkett, County Cork
        Number of people travelling: 18
        Number of people using a wheelchair: 1
        What is the expected journey length in kilometres: 33.5
        Fare Cost = E222.75
```

I made a mistake and choice a vehicle that is not wheel chair accessible and the program caught that and gave me an error message. It also allowed me to re-type the index of the vehicle I wanted

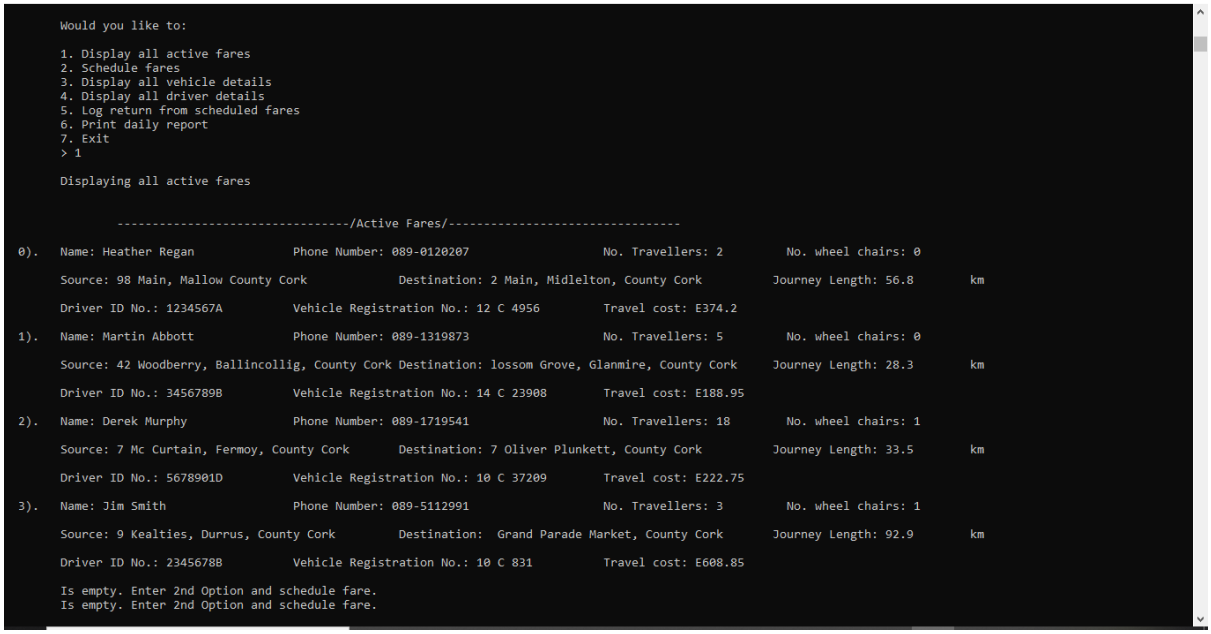
```
      Displaying all driver details

      ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
 0).  1234567A      Tom Daly          14 Green St., Cork        087-6543210    23231          12/08/2008     B                false            E0
 1).  2345678B      Anne O'Brien      Beach View, Kinsale       086-5432109    11980          09/12/2011     D                true             E0
 2).  3456789B      James Twomey      14, French St., Cork      085-4321098    18414          14/11/2010     D1               false            E0
 3).  4567890C      Mary O'Neill      23 Castle Road, Youghal   089-8765432    12669          11/02/2014     B                true             E0
 4).  5678901D      Brendan Brown     98 Nuns Walk, Cork        083-2109876    23864          01/04/2007     D                true             E0
 5).  6789012E      Vincent Coy       Green Valley, Cobh        087-8901234    34196          03/04/1998     D1               true             E0

      Which driver would you like: 4

      ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
      5678901D      Brendan Brown     98 Nuns Walk, Cork        083-2109876    23864          01/04/2007     D                true             E0

      Displaying all vehicle details

      Type          Registration No.  Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
 0).  Taxi          12 C 4956         Hyundai                   i30 Tourer     65172          4              true             false            E0
 1).  Taxi          14 C 89365        Ford                      Mondeo         33892          4              true             true             E0
 2).  Taxi          15 C 46046        VW                        Passat         23897          4              true             true             E0
 3).  Taxi          14 C 38492        Nissan                    Primera        29418          4              true             true             E0
 4).  Taxi          10 C 99393        Skoda                     Octavia        89678          4              true             true             E0
 5).  Taxi          15 C 2379         Seat                      Toledo         12812          4              true             true             E0
 6).  Bus           10 C 37209        Ace                       Cougar         28786          48             true             true             E0
 7).  Bus           11 C 882          Daimler                   Fleetline      68893          48             false            true             E0
 8).  Minibus       14 C 23908        Ford                      Transit        18827          16             true             false            E0
 9).  Minibus       10 C 831          Fiat                      Ducato         32986          16             true             true             E0
10).  Minibus       13 C 82677        Mercedes-Benz             Vario          18567          20             false            true             E0

      Which vehicle would you like: 7

            Error: Vehicle is not wheel chair accessible.

Error: Vehicle is not available.

            Please try again
```

```
            Please try again


      Which vehicle would you like: 6

      Type          Registration No.  Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
      Bus           10 C 37209        Ace                       Cougar         28786          48             true             true             E0

      ____________________________________________________________________________________________________________________________________
```

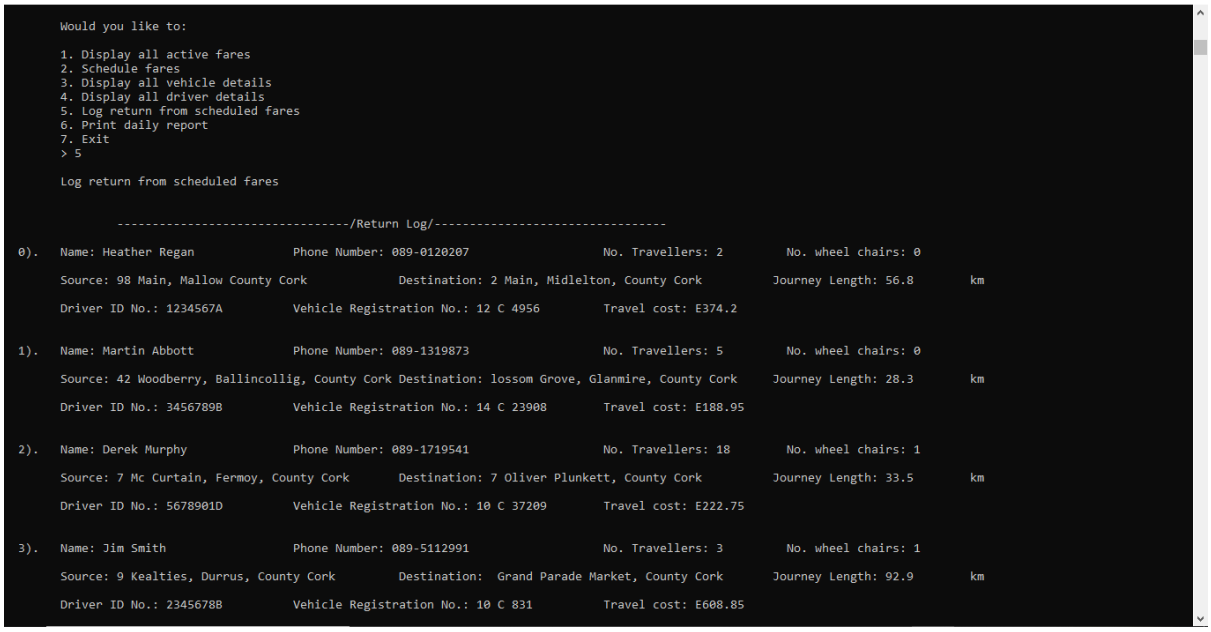
```
      Would you like to:

      1. Display all active fares
      2. Schedule fares
      3. Display all vehicle details
      4. Display all driver details
      5. Log return from scheduled fares
      6. Print daily report
      7. Exit
      > 2

      Scheduling fares


            --------------------------------/Schedule Fares/--------------------------------

      Enter fare details.

            Name: Jim Smith
            Phone Number (089-1234567): 089-5112991
            Source: 9 Kealties, Durrus, County Cork
            Destination: 2 Grand Parade Market, County Cork
            Number of people travelling: 3
            Number of people using a wheelchair: 1
            What is the expected journey length in kilometres: 92.9
            Fare Cost = E608.85
```

```
      Displaying all driver details

      ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
 0).  1234567A      Tom Daly          14 Green St., Cork        087-6543210    23231          12/08/2008     B                false            E0
 1).  2345678B      Anne O'Brien      Beach View, Kinsale       086-5432109    11980          09/12/2011     D                true             E0
 2).  3456789B      James Twomey      14, French St., Cork      085-4321098    18414          14/11/2010     D1               false            E0
 3).  4567890C      Mary O'Neill      23 Castle Road, Youghal   089-8765432    12669          11/02/2014     B                true             E0
 4).  5678901D      Brendan Brown     98 Nuns Walk, Cork        083-2109876    23864          01/04/2007     D                false            E0
 5).  6789012E      Vincent Coy       Green Valley, Cobh        087-8901234    34196          03/04/1998     D1               true             E0

      Which driver would you like: 1

      ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
      2345678B      Anne O'Brien      Beach View, Kinsale       086-5432109    11980          09/12/2011     D                true             E0

      Displaying all vehicle details

      Type          Registration No.  Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
 0).  Taxi          12 C 4956         Hyundai                   i30 Tourer     65172          4              true             false            E0
 1).  Taxi          14 C 89365        Ford                      Mondeo         33892          4              true             true             E0
 2).  Taxi          15 C 46046        VW                        Passat         23897          4              true             true             E0
 3).  Taxi          14 C 38492        Nissan                    Primera        29418          4              true             true             E0
 4).  Taxi          10 C 99393        Skoda                     Octavia        89678          4              true             true             E0
 5).  Taxi          15 C 2379         Seat                      Toledo         12812          4              true             true             E0
 6).  Bus           10 C 37209        Ace                       Cougar         28786          48             true             false            E0
 7).  Bus           11 C 882          Daimler                   Fleetline      68893          48             false            true             E0
 8).  Minibus       14 C 23908        Ford                      Transit        18827          16             true             false            E0
 9).  Minibus       10 C 831          Fiat                      Ducato         32986          16             true             true             E0
10).  Minibus       13 C 82677        Mercedes-Benz             Vario          18567          20             false            true             E0

      Which vehicle would you like: 9

      Type          Registration No.  Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
      Minibus       10 C 831          Fiat                      Ducato         32986          16             true             true             E0

      ____________________________________________________________________________________________________________________________________
```

View a list of all active fares: The dispatcher should be able to view a list of all active fares at any time. This should include details on the vehicle, driver and customer. Any information inputted by the customer and dispatcher will be listed here. All this information about the fares will be given to the drivers for information.



After each fare, a driver will go to the dispatcher and tell them that the fare is complete. These details include the fare details that were in the driver's schedule and the cost of the fare. The dispatcher will ask the driver about the name of the customer that ordered the fare. Then the dispatcher can enter the index of the customer that is saved in the system.



The dispatcher can ask the driver for their driver ID number and the vehicle registration number that the driver used for their fare. With this, they'll enter the index of both the driver and vehicle saved in the system.

```
Is empty. Enter 2nd Option and schedule fare.
Is empty. Enter 2nd Option and schedule fare.

Which fare would you like to return: 0

Enter index of the driver that was assigned to this customer: 0

ID No.      Name            Address                 Phone No.     KMS Driven    Start Date    License Type    Is Available    Revenue
1234567A    Tom Daly        14 Green St., Cork      087-6543210   23231         12/08/2008    B               false           E0

Enter index of the vehicle that was assigned to this customer: 0

Type        Registration No.   Make          Model        Mileage    Capacity    Wheelchair    Is Available    Revenue
Taxi        12 C 4956          Hyundai       i30 Tourer   65172      4           true          false           E0

Fare has been returned

_____________________________________________________________________________________________________
```

The driver is marked as free and the fare details are added to the daily log. The number of kilometres is updated for both the driver and the vehicle.

```
Would you like to:

1. Display all active fares
2. Schedule fares
3. Display all vehicle details
4. Display all driver details
5. Log return from scheduled fares
6. Print daily report
7. Exit
> 6

Printing daily report

        --------------------------------/Daily Report/--------------------------------

Printing drivers daily report

    ID No.      Name              Address                 Phone No.      Total KMs    Start Date    License Type    Is Available    Revenue
0).  1234567A    Tom Daly          14 Green St., Cork      087-6543210    23287.8      12/08/2008    B               true            E374.2
1).  2345678B    Anne O'Brien      Beach View, Kinsale     086-5432109    12072.9      09/12/2011    D               true            E608.85
2).  3456789B    James Twomey      14, French St., Cork    085-4321098    18442.3      14/11/2010    D1              true            E188.95
3).  4567890C    Mary O'Neill      23 Castle Road, Youghal 089-8765432    12669        11/02/2014    B               true            E0
4).  5678901D    Brendan Brown     98 Nuns Walk, Cork      083-2109876    23897.5      01/04/2007    D               true            E222.75
5).  6789012E    Vincent Coy       Green Valley, Cobh      087-8901234    34196        03/04/1998    D1              true            E0
```

```
Printing vehicle daily report

    Type        Registration No.   Make          Model        Total Mileage   Capacity    Wheelchair    Is Available    Revenue
0).  Taxi        12 C 4956          Hyundai       i30 Tourer   65228.8         4           true          true            E374.2
1).  Taxi        14 C 89365         Ford          Mondeo       33892           4           true          true            E0
2).  Taxi        15 C 46046         VW            Passat       23897           4           true          true            E0
3).  Taxi        14 C 38492         Nissan        Primera      29418           4           true          true            E0
4).  Taxi        10 C 99393         Skoda         Octavia      89678           4           true          true            E0
5).  Taxi        15 C 2379          Seat          Toledo       12812           4           true          true            E0
6).  Bus         10 C 37209         Ace           Cougar       28819.5         48          true          true            E222.75
7).  Bus         11 C 882           Daimler       Fleetline    68893           48          false         true            E0
8).  Minibus     14 C 23908         Ford          Transit      18855.3         16          true          true            E188.95
9).  Minibus     10 C 831           Fiat          Ducato       33078.9         16          true          true            E608.85
10).  Minibus     13 C 82677         Mercedes-Benz Vario        18567           20          false         true            E0

Total Revenue: E1394.75

_____________________________________________________________________________________________________
```

```
Would you like to:

1. Display all active fares
2. Schedule fares
3. Display all vehicle details
4. Display all driver details
5. Log return from scheduled fares
6. Print daily report
7. Exit
> 7

Closing Program

Press [Enter] to close the terminal ...
```

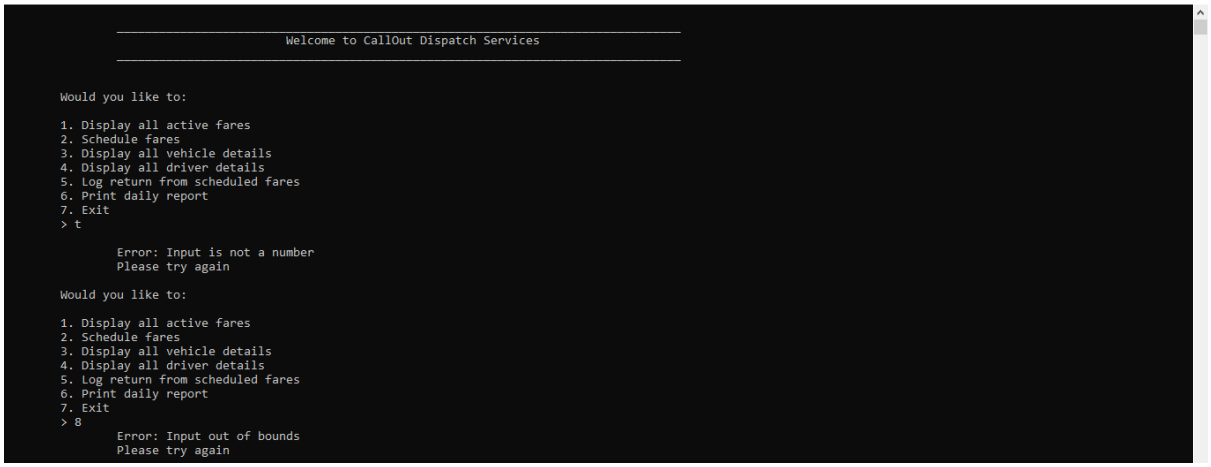
Validation Tests

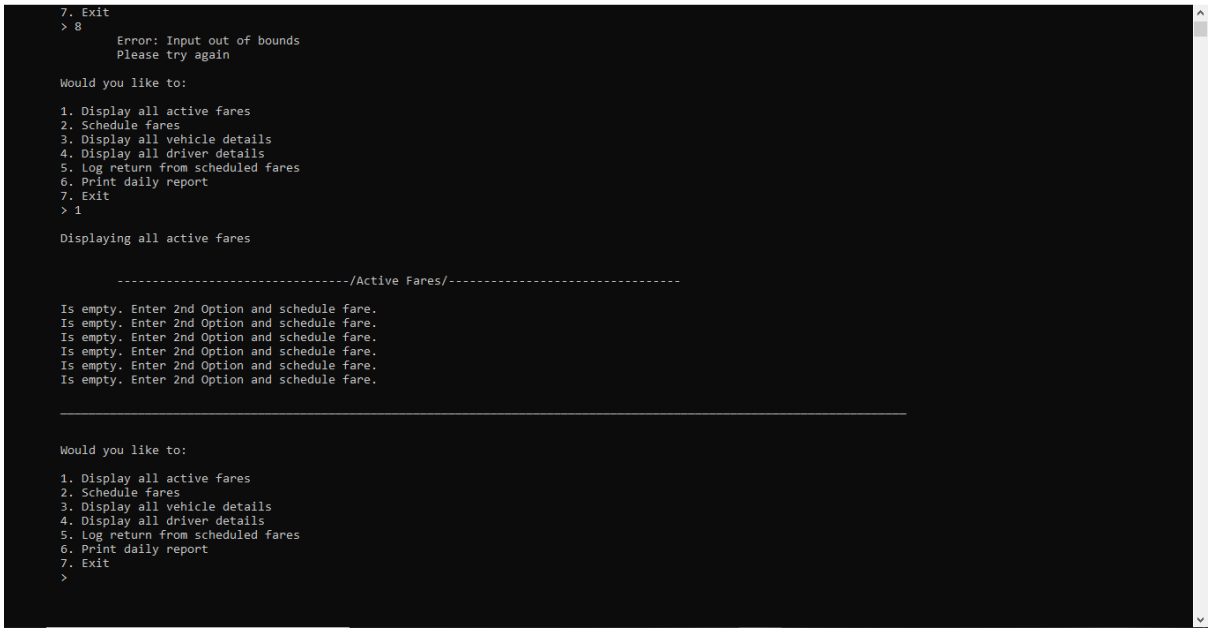
Test Type	Test Description	Expected result	Testing method	Result
Is number validation	Check menu input is a number	The program should catch any input that is not a number and give me an error	I entered an alphabet	Showed me an error message "Error: Input is not a number. Please try again"
Check if customer/fares array index is empty	Check if customer/fares array is empty	1) The program should catch if there hasn't been a fare put in the system and display a message indicated such a case.	1) No fare was entered into the system	Showed me an message "Is empty. Enter 2nd Option and schedule fare."
Greater than 0	Check when customer enters the number of travelers in the car is greater than 0	The program should catch that input is 0 and give me an error message	I put 0 for the number of travelers	Showed me error message "Please try again"
Check is available	1)Check driver is available 2)Check vehicle is available	The program should display an error message if the dispatcher chooses a vehicle or driver that is currently busy and hasn't made a log return	I entered a second fare and tried choosing a driver and vehicle that is busy and hasn't made a log return	1)Showed me an error message "Error: Driver is not available. Please try again" 2)Showed me an error message "Error: Vehicle is not available. Please try again"
Check input is out of bounds	1)Check menu index input is not greater than 7 or less than 1 2)Check driver array index input is not less than 0 or greater than 5 3)Check vehicle array index input is not less than 0 or greater than 11 4)Check	The program should catch that and display an error	1) I entered 8 and -1 for the menu index 2) I entered 6 and -1 for the driver array index 3) I entered 12 and -1 for the driver array index 4) I entered 6 and	Showed me error message "Error: Input is out of bounds Please try again"

	customer/fares array index input is not less than 0 or greater than 5		-1 for the customer array index	
Check if vehicle is wheel chair accessible	Check vehicle selected by dispatcher is wheel chair accessible	The program should catch if its not and display an error	I entered a customer that needs a wheel chair to a vehicle that is not wheel chair accessible	Showed me an error message "Error: Vehicle is not wheel chair accessible. Please try again"

Working Programme Validation Screenshots

Upon validation errors, I want my program to continue working and allow user re-enter the input





```
--------------------------------/Schedule Fares/--------------------------------

Enter fare details.

        Name: Shelton Ngwenya
        Phone Number (089-1234567): 089-1234567
        Source: Cork
        Destination: Dublin
        Number of people travelling: 0
        Please try again

        Number of people travelling:
```

```
--------------------------------/Schedule Fares/--------------------------------

Enter fare details.

        Name: Shelton Ngwenya
        Phone Number (089-1234567): 089-1234567
        Source: Cork
        Destination: Dublin
        Number of people travelling: 0
        Please try again

        Number of people travelling: 1
        Number of people using a wheelchair: a

        Error: Input is not a number
        Please try again

        Number of people using a wheelchair:
```

```
Displaying all vehicle details

     Type          Registration No.   Make              Model          Mileage   Capacity   Wheelchair   Is Available   Revenue
 0). Taxi          12 C 4956          Hyundai           i30 Tourer     65172     4          true         true           E0
 1). Taxi          14 C 89365         Ford              Mondeo         33892     4          true         true           E0
 2). Taxi          15 C 46046         VW                Passat         23897     4          true         true           E0
 3). Taxi          14 C 38492         Nissan            Primera        29418     4          true         true           E0
 4). Taxi          10 C 99393         Skoda             Octavia        89678     4          true         true           E0
 5). Taxi          15 C 2379          Seat              Toledo         12812     4          true         true           E0
 6). Bus           10 C 37209         Ace               Cougar         28786     48         true         true           E0
 7). Bus           11 C 882           Daimler           Fleetline      68893     48         false        true           E0
 8). Minibus       14 C 23908         Ford              Transit        18827     16         true         true           E0
 9). Minibus       10 C 831           Fiat              Ducato         32986     16         true         true           E0
10). Minibus       13 C 82677         Mercedes-Benz     Vario          18567     20         false        true           E0

Which vehicle would you like: 12
Error: Input is out of bounds
        Please try again

Which vehicle would you like:
```

```
Displaying all vehicle details

     Type          Registration No.   Make              Model          Mileage   Capacity   Wheelchair   Is Available   Revenue
 0). Taxi          12 C 4956          Hyundai           i30 Tourer     65172     4          true         true           E0
 1). Taxi          14 C 89365         Ford              Mondeo         33892     4          true         true           E0
 2). Taxi          15 C 46046         VW                Passat         23897     4          true         true           E0
 3). Taxi          14 C 38492         Nissan            Primera        29418     4          true         true           E0
 4). Taxi          10 C 99393         Skoda             Octavia        89678     4          true         true           E0
 5). Taxi          15 C 2379          Seat              Toledo         12812     4          true         true           E0
 6). Bus           10 C 37209         Ace               Cougar         28786     48         true         true           E0
 7). Bus           11 C 882           Daimler           Fleetline      68893     48         false        true           E0
 8). Minibus       14 C 23908         Ford              Transit        18827     16         true         true           E0
 9). Minibus       10 C 831           Fiat              Ducato         32986     16         true         true           E0
10). Minibus       13 C 82677         Mercedes-Benz     Vario          18567     20         false        true           E0

Which vehicle would you like: 12
Error: Input is out of bounds
        Please try again

Which vehicle would you like: -1
Error: Input is out of bounds
        Please try again

Which vehicle would you like:
```

```
                                        /Schedule Fares/
       Enter fare details.

              Name: Shelton Ngwenya
              Phone Number (089-1234567): 089-1234567
              Source: Dublin
              Destination: Cork
              Number of people travelling: 1
              Number of people using a wheelchair: 1
              What is the expected journey length in kilometres: 30
              Fare Cost = E200

       Displaying all driver details

       ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
  0).  1234567A      Tom Daly          14 Green St., Cork        087-6543210    23231          12/08/2008     B                false            E0
  1).  2345678B      Anne O'Brien      Beach View, Kinsale       086-5432109    11980          09/12/2011     D                true             E0
  2).  3456789B      James Twomey      14, French St., Cork      085-4321098    18414          14/11/2010     D1               true             E0
  3).  4567890C      Mary O'Neill      23 Castle Road, Youghal   089-8765432    12669          11/02/2014     B                true             E0
  4).  5678901D      Brendan Brown     98 Nuns Walk, Cork        083-2109876    23864          01/04/2007     D                true             E0
  5).  6789012E      Vincent Coy       Green Valley, Cobh        087-8901234    34196          03/04/1998     D1               true             E0

       Which driver would you like: 0

              Error: Driver is not available.

              Please try again


       Which driver would you like:
```

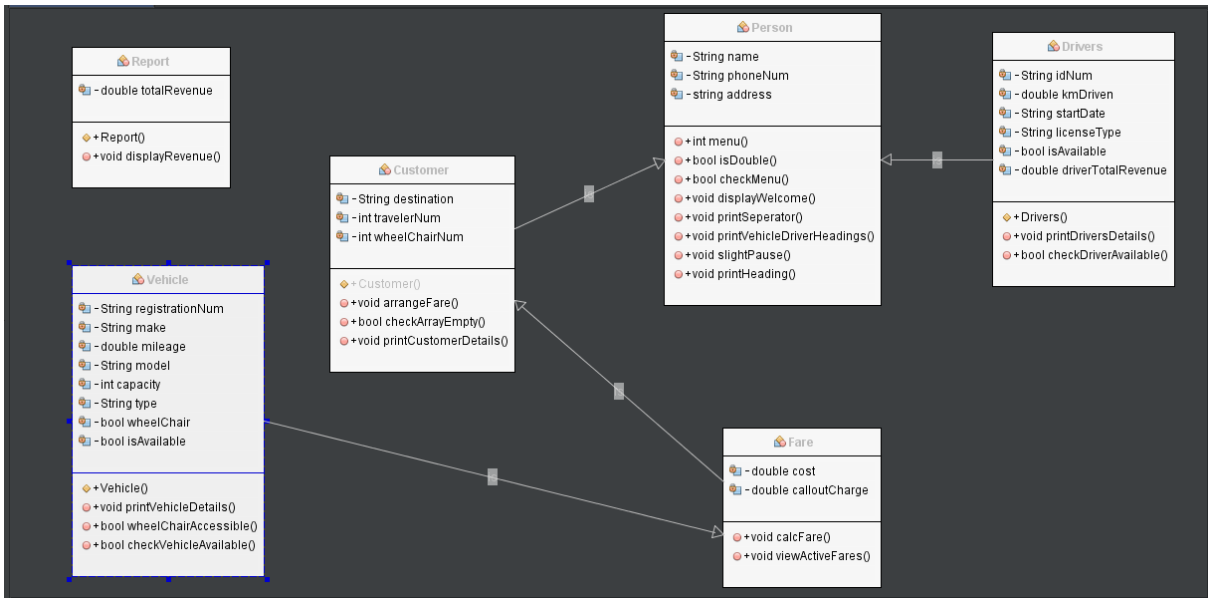
```
              Please try again


       Which driver would you like: 1

       ID No.        Name              Address                   Phone No.      KMS Driven     Start Date     License Type     Is Available     Revenue
       2345678B      Anne O'Brien      Beach View, Kinsale       086-5432109    11980          09/12/2011     D                true             E0

       Displaying all vehicle details

       Type          Registration No.   Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
  0).  Taxi          12 C 4956          Hyundai                   i30 Tourer     65172          4              true             false            E0
  1).  Taxi          14 C 89365         Ford                      Mondeo         33892          4              true             true             E0
  2).  Taxi          15 C 46046         VW                        Passat         23897          4              true             true             E0
  3).  Taxi          14 C 38492         Nissan                    Primera        29418          4              true             true             E0
  4).  Taxi          10 C 99393         Skoda                     Octavia        89678          4              true             true             E0
  5).  Taxi          15 C 2379          Seat                      Toledo         12812          4              true             true             E0
  6).  Bus           10 C 37209         Ace                       Cougar         28786          48             true             true             E0
  7).  Bus           11 C 882           Daimler                   Fleetline      68893          48             false            true             E0
  8).  Minibus       14 C 23908         Ford                      Transit        18827          16             true             true             E0
  9).  Minibus       10 C 831           Fiat                      Ducato         32986          16             true             true             E0
 10).  Minibus       13 C 82677         Mercedes-Benz             Vario          18567          20             false            true             E0

       Which vehicle would you like: 7

              Error: Vehicle is not wheel chair accessible.

Error: Vehicle is not available.

              Please try again


       Which vehicle would you like:
```

```
       Displaying all vehicle details

       Type          Registration No.   Make                      Model          Mileage        Capacity       Wheelchair       Is Available     Revenue
  0).  Taxi          12 C 4956          Hyundai                   i30 Tourer     65172          4              true             false            E0
  1).  Taxi          14 C 89365         Ford                      Mondeo         33892          4              true             true             E0
  2).  Taxi          15 C 46046         VW                        Passat         23897          4              true             true             E0
  3).  Taxi          14 C 38492         Nissan                    Primera        29418          4              true             true             E0
  4).  Taxi          10 C 99393         Skoda                     Octavia        89678          4              true             true             E0
  5).  Taxi          15 C 2379          Seat                      Toledo         12812          4              true             true             E0
  6).  Bus           10 C 37209         Ace                       Cougar         28786          48             true             true             E0
  7).  Bus           11 C 882           Daimler                   Fleetline      68893          48             false            true             E0
  8).  Minibus       14 C 23908         Ford                      Transit        18827          16             true             true             E0
  9).  Minibus       10 C 831           Fiat                      Ducato         32986          16             true             true             E0
 10).  Minibus       13 C 82677         Mercedes-Benz             Vario          18567          20             false            true             E0

       Which vehicle would you like: 7

              Error: Vehicle is not wheel chair accessible.

Error: Vehicle is not available.

              Please try again


       Which vehicle would you like: -1
Error: Input is out of bounds
              Please try again


       Which vehicle would you like:
```

```
       2. Schedule fares
       3. Display all vehicle details
       4. Display all driver details
       5. Log return from scheduled fares
       6. Print daily report
       7. Exit
       > 5

       Log return from scheduled fares


              --------------------------------/Return Log/--------------------------------

 0).   Name: Shelton Ngwenya            Phone Number: 089-1234567                 No. Travellers: 1        No. wheel chairs: 1

       Source: Cork                             Destination: ublin                                Journey Length: 30          km

       Driver ID No.: 1234567A          Vehicle Registration No.: 12 C 4956       Travel cost: E200


 1).   Name: Shelton Ngwenya            Phone Number: 089-1234567                 No. Travellers: 1        No. wheel chairs: 1

       Source: Dublin                           Destination: ork                                  Journey Length: 30          km

       Driver ID No.: 2345678B          Vehicle Registration No.: 14 C 89365      Travel cost: E200


       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.

       Which fare would you like to return: -1
Error: Input is out of bounds          Please try again

       Which fare would you like to return:
```

```
       2. Schedule fares
       3. Display all vehicle details
       4. Display all driver details
       5. Log return from scheduled fares
       6. Print daily report
       7. Exit
       > 5

       Log return from scheduled fares


              --------------------------------/Return Log/--------------------------------

 0).   Name: Shelton Ngwenya            Phone Number: 089-1234567                 No. Travellers: 1        No. wheel chairs: 1

       Source: Cork                             Destination: ublin                                Journey Length: 30          km

       Driver ID No.: 1234567A          Vehicle Registration No.: 12 C 4956       Travel cost: E200


 1).   Name: Shelton Ngwenya            Phone Number: 089-1234567                 No. Travellers: 1        No. wheel chairs: 1

       Source: Dublin                           Destination: ork                                  Journey Length: 30          km

       Driver ID No.: 2345678B          Vehicle Registration No.: 14 C 89365      Travel cost: E200


       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.
       Is empty. Enter 2nd Option and schedule fare.

       Which fare would you like to return: -1
Error: Input is out of bounds          Please try again

       Which fare would you like to return: 2

              That one is empty.
              Please try again

       Which fare would you like to return:
```

CLASS DIAGRAM



CODE

```
/*
 * File:   CDSMain.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 08 March 2021, 20:32
 */

#include <cstdlib>
#include <iostream>
#include <stdio.h>
#include <iomanip>
#include <cctype>



#include "Person.h"
#include "Customer.h"
#include "Vehicles.h"
#include "Drivers.h"
#include "Report.h"
#include "Fare.h"

using namespace std;

unsigned short arrayVehicles = 11, arrayDrivers = 6, arrayCustomers = 6;
bool validInput = true, addFare = true, addCus = true, yesNoCheck = true, selectedIsAvail = true,
returnInfo = true;
char anotherCusChoice;
int arrayIndex, i = 0, x = 0;
double info;
```

```
/*
 *
 */

int main() {
    Person person; //create instance of person class
    Vehicles vehicle;
    Drivers driver;
    Customer cus;
    Report report;

    Vehicles vehicles[arrayVehicles] = {//create an array of vehicle class
        Vehicles("Taxi", "12 C 4956", "Hyundai", "i30 Tourer", 65172, 4, true, true),
        Vehicles("Taxi", "14 C 89365", "Ford", "Mondeo", 33892, 4, true, true),
        Vehicles("Taxi", "15 C 46046", "VW", "Passat", 23897, 4, true, true),
        Vehicles("Taxi", "14 C 38492", "Nissan", "Primera", 29418, 4, true, true),
        Vehicles("Taxi", "10 C 99393", "Skoda", "Octavia", 89678, 4, true, true),
        Vehicles("Taxi", "15 C 2379", "Seat", "Toledo", 12812, 4, true, true),
        Vehicles("Bus", "10 C 37209", "Ace", "Cougar", 28786, 48, true, true),
        Vehicles("Bus", "11 C 882", "Daimler", "Fleetline", 68893, 48, false, true),
        Vehicles("Minibus", "14 C 23908", "Ford", "Transit", 18827, 16, true, true),
        Vehicles("Minibus", "10 C 831", "Fiat", "Ducato", 32986, 16, true, true),
        Vehicles("Minibus", "13 C 82677", "Mercedes-Benz", "Vario", 18567, 20, false, true)
    };

    Drivers drivers[arrayDrivers] = {//create an array of drivers class
        Drivers("1234567A", "Tom Daly", "14 Green St., Cork", "087-6543210", 23231, "12/08/2008",
"B", true),
        Drivers("2345678B", "Anne O'Brien", "Beach View, Kinsale", "086-5432109", 11980,
"09/12/2011", "D", true),
```

```
    Drivers("3456789B", "James Twomey", "14, French St., Cork", "085-4321098", 18414,
"14/11/2010", "D1", true),

    Drivers("4567890C", "Mary O'Neill", "23 Castle Road, Youghal", "089-8765432", 12669,
"11/02/2014", "B", true),

    Drivers("5678901D", "Brendan Brown", "98 Nuns Walk, Cork", "083-2109876", 23864,
"01/04/2007", "D", true),

    Drivers("6789012E", "Vincent Coy", "Green Valley, Cobh", "087-8901234", 34196, "03/04/1998",
"D1", true),

  };

  Customer customer[arrayCustomers]; //create an array of customer class


  person.displayWelcome(); //display welcome message


MENU://loop id jump

    switch (person.menu()) {//get program menu and get user input, execute program functions on
commands


        /*execute command 1,

         * display active fares*/


      case 1: cout << "\n\tDisplaying all active fares";

        person.slightPause(); //execute a slight pause for better execution

        cout << "\n\n";

        person.printHeading("Active Fares");


        for (unsigned short i = 0; i <= arrayCustomers - 1; i++) {//for loop to display active fares

          if (customer[i].getIdNum() != "") {//if fare index id num is not empty, carry on with display

            printf("%*d). ", 3, i);

            customer[i].printCustomerDetails();

          } else {//if fare index id num is empty, don't carry on with display(Print error message

            cout << "\tIs empty. Enter 2nd Option and schedule fare.\n";

          }
```

```
        }

        person.printSeperator();
        goto MENU;



        /*execute command 2,
         * Schedule fares*/

    case 2: cout << "\n\tScheduling fares";
        person.slightPause(); //execute a slight pause for better execution
        cout << "\n\n";
        person.printHeading("Schedule Fares");

        do {//loop this statement while theres less than six fares

            addCus = person.checkInputArrayIndex(arrayCustomers, i); //check if theres less than 6
fares
            if (!addCus) {//if not
                cout << "\n\tError:You can only order 6 fares" << endl; //output error message
                person.printSeperator();
                goto MENU;
            }
            else {
                customer[i++].scheduleFare(); //schedule fare, increment the customer by one



                cout << "\n\tDisplaying all driver details";
                person.slightPause(); //execute a slight pause for better execution
                cout << "\n\n";
```

```
            person.printVehiclesDriversHeadings("ID No.", "Name", "Address", "Phone No.", "KMS
Driven",
                  "Start Date", "License Type", "Is Available", "Revenue");

            for (unsigned short i = 0; i <= arrayDrivers - 1; i++) {
               printf("%*d). ", 3, i); //print the index and increment by one per driver
               drivers[i].printDriverDetails();
            }

            do {
               cout << "\n\tWhich driver would you like: ";
               cin >> arrayIndex;
               validInput = person.isInt(arrayIndex)
                     && person.checkInputArrayIndex(arrayDrivers, arrayIndex)
                     && driver.checkDriversAvail(drivers[arrayIndex].getIsDriverIsAvail());
               if (!validInput) {
                  cout << "\n\t\tPlease try again\n" << endl;
               } else {
                  cout << "\n";
                  person.printVehiclesDriversHeadings("ID No.", "Name", "Address", "Phone No.",
"KMS Driven",
                        "Start Date", "License Type", "Is Available", "Revenue");
                  drivers[arrayIndex].printDriverDetails();
                  drivers[arrayIndex].setDriverIsAvail(false);
                  customer[i - 1].setIdNum(drivers[arrayIndex].getIdNum());
                  report.setTotalRevenue(customer[i - 1].getFareCost());
               }
            } while (!validInput);

            cout << "\n\tDisplaying all vehicle details"; //display all vehicle details
            person.slightPause(); //execute a slight pause for better execution
```

```
                cout << "\n\n";


                person.printVehiclesDriversHeadings("Type", "Registration No.", "Make", "Model",
"Mileage", "Capacity",
                    "Wheelchair", "Is Available", "Revenue");
                for (unsigned short i = 0; i <= arrayVehicles - 1; i++) {//for loop to display vehicle details
                   printf("%*d). ", 3, i); //print the index and increment by one per vehicle
                   vehicles[i].printVehicleDetails(); //print vehicle details
                }


                do {
                   cout << "\n\tWhich vehicle would you like: "; //ask user which vehicle they would
like
                   cin >> arrayIndex; //input its index
                   validInput = person.isInt(arrayIndex)
                       && person.checkInputArrayIndex(arrayVehicles, arrayIndex)
                       && vehicle.checkVehiclesAvail(vehicles[arrayIndex].getVehicleIsAvail()
                       && vehicle.wheelchairAccessible(vehicles[arrayIndex].getIsWheelChair(),
customer[i - 1].getWheelChairNum())); //validate user input


                   if (!validInput) {//if user input is not valid
                      cout << "\n\t\tPlease try again\n" << endl; //display error message
                   } else {//if user input is valid
                      cout << "\n";
                      person.printVehiclesDriversHeadings("Type", "Registration No.", "Make", "Model",
"Mileage", "Capacity",
                          "Wheelchair", "Is Available", "Revenue"); //if display information menu
                      vehicles[arrayIndex].printVehicleDetails(); //print vehicle details according to index
from user input
                      vehicles[arrayIndex].setVehicleAvail(false); //set vehicle index selected by user to
unavailable
                      customer[i - 1].setRegistrationNum(vehicles[arrayIndex].getRegistrationNum());
//set vehicle registration num to customer array information
```

```
            }
        } while (!validInput);

        person.printSeperator();
        goto MENU;

      }
    } while (!addCus);


    /*execute command 3,
     * display vehicle details*/


  case 3: cout << "\n\tDisplaying all vehicle details";
    person.slightPause(); //execute a slight pause for better execution
    cout << "\n\n";
    person.printHeading("Vehicle Details");

    person.printVehiclesDriversHeadings("Type", "Registration No.", "Make", "Model",
"Mileage", "Capacity",
        "Wheelchair", "Is Available", "Revenue");
    for (unsigned short i = 0; i <= arrayVehicles - 1; i++) {//loop through the array
      vehicles[i].printVehicleDetails(); //display vehicle details
    }

    person.printSeperator();
    goto MENU;
```

```
            /*execute command 4,
             * display driver details*/


        case 4: cout << "\n\tDisplaying all driver details";
            person.slightPause(); //execute a slight pause for better execution
            cout << "\n\n";
            person.printHeading("Driver Details");

            person.printVehiclesDriversHeadings("ID No.", "Name", "Address", "Phone No.", "KMS
Driven",
                    "Start Date", "License Type", "Is Available", "Revenue");
            for (unsigned short i = 0; i <= arrayDrivers - 1; i++) {//loop through array
               drivers[i].printDriverDetails(); //display driver details
            }

            person.printSeperator();
            goto MENU;


            /*execute command 5,
             * display and log return from scheduled fares
             */


        case 5: cout << "\n\tLog return from scheduled fares";
            person.slightPause(); //execute a slight pause for better execution
            cout << "\n\n";
            person.printHeading("Return Log");

            if (customer[0].getIdNum() == "" && customer[1].getIdNum() == "" &&
customer[2].getIdNum() == ""
```

```
            && customer[3].getIdNum() == "" && customer[4].getIdNum() == "" &&
customer[5].getIdNum() == "") {//check if entire log is empty
            cout << "\tEntire Log is empty" << "\n\n";
            person.printSeperator();
            goto MENU;
          } else {//if not carry on with logging in fare returns

            for (unsigned short i = 0; i <= arrayCustomers - 1; i++) {//for loop to display active fares
              if (customer[i].getIdNum() != "") {//if fare index id num is not empty, carry on with
display
                printf("%*d). ", 3, i);
                customer[i].printCustomerDetails();
                cout << "\n";
              } else {//if fare index id num is empty, don't carry on with display(Print error message
                cout << "\tIs empty. Enter 2nd Option and schedule fare.\n";
              }
            }

            do {
              cout << "\n\tWhich fare would you like to return: ";
              cin >> arrayIndex;
              validInput = person.isInt(arrayIndex)
                  && person.checkInputArrayIndex(arrayCustomers, arrayIndex)
                  && cus.checkArrayEmpty(customer[arrayIndex].getIdNum());
              if (!validInput) {
                cout << "\t\tPlease try again" << endl;
              } else {

                do {
                  cout << "\n\tEnter index of the driver that was assigned to this customer: ";
                  cin >> x;
                  returnInfo = person.isInt(x)
```

```
                    && person.checkInputArrayIndex(arrayDrivers, x);
                if (!returnInfo) {
                    cout << "\t\tPlease try again" << endl;
                } else {
                    cout << "\n";
                    person.printVehiclesDriversHeadings("ID No.", "Name", "Address", "Phone No.",
"KMS Driven",
                            "Start Date", "License Type", "Is Available", "Revenue");
                    drivers[x].printDriverDetails();
                    drivers[x].setDriverIsAvail(true);
                    drivers[x].setKmDriven(drivers[x].getKmDriven() +
customer[arrayIndex].getJourneyLength()); //calculate driver total km driven
                    drivers[x].setDriverTotalRev((customer[arrayIndex].getJourneyLength() *6.50) +
5);

                }
            } while (!returnInfo);

            do {
                cout << "\n\tEnter index of the vehicle that was assigned to this customer: ";
                cin >> x;
                returnInfo = person.isInt(x)
                        && person.checkInputArrayIndex(arrayVehicles, x);
                if (!returnInfo) {
                    cout << "\t\tPlease try again" << endl;
                } else {
                    cout << "\n";
                    person.printVehiclesDriversHeadings("Type", "Registration No.", "Make",
"Model", "Mileage", "Capacity",
                            "Wheelchair", "Is Available", "Revenue"); //if display information menu
                    vehicles[x].printVehicleDetails(); //print vehicle details according to index from
user input
                    vehicles[x].setVehicleAvail(true);
```

```
                    vehicles[x].setMileage(vehicles[x].getMileage() +
customer[arrayIndex].getJourneyLength()); //calculate vehicle total mileage

                    vehicles[x].setVehicleTotalRev((customer[arrayIndex].getJourneyLength()*6.50)
+ 5); // vehicle

                  }

                } while (!returnInfo);



                cout << "\n\tFare has been returned" << endl;

              }

            } while (!validInput);


            person.printSeperator();

            goto MENU;


          }







          /*execute command 6,

           * display and daily report

           */



        case 6: cout << "\n\tPrinting daily report";

            person.slightPause(); //execute a slight pause for better execution

            cout << "\n\n";

            person.printHeading("Daily Report");


            cout << "\n\tPrinting drivers daily report";

            person.slightPause(); //execute a slight pause for better execution
```

```
            cout << "\n\n";

            person.printVehiclesDriversHeadings("ID No.", "Name", "Address", "Phone No.", "Total
KMs",
                  "Start Date", "License Type", "Is Available", "Revenue");
            for (unsigned short i = 0; i <= arrayDrivers - 1; i++) {//loop through array
               printf("%*d). ", 3, i); //print the index and increment by one per driver
               drivers[i].printDriverDetails(); //display driver details
            }

            cout << "\n\n";

            cout << "\n\tPrinting vehicle daily report";
            person.slightPause(); //execute a slight pause for better execution
            cout << "\n\n";

            person.printVehiclesDriversHeadings("Type", "Registration No.", "Make", "Model", "Total
Mileage", "Capacity",
                  "Wheelchair", "Is Available", "Revenue");
            for (unsigned short i = 0; i <= arrayVehicles - 1; i++) {//loop through the array
               printf("%*d). ", 3, i); //print the index and increment by one per driver
               vehicles[i].printVehicleDetails(); //display vehicle details
            }

            cout << "\n\n";

            report.displayRevenue();

            person.printSeperator();
            goto MENU;
```

```
            /*execute command 7,
             * Close Program
             */


        case 7: cout << "\n\tClosing Program";
            person.slightPause(); //execute a slight pause for better execution
            cout << "\n\n";
            exit(0);

      }

   return 0;
}
```

```
/*
 * File:   Customer.h
 * Author: Shelton Ngwenya
 *
 * Created on 12 March 2021, 14:39
 */

#ifndef CUSTOMER_H
#define CUSTOMER_H

#include "Person.h"
#include "Drivers.h"
#include "Vehicles.h"
#include "Fare.h"
#include "Fare.h"

#include <iostream>
using namespace std;

class Customer: virtual public Person, virtual public Drivers, virtual public Vehicles, virtual public Fare, virtual public Report {
public:
   Customer (){};

   Customer(string, string, string, string, int, int, string, string, double, double);
   virtual ~Customer();
   void printCustomerDetails();
   void scheduleFare();
   bool checkArrayEmpty(string);

   int getWheelChairNum() const {
```

```
        return wheelChairNum;
    }

private:
    string source, destination;
    int travellerNum, wheelChairNum;

};

#endif /* CUSTOMER_H */
```

```
/*
 * File:   Customer.cpp
 * Author:Shelton Ngwenya
 *
 * Created on 12 March 2021, 14:39
 */

#include "Customer.h"

#include <cstdlib>
#include <iostream>
#include <iomanip>

using namespace std;

Customer::Customer(string cusName, string cusPhoneNum, string cusSource, string cusDestination,
      int cusTravellerNum, int cusWheelChairNum, string driverIDNum, string vehicleRegNum, double
cusJourneyLength, double cost) {//constructor
   name = cusName;
   phoneNum = cusPhoneNum;
   source = cusSource;
   destination = cusDestination;
   travellerNum = cusTravellerNum;
   wheelChairNum = cusWheelChairNum;
   idNum = driverIDNum;
   registrationNum = vehicleRegNum;
   fareCost = cost;
   journeyLength = cusJourneyLength;

}
```

```
Customer::~Customer() {//destructor
}

void Customer::scheduleFare() {//method to schedule fare
   bool validateInt = true;

   cout << "\tEnter fare details.\n" << endl;
   cout << "\t\tName: ";
   cin.get();
   getline(cin, name);//get line input from user
   cout << "\t\tPhone Number (089-1234567): ";
   cin >> phoneNum;
   cout << "\t\tSource: ";
   cin.get();
   getline(cin, source);//get source address line input from user
   cout << "\t\tDestination: ";
   cin.get();
   getline(cin, destination);//get destination address line input from user

   do {
      cout << "\t\tNumber of people travelling: ";
      cin >> travellerNum;//get traveller number
      validateInt = isInt(travellerNum) && travellerNum > 0;//validate traveller number input is int
and is greater than 0
      if (!validateInt) {//if not output error message
         cout << "\t\tPlease try again\n" << endl;
      }
   } while (!validateInt);

   do {
```

```
        cout << "\t\tNumber of people using a wheelchair: ";
        cin >> wheelChairNum;//get number of wheelChair
        validateInt = isInt(wheelChairNum);//validate traveller number input is int
        if (!validateInt) {//if not output error message
            cout << "\t\tPlease try again\n" << endl;
        }
    } while (!validateInt);

    calcFare();//calculate fare

    fflush(stdin);

}

bool Customer::checkArrayEmpty(string input) {//method to check if array is empty
    if (input == "") {//if it is, output message
        cout << "\n\t\tThat one is empty." << endl;
        return false;
    }
    return true;
}

void Customer::printCustomerDetails() {//method to display customer/fare details

    cout << "\tName: " << setw(27) << setfill(' ') << name
         << "Phone Number: " << setw(30) << setfill(' ') << phoneNum
         << "No. Travellers: " << setw(10) << setfill(' ') << travellerNum
         << "No. wheel chairs: " << setw(10) << setfill(' ') << wheelChairNum << "\n";

    cout << "\n\tSource: " << setw(40) << setfill(' ') << source
         << "Destination: " << setw(40) << setfill(' ') << destination
```

```
        << "Journey Length: " << setw(12) << setfill(' ') << journeyLength << left << "km" << "\n";


    cout << "\n\tDriver ID No.: " << setw(18) << setfill(' ') << idNum
        << "Vehicle Registration No.: " << setw(18) << setfill(' ') << registrationNum
        << "Travel cost: E" << setw(10) << setfill(' ') << fareCost << "\n\n";

}
```

```
/*
 * File:   Drivers.h
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */

#ifndef DRIVERS_H
#define DRIVERS_H

#include "Person.h"
#include "Report.h"

#include <iostream>
using namespace std;

class Drivers: virtual public Person, virtual public Report {
public:
   Drivers (){};
   Drivers(string, string, string, string, double, string, string, bool);
   virtual ~Drivers();
   void printDriverDetails();
   bool checkDriversAvail(bool);

   void setDriverIsAvail(bool driverIsAvail) {
      this->driverIsAvail = driverIsAvail;
   }

   string getIdNum() const {
```

```
    return idNum;
}

void setIdNum(string idNum) {
    this->idNum = idNum;
}

bool getIsDriverIsAvail() const {
    return driverIsAvail;
}

string getLicenseType() const {
    return licenseType;
}

double getKmDriven() const {
    return kmDriven;
}

void setKmDriven(double kmDriven) {
    this->kmDriven = kmDriven;
}

double getDriverTotalRev() const {
    return driverTotalRev;
}

void setDriverTotalRev(double driverTotalRev) {
    this->driverTotalRev += driverTotalRev;
}
```

```
protected:
   string idNum, startDate;
   string licenseType;
   double kmDriven, driverTotalRev = 0;
   bool driverIsAvail;

};

#endif /* DRIVERS_H */
```

```
/*
 * File:   Drivers.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */

#include "Drivers.h"
#include <iomanip>
#include <iostream>

using namespace std;

Drivers::Drivers(string dID, string dName, string dAddress, string dPhoneNum, double dKmDriven,
        string dStartDate, string dlicense, bool dIsAvail) {//constructor
    idNum = dID;
    name = dName;
    address = dAddress;
    phoneNum = dPhoneNum;
    startDate = dStartDate;
    licenseType = dlicense;
    kmDriven = dKmDriven;
    driverIsAvail = dIsAvail;
    driverTotalRev = 0;
}



Drivers::~Drivers() {//destructor
```

```
}

void Drivers::printDriverDetails() {//method to print driver details
   cout << "\t" << left << setw(14) << setfill(' ') << idNum
        << left << setw(19) << setfill(' ') << name
        << left << setw(28) << setfill(' ') << address
        << left << setw(16) << setfill(' ') << phoneNum
        << left << setw(15) << setfill(' ') << kmDriven
        << left << setw(16) << setfill(' ') << startDate
        << left << setw(17) << setfill(' ') << licenseType
        << left << setw(17) << setfill(' ') << driverIsAvail << boolalpha
        << "E" << left << setw(12) << setfill(' ') << driverTotalRev << "\n";
}

bool Drivers::checkDriversAvail(bool isAvailable) {//method to check if driver is available
   if (isAvailable != true) {//if not, display error message
      cout << "\n\t\tError: Driver is not available." << endl;
      return false;
   }
   return true;
}
```

```
/*
 * File:   Fare.h
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */
#include "Person.h"

#ifndef FARE_H
#define FARE_H

class Fare: virtual public Person {
public:
   void calcFare();
   void updateFare();
   void viewActiveFare();

   double getFareCost() const {
      return fareCost;
   }

   double getJourneyLength() const {
      return journeyLength;
   }


protected:
   double fareCost, journeyLength;
private:
```

```
    double kmCharge = 6.50;
    int callOutCharge = 5;
    bool validInput;

};

#endif /* FARE_H */
```

```
/*
 * File:   Fare.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */

#include "Fare.h"

#include <iostream>
using namespace std;

void Fare::calcFare() {//method to get journey length then calculate fare cost
    do {//loop to check if input is valid
        cout << "\t\tWhat is the expected journey length in kilometres: ";
        cin >> journeyLength;
        validInput = isDouble(journeyLength);
        if (!validInput) {//if not display error message
            cout << "\n\t\tPlease try again\n" << endl;
        } else {//else, continue and calc fare cost
            fareCost = (journeyLength * kmCharge) + callOutCharge;
            cout << "\t\tFare Cost = E" << fareCost << endl;
            fareCost;
        }
    } while (!validInput);

}
```

```
/*
 * File:   Person.h
 * Author: Shelton Ngwenya
 *
 * Created on 12 March 2021, 14:43
 */

#ifndef PERSON_H
#define PERSON_H

#include <iomanip>
#include <iostream>

using namespace std;

class Person {
public:
    int menu();
    bool isInt(int);
    bool isDouble(double);
    bool checkMenu(int);
    void displayWelcome();
    void printSeperator();
    void printVehiclesDriversHeadings(string, string, string, string, string, string, string, string, string);
    bool checkInputArrayIndex(unsigned short, int);

    void slightPause();
    void printHeading(string heading) {
```

```
      cout << "\n\t\t" << setw(33) << setfill('-') << "-" << "/" << heading << "/" << setw(33) << setfill('-')
<< "-" << "\n\n";
   }

protected:
   string name, phoneNum, address;
private:

};

#endif /* PERSON_H */
```

```
/*
 * File:   Person.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 12 March 2021, 14:43
 */

#include "Person.h"

#include <limits>
#include <iomanip>
#include <unistd.h>

#include <iostream>
using namespace std;

bool Person::isInt(int input) {//method to check if input is an int
   if (cin.fail()) {//if not clear input and display error message
      cin.clear();
      cin.ignore(numeric_limits<streamsize>::max(), '\n');
      cout << "\n\t\tError: Input is not a number" << endl;
      return false;
   }
   return true;
}

bool Person::isDouble(double input) {//method to check if input is an double
   if (cin.fail()) {//if not clear input and display error message
      cin.clear();
```

```
        cin.ignore(numeric_limits<streamsize>::max(), '\n');
        cout << "\n\t\tError: Input is not a number" << endl;
        return false;
    }
    return true;
}

bool Person::checkMenu(int input) {//method to check menu input
    if (input < 1 || input > 7) {//if input is greater than 7 or less than 1, display error message
        cout << "\t\tError: Input out of bounds" << endl;
        return false;
    }
    return true;
}

void Person::displayWelcome()//display welcome message
{
    cout <<
"\n\n\t\t_____
_____\n"
         << "\t\t\t\t\tWelcome to CallOut Dispatch Services\n"
         <<
"\t\t_____
__\n\n";
}

int Person::menu() {//method to display menu and return user input

    bool isValid = true;
    int choice;

    do {//loop to check if input is valid
```

```
        cout << "\n\tWould you like to:" << endl
                << "\n\t1. Display all active fares" << endl
                << "\t2. Schedule fares" << endl
                << "\t3. Display all vehicle details" << endl
                << "\t4. Display all driver details" << endl
                << "\t5. Log return from scheduled fares" << endl
                << "\t6. Print daily report" << endl
                << "\t7. Exit" << endl
                << "\t> ";
        cin >> choice;//get users choice

        isValid = isInt(choice) && checkMenu(choice);// validation to check if input is int and is in
bounds

        if (!isValid) {//if not display error
           cout << "\t\tPlease try again" << endl;
        } else {
           return choice;
        }

    } while (!isValid);
}

void Person::printVehiclesDriversHeadings(string s1, string s2, string s3, string s4,
        string s5, string s6, string s7, string s8, string s9) {//method to display Vehicles Drivers Headings
    cout << "\t" << left << setw(14) << setfill(' ') << s1
            << left << setw(19) << setfill(' ') << s2
            << left << setw(28) << setfill(' ') << s3
            << left << setw(16) << setfill(' ') << s4
            << left << setw(15) << setfill(' ') << s5
```

```
        << left << setw(16) << setfill(' ') << s6
        << left << setw(17) << setfill(' ') << s7
        << left << setw(17) << setfill(' ') << s8
        << left << setw(12) << setfill(' ') << s9 << endl;
}

bool Person::checkInputArrayIndex(unsigned short sizeOfArray, int input) {//method to check if user input is not out of bounds of array
   if (input > sizeOfArray || input < 0) {//if so, display error
      cout << "Error: Input is out of bounds";
      return false;
   }
   return true;
}

void Person::slightPause() {// method to make slight pause for better viewing
   for (int i = 0; i < 3; i++) {//display 3 dot per second
      cout << ".";
      cout.flush();
      sleep(1);
   }
   cout << "\b\b\b   \b\b\b";
}

void Person::printSeperator() {//method to display a case separator
   cout << "\n\t" << setw(120) << setfill('_') << "_" << "\n\n";
}
```

```
/*
 * File:   Report.h
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */

#ifndef REPORT_H
#define REPORT_H

#include <iostream>
using namespace std;

class Report  {
public:
   Report() {
      totalRevenue = 0;
   };
   virtual ~Report();
   void displayRevenue();

   void setTotalRevenue(double totalRevenue) {
      this->totalRevenue += totalRevenue;
   }

protected:
   double totalRevenue;

};
```

```
#endif /* REPORT_H */
```

```
/*
 * File:   Report.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:46
 */

#include "Report.h"
#include <iomanip>

#include <iostream>
using namespace std;

Report::~Report() {
}

void Report::displayRevenue() {//method to display the total revenue generated from fares.
    cout << "\tTotal Revenue: E" << totalRevenue << endl;
}
```

```
/*
 * File:   Vehicles.h
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:45
 */

#ifndef VEHICLES_H
#define VEHICLES_H

#include "Report.h"

#include <iostream>
using namespace std;

class Vehicles {
public:
    Vehicles (){};
    Vehicles(string, string, string, string, double, int, bool, bool);
    virtual ~Vehicles();

    bool checkVehiclesAvail(bool);
    bool wheelchairAccessible(bool, int);
    void printVehicleDetails();

    void setVehicleAvail(bool Avail) {
        isAvail = Avail;
    }

    string getRegistrationNum() const {
```

```
    return registrationNum;
}

void setRegistrationNum(string registrationNum) {
    this->registrationNum = registrationNum;
}

bool getVehicleIsAvail() const {
    return isAvail;
}

string getType() const {
    return type;
}

double getMileage() const {
    return mileage;
}

void setMileage(double mileage) {
    this->mileage = mileage;
}

double getVehicleTotalRev() const {
    return vehicleTotalRev;
}

void setVehicleTotalRev(double vehicleTotalRev) {
    this->vehicleTotalRev = vehicleTotalRev;
}
```

```
    bool getIsWheelChair() const {
        return wheelChair;
    }




protected:
    string registrationNum, make, model, type;
    double mileage, vehicleTotalRev = 0;
    bool wheelChair;
    int capacity;
    bool isAvail;

};

#endif /* VEHICLES_H */
```

```
/*
 * File:   Vehicles.cpp
 * Author: Shelton Ngwenya
 *
 * Created on 15 March 2021, 19:45
 */

#include "Vehicles.h"
#include <iomanip>
#include <iostream>
using namespace std;

Vehicles::Vehicles(string vType, string vRegNum, string vMake, string vModel,
        double vMileage, int vCapacity,  bool vWheelChair, bool vIsAvailable) {//constructor
    type = vType;
    registrationNum = vRegNum;
    make = vMake;
    model = vModel;
    mileage = vMileage;
    wheelChair = vWheelChair;
    capacity = vCapacity;
    isAvail = vIsAvailable;
    vehicleTotalRev = 0;

}

Vehicles::~Vehicles() {//destructor
}
```

```
void Vehicles::printVehicleDetails() {//method to display vehicle details
   cout << "\t" << left << setw(14) << setfill(' ') << type
        << left << setw(19) << setfill(' ') << registrationNum
        << left << setw(28) << setfill(' ') << make
        << left << setw(16) << setfill(' ') << model
        << left << setw(15) << setfill(' ') << mileage
        << left << setw(16) << setfill(' ') << capacity
        << left << setw(17) << setfill(' ') << wheelChair << boolalpha
        << left << setw(17) << setfill(' ') << isAvail << boolalpha
        << "E" << left << setw(12) << setfill(' ') << vehicleTotalRev << "\n";
}

bool Vehicles::checkVehiclesAvail(bool isAvailable) {//method to check if vehicle is available

   if (isAvailable != true) {//if not, display error message
      cout << "\t\t\nError: Vehicle is not available." << endl;
      return false;
   }
   return true;
}

bool Vehicles::wheelchairAccessible(bool vehicle, int wcNum) {//method to check if vehicle is wheel
chair accessible
   if (vehicle == false && wcNum > 0) {
      cout <<"\n\t\tError: Vehicle is not wheel chair accessible." << endl;
      return false;
   }
   return true;
}
```