

Assignment 4 - CT2106 Object Oriented Programming

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November 2020

1 Overview

For this project we had to create a basic interface for a theoretical website called TravellIreland in which you have the ability to book bus tickets from three major bus companies:

- BusEireann
- Go Bus
- CityLink

As it is a consumer interface we imagine that the company class pulls trip data from the websites of the relative bus companies, consequently the only time bus ticket data can be edited is when a purchase is made and then the seats Available on the bus are reduced.

As it would not make sense to make a completely new class for each travel company, they all inherit all their functions from an abstract class Company, which handles making bookings and keeps track of all the available bus journeys.

The Trip class holds all relative data for a journey (Apart from the company name as that would not make sense if each company is a separate object). The Booking class is rather primitive as it holds the reference to the Trip, Quantity of seats, and the total cost of the booking (if Successful), everything within the booking class is evaluated by the Company class and TravellIreland class.

TravellIreland is the class which implements the user interface itself, it communicates with the Company sub classes and then provides a very rudimentary interface so they can be utilized.

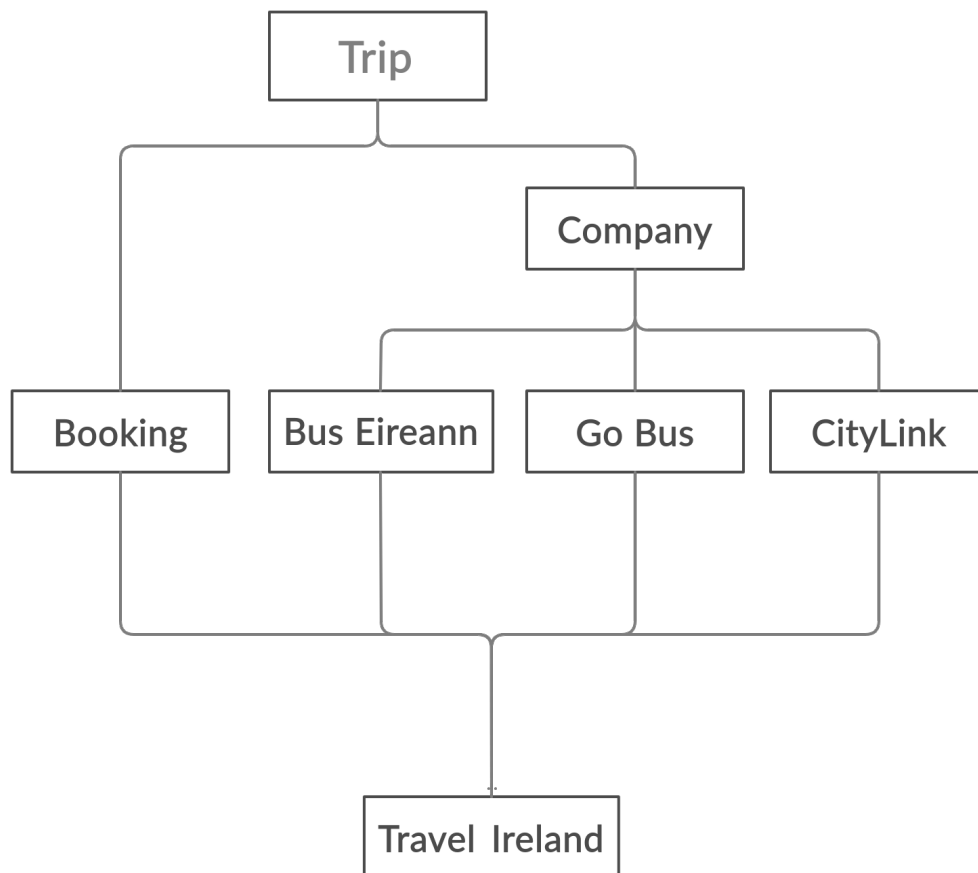


Figure 1: Class Hierarchy

2 Output

Printing all Available trips

Company Name: BusEireann
Trip ID: 5947
Origin: Foynes
Destination: Maynooth
Departure Date: 18/06/2020
Departure Time: 11:02
Arrival Date: 16/02/2020
Arrival Time: 22:23
Fare: €44.19 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 3414
Origin: Moyvane
Destination: Athenry
Departure Date: 09/10/2020
Departure Time: 22:03
Arrival Date: 22/01/2020
Arrival Time: 04:03
Fare: €58.52 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 8540
Origin: Derry
Destination: Foynes
Departure Date: 06/04/2020
Departure Time: 15:29
Arrival Date: 02/10/2020
Arrival Time: 20:20
Fare: €22.05 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 3231
Origin: Tarbert
Destination: Ballyjamesduff
Departure Date: 23/09/2020
Departure Time: 15:45
Arrival Date: 04/01/2020
Arrival Time: 18:41
Fare: €19.37 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 2650
Origin: Moyvane
Destination: Longford
Departure Date: 03/02/2020
Departure Time: 16:10
Arrival Date: 24/12/2020
Arrival Time: 00:49

Fare: €26.58 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 2018
Origin: Moyvane
Destination: Castlerea
Departure Date: 22/05/2020
Departure Time: 08:50
Arrival Date: 05/05/2020
Arrival Time: 20:35
Fare: €83.17 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 1694
Origin: Poundtown
Destination: Wexford
Departure Date: 13/06/2020
Departure Time: 07:49
Arrival Date: 07/06/2020
Arrival Time: 14:16
Fare: €28.76 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 1195
Origin: Letterfrack
Destination: Tuam
Departure Date: 18/01/2020
Departure Time: 21:58
Arrival Date: 28/02/2020
Arrival Time: 20:17
Fare: €12.27 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 9283
Origin: Foynes
Destination: Tarbert
Departure Date: 24/04/2020
Departure Time: 12:38
Arrival Date: 01/07/2020
Arrival Time: 21:51
Fare: €7.43 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 913
Origin: Roscommon
Destination: Foynes
Departure Date: 19/08/2020
Departure Time: 01:21
Arrival Date: 18/06/2020
Arrival Time: 04:31

Fare: €91.41 per passenger
Currently Available Seats: 60

Company Name: BusEireann
Trip ID: 1202
Origin: Longford
Destination: Maynooth
Departure Date: 03/04/2020
Departure Time: 17:53
Arrival Date: 14/05/2020
Arrival Time: 19:07
Fare: €33.15 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 3656
Origin: Ballybunion
Destination: Dublin
Departure Date: 07/11/2020
Departure Time: 02:36
Arrival Date: 09/12/2020
Arrival Time: 12:17
Fare: €35.03 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 4921
Origin: Roscommon
Destination: Poundtown
Departure Date: 22/06/2020
Departure Time: 23:54
Arrival Date: 23/06/2020
Arrival Time: 03:07
Fare: €24.75 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 6783
Origin: Tullamore
Destination: Ballybofey
Departure Date: 10/09/2020
Departure Time: 14:59
Arrival Date: 05/08/2020
Arrival Time: 14:04
Fare: €75.87 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 6395
Origin: Tuam
Destination: Tullamore
Departure Date: 28/02/2020
Departure Time: 13:46
Arrival Date: 04/06/2020

Arrival Time: 15:48
Fare: €8.08 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 1180
Origin: New Ross
Destination: Longford
Departure Date: 09/05/2020
Departure Time: 21:40
Arrival Date: 10/09/2020
Arrival Time: 04:17
Fare: €9.86 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 9402
Origin: Castlebar
Destination: Roscommon
Departure Date: 26/12/2020
Departure Time: 10:36
Arrival Date: 09/12/2020
Arrival Time: 00:32
Fare: €70.76 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 340
Origin: New Ross
Destination: Cork
Departure Date: 13/10/2020
Departure Time: 07:21
Arrival Date: 20/09/2020
Arrival Time: 03:16
Fare: €18.88 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 1179
Origin: Boyle
Destination: Longford
Departure Date: 15/07/2020
Departure Time: 21:43
Arrival Date: 14/04/2020
Arrival Time: 23:44
Fare: €63.95 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 4916
Origin: Lisdoonvarna
Destination: Limerick
Departure Date: 26/09/2020
Departure Time: 11:18
Arrival Date: 13/06/2020

Arrival Time: 17:10
Fare: €69.8 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 6408
Origin: Castlebar
Destination: Athlone
Departure Date: 11/08/2020
Departure Time: 22:33
Arrival Date: 11/05/2020
Arrival Time: 12:52
Fare: €70.99 per passenger
Currently Available Seats: 60

Company Name: GoBus
Trip ID: 2720
Origin: Athboy
Destination: Dublin
Departure Date: 05/08/2020
Departure Time: 16:02
Arrival Date: 25/01/2020
Arrival Time: 04:32
Fare: €9.17 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 5927
Origin: Castlerea
Destination: Galway
Departure Date: 28/04/2020
Departure Time: 07:52
Arrival Date: 05/05/2020
Arrival Time: 21:49
Fare: €17.15 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 436
Origin: Bunclody
Destination: Kill
Departure Date: 11/08/2020
Departure Time: 15:00
Arrival Date: 18/01/2020
Arrival Time: 15:16
Fare: €42.34 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 1226
Origin: Tarbert
Destination: Dublin
Departure Date: 17/04/2020

Departure Time: 14:30
Arrival Date: 07/08/2020
Arrival Time: 01:07
Fare: €94.1 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 2816
Origin: Oughterard
Destination: Tuam
Departure Date: 25/03/2020
Departure Time: 19:17
Arrival Date: 01/12/2020
Arrival Time: 09:40
Fare: €29.84 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 3554
Origin: Kill
Destination: Foynes
Departure Date: 11/09/2020
Departure Time: 18:26
Arrival Date: 28/05/2020
Arrival Time: 14:30
Fare: €96.46 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 1568
Origin: Ballybofey
Destination: Maynooth
Departure Date: 18/11/2020
Departure Time: 18:27
Arrival Date: 12/07/2020
Arrival Time: 00:09
Fare: €28.52 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 9662
Origin: Boyle
Destination: Dublin
Departure Date: 04/05/2020
Departure Time: 19:06
Arrival Date: 09/04/2020
Arrival Time: 22:21
Fare: €40.01 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 2763
Origin: Garryowen
Destination: Tullamore
Departure Date: 07/09/2020

Departure Time: 22:33
Arrival Date: 09/11/2020
Arrival Time: 22:28
Fare: €73.34 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 7761
Origin: Longford
Destination: Ballyjamesduff
Departure Date: 21/10/2020
Departure Time: 11:29
Arrival Date: 02/12/2020
Arrival Time: 10:34
Fare: €43.83 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 1629
Origin: Castlerea
Destination: Roscommon
Departure Date: 27/06/2020
Departure Time: 04:05
Arrival Date: 24/03/2020
Arrival Time: 16:59
Fare: €87.42 per passenger
Currently Available Seats: 60

Company Name: City Link
Trip ID: 8643
Origin: Bunclody
Destination: Garryowen
Departure Date: 23/11/2020
Departure Time: 01:53
Arrival Date: 13/10/2020
Arrival Time: 10:19
Fare: €17.47 per passenger
Currently Available Seats: 60

Test Bookings:

These should all fail
Invalid Seat Quantities
Transaction Failed!

Transaction Failed!

Transaction Failed!

Invalid Trip Data
Transaction Failed!

Transaction Failed!

Transaction Failed!

These Should All Succeed
Booking Successful!
Trip ID: 913
Origin: Roscommon
Destination: Foynes
Departure Date: 19/08/2020
Departure Time: 01:21
Arrival Date: 18/06/2020
Arrival Time: 04:31
Fare: €91.41 per passenger
Currently Available Seats: 55
Total Cost: 457.05

Booking Successful!
Trip ID: 340
Origin: New Ross
Destination: Cork
Departure Date: 13/10/2020
Departure Time: 07:21
Arrival Date: 20/09/2020
Arrival Time: 03:16
Fare: €18.88 per passenger
Currently Available Seats: 43
Total Cost: 320.96

Booking Successful!
Trip ID: 9662
Origin: Boyle
Destination: Dublin
Departure Date: 04/05/2020
Departure Time: 19:06
Arrival Date: 09/04/2020
Arrival Time: 22:21
Fare: €40.01 per passenger
Currently Available Seats: 48
Total Cost: 480.12

3 Code

3.1 Trip.java

```
1 import java.util.Date;
2 import java.text.SimpleDateFormat;
3 /*
4  * As this is an end user class, IE - not controlled by the bus company
5  * It does not require any setters beyond the initialization of a trip ID
6  * And the ability to modify the amount of Available seats due to seats being
7  * Purchased
8  */
9 public class Trip{
10     private int ID;
11     private int seats;
12     private float cost;
13     private String startingLocation;
14     private String destination;
15     private Date dateOfDeparture;
16     private Date timeOfDeparture;
```

```

17 private Date dateOfArrival;
18 private Date timeOfArrival;
19
20 public Trip(int ID, float cost, String start, String destination, String departureDate,
    ↪ String departureTime, String arrivalDate, String arrivalTime) {
21     this.seats = 60;
22     this.ID = ID;
23     this.startingLocation = start;
24     this.destination = destination;
25     this.cost = cost;
26     try {
27         /*Dates are stored as Date Objects as they occupy less space than a String*/
28         this.dateOfDeparture = new SimpleDateFormat("dd/MM/yyyy").parse(departureDate);
29         this.timeOfDeparture = new SimpleDateFormat("HH:mm").parse(departureTime);
30         this.dateOfArrival = new SimpleDateFormat("dd/MM/yyyy").parse(arrivalDate);
31         this.timeOfArrival = new SimpleDateFormat("HH:mm").parse(arrivalTime);
32     } catch(Exception e) {
33         System.out.printf("Parse Error");
34     }
35 }
36
37 public int getID() {
38     return this.ID;
39 }
40
41 public int getSeats() {
42     return this.seats;
43 }
44
45 public float getCost() {
46     return this.cost;
47 }
48
49 public String getStartingLocation() {
50     return this.startingLocation;
51 }
52
53 public String getDestination() {
54     return this.destination;
55 }
56
57 public Date getDateOfDeparture() {
58     return this.dateOfDeparture;
59 }
60
61 public Date getTimeOfDeparture() {
62     return this.timeOfDeparture;
63 }
64
65 public Date getDateOfArrival() {
66     return this.dateOfArrival;
67 }
68
69 public Date getTimeOfArrival() {
70     return this.timeOfArrival;
71 }
72
73 public void setSeats(int newSeats) {
74     this.seats = newSeats;
75 }

```

```

76  /*It did not make sense not to override toString*/
77  @Override
78  public String toString() {
79      String output = "";
80      output += "Trip ID: " + ID;
81      output += "\nOrigin: " + startingLocation;
82      output += "\nDestination: " + destination;
83      output += "\nDeparture Date: " + new
84          ↳ SimpleDateFormat("dd/MM/yyyy").format(dateOfDeparture);
85      output += "\nDeparture Time: " + new
86          ↳ SimpleDateFormat("HH:mm").format(timeOfDeparture);
87      output += "\nArrival Date: " + new
88          ↳ SimpleDateFormat("dd/MM/yyyy").format(dateOfArrival);
89      output += "\nArrival Time: " + new SimpleDateFormat("HH:mm").format(timeOfArrival);
90      output += "\nFare: €" + cost + " per passenger";
91      output += "\nCurrently Available Seats: " + seats+"\n";
92      return output;
93  }
94  }

```

3.2 Company.java

```

1  import java.util.ArrayList;
2
3  /*To stay in line with the Design featured in the PDF each bus company is an extension of
4  an Abstract class Company*/
5  public abstract class Company {
6      //Used ArrayList to record journeys as it does not require an initialization value
7      ArrayList<Trip> journeys;
8      String companyName;
9      public Company() {
10         journeys = new ArrayList<Trip>();
11     }
12
13     public Trip getTrip(int ID) {
14         for(int i = 0; i < journeys.size(); i++) {
15             //Iterates through the ArrayList looking for the ID given, returns null if it does not exist
16             if(journeys.get(i).getID() == ID) {
17                 return journeys.get(i);
18             }
19         }
20         return null;
21     }
22
23     public boolean makeBooking(Booking mybooking) {
24         //Error handling, make sure the trip exists
25         if(mybooking.getTrip() == null || !journeys.contains(mybooking.getTrip())) {
26             return false;
27         }
28         //Makes sure a valid seat quantity is entered
29         if(mybooking.getTrip().getSeats() > mybooking.getSeats() && mybooking.getSeats() > 0)
30             ↳ {
31             mybooking.setCost(mybooking.getTrip().getCost() * mybooking.getSeats());
32             mybooking.getTrip().setSeats(mybooking.getTrip().getSeats() - mybooking.getSeats());
33             return true;
34         }
35         return false;
36     }
37 }

```

```

35     }
36
37     public String getAllAvailableTrips() {
38         /*This takes advantage of the new toString tht was produced for trip*/
39         String output = "";
40         for(int i = 0; i < journeys.size(); i++) {
41             output += "Company Name: " + companyName + "\n"+journeys.get(i).toString()+"\n\n";
42         }
43         return output;
44     }
45 }

```

3.3 Booking.java

```

1  public class Booking {
2      private Trip myTrip;
3      private int seats;
4      private float cost;
5      public Booking(Trip newTrip, int newSeats) {
6          this.myTrip = newTrip;
7          this.seats = newSeats;
8          this.cost = 0.0f;
9      }
10     public Trip getTrip() {
11         return this.myTrip;
12     }
13
14     public int getSeats() {
15         return this.seats;
16     }
17
18     public float getCost() {
19         return this.cost;
20     }
21
22     public void setTrip(Trip trip) {
23         this.myTrip = trip;
24     }
25
26     public void setSeats(int newSeats) {
27         this.seats = newSeats;
28     }
29
30     public void setCost(float newCost) {
31         this.cost = newCost;
32     }
33 }

```

3.4 BusEireann.java

```

1  public class BusEireann extends Company {
2      public BusEireann() {
3          super();
4          companyName = "BusEireann";

```

```

5     journeys.add(new
        ↳ Trip(5947,44.19f,"Foynes","Maynooth","18/6/2020","11:2","16/2/2020","22:23"));
6     journeys.add(new
        ↳ Trip(3414,58.52f,"Moyvane","Athenry","9/10/2020","22:3","22/1/2020","4:3"));
7     journeys.add(new
        ↳ Trip(8540,22.05f,"Derry","Foynes","6/4/2020","15:29","2/10/2020","20:20"));
8     journeys.add(new
        ↳ Trip(3231,19.37f,"Tarbert","Ballyjamesduff","23/9/2020","15:45","4/1/2020","18:41"));
9     journeys.add(new
        ↳ Trip(2650,26.58f,"Moyvane","Longford","3/2/2020","16:10","24/12/2020","0:49"));
10    journeys.add(new
        ↳ Trip(2018,83.17f,"Moyvane","Castlerea","22/5/2020","8:50","5/5/2020","20:35"));
11    journeys.add(new
        ↳ Trip(1694,28.76f,"Poundtown","Wexford","13/6/2020","7:49","7/6/2020","14:16"));
12    journeys.add(new
        ↳ Trip(1195,12.27f,"Letterfrack","Tuam","18/1/2020","21:58","28/2/2020","20:17"));
13    journeys.add(new
        ↳ Trip(9283,7.43f,"Foynes","Tarbert","24/4/2020","12:38","1/7/2020","21:51"));
14    journeys.add(new
        ↳ Trip(913,91.41f,"Roscommon","Foynes","19/8/2020","1:21","18/6/2020","4:31"));
15    journeys.add(new
        ↳ Trip(1202,33.15f,"Longford","Maynooth","3/4/2020","17:53","14/5/2020","19:7"));
16    }
17 }

```

3.5 CityLink.java

```

1 public class CityLink extends Company {
2     public CityLink() {
3         super();
4         companyName = "City Link";
5         journeys.add(new
6             ↳ Trip(5927,17.15f,"Castlerea","Galway","28/4/2020","7:52","5/5/2020","21:49"));
7         journeys.add(new
8             ↳ Trip(436,42.34f,"Buncclody","Kill","11/8/2020","15:0","18/1/2020","15:16"));
9         journeys.add(new
10            ↳ Trip(1226,94.10f,"Tarbert","Dublin","17/4/2020","14:30","7/8/2020","1:7"));
11        journeys.add(new
12            ↳ Trip(2816,29.84f,"Oughterard","Tuam","25/3/2020","19:17","1/12/2020","9:40"));
13        journeys.add(new
14            ↳ Trip(3554,96.46f,"Kill","Foynes","11/9/2020","18:26","28/5/2020","14:30"));
15        journeys.add(new
16            ↳ Trip(1568,28.52f,"Ballybofey","Maynooth","18/11/2020","18:27","12/7/2020","0:9"));
17        journeys.add(new
18            ↳ Trip(9662,40.01f,"Boyle","Dublin","4/5/2020","19:6","9/4/2020","22:21"));
19        journeys.add(new
20            ↳ Trip(2763,73.34f,"Garryowen","Tullamore","7/9/2020","22:33","9/11/2020","22:28"));
21        journeys.add(new
22            ↳ Trip(7761,43.83f,"Longford","Ballyjamesduff","21/10/2020","11:29","2/12/2020","10:34"));
23        journeys.add(new
24            ↳ Trip(1629,87.42f,"Castlerea","Roscommon","27/6/2020","4:5","24/3/2020","16:59"));
25        journeys.add(new
26            ↳ Trip(8643,17.47f,"Buncclody","Garryowen","23/11/2020","1:53","13/10/2020","10:19"));
27    }
28 }

```

3.6 GoBus.java

```
1 public class GoBus extends Company {
2     public GoBus() {
3         super();
4         companyName = "GoBus";
5         journeys.add(new
6             ↳ Trip(3656,35.03f,"Ballybunion","Dublin","7/11/2020","2:36","9/12/2020","12:17"));
7         journeys.add(new
8             ↳ Trip(4921,24.75f,"Roscommon","Poundtown","22/6/2020","23:54","23/6/2020","3:7"));
9         journeys.add(new
10            ↳ Trip(6783,75.87f,"Tullamore","Ballybofey","10/9/2020","14:59","5/8/2020","14:4"));
11        journeys.add(new
12            ↳ Trip(6395,8.08f,"Tuam","Tullamore","28/2/2020","13:46","4/6/2020","15:48"));
13        journeys.add(new Trip(1180,9.86f,"New
14            ↳ Ross","Longford","9/5/2020","21:40","10/9/2020","4:17"));
15        journeys.add(new
16            ↳ Trip(9402,70.76f,"Castlebar","Roscommon","26/12/2020","10:36","9/12/2020","0:32"));
17        journeys.add(new Trip(340,18.88f,"New
18            ↳ Ross","Cork","13/10/2020","7:21","20/9/2020","3:16"));
19        journeys.add(new
20            ↳ Trip(1179,63.95f,"Boyle","Longford","15/7/2020","21:43","14/4/2020","23:44"));
21        journeys.add(new
22            ↳ Trip(4916,69.80f,"Lisdoonvarna","Limerick","26/9/2020","11:18","13/6/2020","17:10"));
23        journeys.add(new
24            ↳ Trip(6408,70.99f,"Castlebar","Athlone","11/8/2020","22:33","11/5/2020","12:52"));
25        journeys.add(new
26            ↳ Trip(2720,9.17f,"Athboy","Dublin","5/8/2020","16:2","25/1/2020","4:32"));
27    }
28 }
```