THE UNIVERSITY OF SYDNEY

INFO1113 Assignment 1

Due: 23 April 2021, 11:59PM AEST

This assignment is worth 12% of your final grade.

Task Description – Flight Scheduler

In this assignment, you will create a Flight Scheduler application in the Java programming language. The program will be a tool for airlines to use to schedule flights between different locations, producing timetable plans, and an easy way to check routing between cities on multiple flights. You must create at least three classes: FlightScheduler, Flight and Location, for which a scaffold and description have been provided to you. The FlightScheduler class will contain the main entry point of the application (static main function).

You are encouraged to ask questions on Ed under the assignments category if you are unsure of the specification – but staff members will not be able to do any coding or debugging in this assignment for you. As with any assignment, make sure that your work is your own, and do not share your code or solutions with other students.

Working on your assignment

You can work on this assignment on your own computer or the lab machines. It is important that you continually back up your assignment files onto your own machine, external drives, and in the cloud.

You are encouraged to submit your assignment on Ed while you are in the process of completing it. By submitting you will obtain some feedback of your progress on the sample test cases provided.

Implementation details

Write a program in Java to implement the Flight Schedular application that accepts input from the user via standard input. The terminal interface allows the user to interact with the program, to give it input and receive output. The available commands are described below in the section 'Commands'.

There are three main classes you must implement, but you may also create more if you wish.

FlightScheduler class

This class will contain the main entry point of your program (static main function) and store links to all the data relevant to the application. It will be a container for the flight schedule, which is made up of a list of Flights. It should also contain a list of Locations.

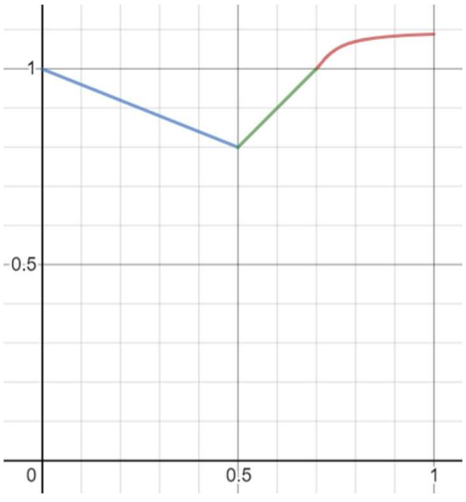
The flight schedule is only a single week, Monday to Sunday, which repeats. Assume all times are in UTC, so you do not have to account for timezone differences at different locations.

Flight class

The Flight type should contain all data relevant to a particular flight, methods that perform operations on a Flight or multiple Flights. Attributes will be the flight ID, departure time, source and destination locations, capacity, ticket price, number of passengers booked, and anything else you think is relevant.

Flight duration is determined by the distance between the start and end locations, calculated using the *Haversine Formula*, and assuming the average speed of an aircraft is 720km/h. The initial ticket price is calculated using an average cost of $30, plus 4x the demand coefficient differential between locations, per 100km distance. For example, if the starting location has demand coefficient of -1 and the end has -1, it remains $30 per 100km. If the starting location has -1 and the end has 1, then it's $38 per 100km. If the starting location has 1 and end has -1, it would be $22 per 100km.

Ticket price changes when the flight starts to fill up. For the first 50% of seats, the price decreases linearly to 80% of its original value by the time the flight is half full. For the next 20% of seats, the price increases linearly back to 100% of its original value. For the last 30% of seats, ticket price increases by an inverse-tan curve to 110% of its original value.



$$y = \begin{cases} -0.4x + 1, & 0 < x \leq 0.5 \\ x + 0.3, & 0.5 < x \leq 0.7 \\ \frac{0.2}{\pi} \times \tan^{-1}(20x - 14) + 1, & 0.7 < x \leq 1 \end{cases}$$

$$T = y \times \frac{d}{100} \times (30 + 4(D_{to} - D_{from}))$$

where
T = ticket price
y = multiplier for ticket price to determine current value
x = proportion of seats filled (booked/capacity)
d = flight distance in kilometres (haversine formula result)
D_{to} = demand coefficient for destination location
D_{from} = demand coefficient for starting location

Location class

The Location type should contain all data relevant to a particular location, and methods that perform operations on a Location or multiple Locations. Attributes will be the location name, latitude and longitude coordinates, lists of arriving and departing flights, and a demand coefficient. Location names must be unique (case insensitive). Latitude must be within [-85, 85] and longitude must be within [-180,180], both in degrees. The demand coefficient is a number between -1 and 1 (inclusive) which represents whether there is a net inflow or outflow of passengers from this location (negative means passengers want to leave, positive means they want to come). It factors into the calculation that determines the ticket price for a particular flight.

Assume each location has only one runway – that is, no flights can be scheduled to arrive or depart within an hour of another at a particular location. Multi-runway airports can be represented by multiple locations in such a system (eg. Heathrow-1, Heathrow-2, etc).

Commands

FLIGHTS - list all available flights ordered by departure time, then departure location name
FLIGHT ADD <departure time> <from> <to> <capacity> - add a flight
FLIGHT IMPORT/EXPORT <filename> - import/export flights to csv file
FLIGHT <id> - view information about a flight (from->to, departure arrival times, current ticket price, capacity, passengers booked)
FLIGHT <id> BOOK <num> - book a certain number of passengers for the flight at the current ticket price, and then adjust the ticket price to reflect the reduced capacity remaining. If no number is given, book 1 passenger. If the given number of bookings is more than the remaining capacity, only accept bookings until the capacity is full.
FLIGHT <id> REMOVE - remove a flight from the schedule
FLIGHT <id> RESET - reset the number of passengers booked to 0, and the ticket price to its original state.

LOCATIONS - list all available locations in alphabetical order
LOCATION ADD <name> <lat> <long> <demand_coefficient> - add a location
LOCATION <name> - view details about a location (it's name, coordinates, demand coefficient)
LOCATION IMPORT/EXPORT <filename> - import/export locations to csv file
SCHEDULE <location_name> - list all departing and arriving flights, in order of the time they arrive/depart
DEPARTURES <location_name> - list all departing flights, in order of departure time
ARRIVALS <location_name> - list all arriving flights, in order of arrival time

TRAVEL <from> <to> [sort] [n] - list the nth possible flight route between a starting location and destination, with a maximum of 3 stopovers. Default ordering is for shortest overall duration. If n is not provided, display the first one in the order. If n is larger than the number of flights available, display the last one in the ordering.

can have other orderings:
TRAVEL <from> <to> cost - minimum current cost
TRAVEL <from> <to> duration - minimum total duration
TRAVEL <from> <to> stopovers - minimum stopovers
TRAVEL <from> <to> layover - minimum layover time
TRAVEL <from> <to> flight_time - minimum flight time

HELP – outputs this help string.
EXIT – end the program.

Note: All commands may be case insensitive.

However Location names when stored in the location class, should display the name as initially given.

Travel command

Since the schedule is weekly and wraps around, you need to consider the possibility of a flight arriving on Sunday evening potentially connecting with a flight that departs on Monday morning. As such, you may ignore available seat capacity selecting a flight in a potential route, since it is assumed that the current bookings are only for the current week, and this flight route may be used to show results for travellers in subsequent weeks, looking to make a booking later on. However, the ticket prices and overall route cost should depend on the current booking numbers of each flight, since we are assuming that the current booking demand is a good indicator of future demand, so ticket prices will be similar in the future to what they are now.

The TRAVEL command has 5 potential orderings, detailed below. If the primary sorting property is equal between two flight paths, it will fall back to the following secondary and tertiary sorting properties. It is assumed that current cost will never be equal for two flight paths (this may not be true in practice, but then any secondary ordering is fine).

- If total duration is equal, sort then by minimum current cost. Total duration is the time taken from initial departure of the first flight, to finally arriving at the destination.

- If number of stopovers is equal, sort then by minimum total duration (and then by minimum cost). Stopovers are intermediary locations travelled to in order to reach the destination.

- If layover time is equal, sort then by minimum total duration (and then by minimum cost). Layover time is the time spent waiting at the airport for connecting flights.

- If flight time is equal, sort then by minimum total duration (and then by minimum cost). Flight time is the time spent onboard the aircraft while it is flying (ie. total duration excluding layover time).

The output format of the travel command is composed of the flight plan, with layover times between flights specified, see the examples section below.

Note: The number of stopovers is the number of intermediary destinations, not including the original starting location and final destination. It is equivalent to the number of flight legs minus 1.

Error messages

The following messages should be output upon encountering the prescribed error case or condition:

command	Description of condition/error case	Message output
flight add	Time added was not in the correct format, for example “Monday 18:00”	Invalid departure time. Use the format <day_of_week> <hour:minute>, with 24h time.
	Starting location was not in the database.	Invalid starting location.
	Ending location was not in the database.	Invalid ending location.
	Capacity was not a positive integer.	Invalid positive integer capacity.
	The two locations entered were the same.	Source and destination cannot be the same place.
	No runways are available for this flight at the designated location at that time. <DateTime> is in the format as above, “Monday 18:00”	Scheduling conflict! This flight clashes with Flight <ID> departing from <Location> on <DateTime>.
	No runways are available for this flight at the designated location at that time. <DateTime> is in the format as above, “Monday 18:00”	Scheduling conflict! This flight clashes with Flight <ID> arriving at <Location> on <DateTime>.
	Not enough command arguments given.	Usage: FLIGHT ADD <departure time> <from> <to> <capacity>\nExample: FLIGHT ADD Monday 18:00 Sydney Melbourne 120
flight book	The number of passengers entered was not a valid positive integer.	Invalid number of passengers to book.
	If the capacity is full, print this after each attempt at booking that would otherwise exceed the capacity, or has filled it.	Flight is now full.
flight remove	Remove this flight – display the short departure time, eg. Mon 18:00, and then source → destination locations.	Removed Flight <ID>, <DateTime> <Location> --> <Location>, from the flight schedule.
flight reset	Display the short departure time, eg. Mon 18:00, and then source → destination locations.	Reset passengers booked to 0 for Flight <ID>, <DateTime> <Location> --> <Location>.
flight <id>	Invalid flight id is entered that is either not a number, or does not exist in the database.	Invalid Flight ID.
flight	no parameters given	Usage:\nFLIGHT <id> [BOOK/REMOVE/RESET] [num]\nFLIGHT ADD <departure time> <from> <to> <capacity>\nFLIGHT IMPORT/EXPORT <filename>
import	No filename is given, or the file doesn’t exist.	Error reading file.
export	No filename is given, or the directory for this file doesn’t exist.	Error writing file.

flights/ locations	No flights/locations are available – print this instead of the flight/location listing	(None)
location add	Location is already present in the database (case insensitive based on name)	This location already exists.
	Latitude exceeds bounds or is an invalid number.	Invalid latitude. It must be a number of degrees between -85 and +85.
	Longitude exceeds bounds or is an invalid number	Invalid longitude. It must be a number of degrees between -180 and +180.
	Demand coefficient exceeds bounds or is an invalid number.	Invalid demand coefficient. It must be a number between -1 and +1.
location	Location is not present in the database (case insensitive based on name)	Invalid location name.
location	No parameters given.	Usage:\nLOCATION <name>\nLOCATION ADD <name> <latitude> <longitude> <demand_coefficient>\nLOCATION IMPORT/EXPORT <filename>
Schedule, departures, arrivals	Location is not present in the database (case insensitive based on name)	This location does not exist in the system.
travel	Starting location is not present in the database (case insensitive based on name.	Starting location not found.
	Ending location is not present in the database (case insensitive based on name.	Ending location not found.
	Bad sorting property.	Invalid sorting property: must be either cost, duration, stopovers, layover, or flight_time.
	No flight paths of 3 stopovers or less are available from the given starting location to the ending destination.	Sorry, no flights with 3 or less stopovers are available from <Location> to <Location>.
	No parameters given.	Usage: TRAVEL <from> <to> [cost/duration/stopovers/layover/flight_time]

CSV file formats

The import and export command for flights and locations allow the contents of the flight and location databases within the program to be saved to CSV (comma separated values) files. Two example files have been provided, as well as a sample command input/output sequence below.

When importing and exporting, if invalid lines are encountered in the file without the required data, skip them and display the total number of errors at the end, if any were invalid. For example:

```
User: location import locations.csv
Imported 23 locations.
1 line was invalid.

User: flight import flights.csv
Imported 23 flights.
3 lines were invalid.

User: flight import flights2.csv
Imported 1 flight.

User: flight export flights3.csv
Exported 1 flight.
```

Flights and locations are to be imported in the order they are given in the file.

Flights csv has the following format: day time,startLocation,endLocation,capacity,booked

Example:

```
Monday 18:00,Sydney,Melbourne,120,80
Monday 19:00,Sydney,Hobart,120,29
Monday 21:30,Sydney,Hobart,120,29
Monday 18:00,Auckland,Rio,120,1
```

Locations csv has the following format: locationName,latitude,longitude,demandCoefficient

Example:

```
Sydney,-33.847927,150.651786,0.4
Hobart,-42.8823399,147.3198016,0.1
Perth,-32.0397559,115.681346,0.5
Adelaide,-35.0004451,138.3309716,0.1
CoffsHarbour,-30.2973943,153.0286009,-0.2
Brisbane,-27.4732824,152.747337,0.3
```

Examples – Input/Output format

Format of FLIGHTS command – sorted by departure time:

```
Flights
-------------------------------------------------------
ID   Departure   Arrival     Source --> Destination
-------------------------------------------------------
   0 Mon 17:00   Mon 17:04   Brisbane --> GoldCoast
   1 Mon 18:05   Mon 18:09   Brisbane --> GoldCoast
   2 Mon 19:05   Mon 19:09   Brisbane --> GoldCoast
```

Format of flight <id> command:

```
Flight 0
Departure:    Mon 00:05 Berlin
Arrival:      Mon 08:57 NewYork
Distance:     6,387km
Duration:     8h 52m
Ticket Cost:  $1724.01
Passengers:   0/189
```

Format of locations command – sorted by alphabetical order:

```
Locations (3):
Berlin, London, NewYork
```

Format of location <name> command:

```
Location:    Hobart
Latitude:    -42.882340
Longitude:   147.319802
Demand:      +0.5000
```

Format of travel command:

```
User: travel sydney london
Stopovers:        3
Total Duration:   34h 36m
Total Cost:       $5172.49
-------------------------------------------------------------
ID   Cost      Departure   Arrival     Source --> Destination
-------------------------------------------------------------
   5 $ 3399.00 Wed 10:00   Thu 02:44   Sydney --> AbuDhabi
LAYOVER 1h 16m at AbuDhabi
  10 $ 1384.44 Thu 04:00   Thu 11:11   AbuDhabi --> Oslo
LAYOVER 7h 49m at Oslo
  20 $  389.05 Thu 19:00   Thu 20:36   Oslo --> London
```

Examples (1)

```
$ java FlightScheduler
User: location add Berlin 52.5 13.15 0.22222
Successfully added location Berlin.

User: location add NewYork 40.7 -74.26 -0.874
Successfully added location NewYork.

User: flight add sunday 20:00 Berlin NewYork 250
Successfully added Flight 0.

User: flights
Flights
-----------------------------------------------------
ID   Departure   Arrival     Source --> Destination
-----------------------------------------------------
   0 Sun 20:00   Mon 04:52   Berlin --> NewYork

User: flight 0
Flight 0
Departure:    Sun 20:00 Berlin
Arrival:      Mon 04:52 NewYork
Distance:     6,387km
Duration:     8h 52m
Ticket Cost:  $1636.01
Passengers:   0/250

User: flight add monday 05:00 newYork berlin 234
Scheduling conflict! This flight clashes with Flight 0 arriving at
NewYork on Monday 04:52.

User: exit
Application closed.
```

Examples (2)

```
$ java FlightScheduler
User: flight import flights.csv
Imported 0 flights.
3 lines were invalid.

User: location import locations.csv
Imported 51 locations.

User: locations
Locations (51):
AbuDhabi, Adelaide, AliceSprings, Alta, Athens, Auckland, Beijing,
Berlin, Bern, Bordeaux, Brisbane, Cairo, Cardiff, Chicago,
CoffsHarbour, Dallas, Darwin, Dubai, Dubbo, GoldCoast, Hanoi, Hobart,
Houston, Jakarta, Johannesburg, Lagos, Liverpool, London, Longyearbyen,
LosAngeles, Luton, Madrid, Manchester, Moscow, NewYork, Orange, Oslo,
Paris, Perth, Rio, Rome, SanFrancisco, Stockholm, Sydney, Toulouse,
Townsville, Tromso, Ufa, Utqiagvik, Vladivostok, Washington

User: flights import flights.csv
Flights
------------------------------------------------------
ID   Departure   Arrival     Source --> Destination
------------------------------------------------------
(None)

User: flight import flights.csv
Imported 2 flights.
1 line was invalid.

User: flights
Flights
------------------------------------------------------
ID   Departure   Arrival     Source --> Destination
------------------------------------------------------
   0 Mon 19:00   Mon 20:27   Sydney --> Hobart
   1 Mon 21:30   Mon 22:57   Sydney --> Hobart

User: flight 0
Flight 0
Departure:    Mon 19:00 Sydney
Arrival:      Mon 20:27 Hobart
Distance:     1,045km
Duration:     1h 27m
Ticket Cost:  $272.00
Passengers:   29/120

User: flight 1
Flight 1
Departure:    Mon 21:30 Sydney
Arrival:      Mon 22:57 Hobart
Distance:     1,045km
Duration:     1h 27m
Ticket Cost:  $272.00
Passengers:   29/120

User: exit
Application closed.
```

Examples (3)

```
User: location import locations.csv
Imported 51 locations.

User: flight add wednesday 6:00 sydney perth 180
Successfully added Flight 0.

User: flight add wednesday 8:00 sydney perth 180
Successfully added Flight 1.

User: flight 0
Flight 0
Departure:    Wed 06:00 Sydney
Arrival:      Wed 10:31 Perth
Distance:     3,254km
Duration:     4h 31m
Ticket Cost:  $989.16
Passengers:   0/180

User: flight 0 book 20
Booked 20 passengers on flight 0 for a total cost of $19365.60

User: flight 0 book 20
Booked 20 passengers on flight 0 for a total cost of $18486.35

User: flight 0 book 20
Booked 20 passengers on flight 0 for a total cost of $17607.09

User: fligh1 book 100
Invalid command. Type 'help' for a list of commands.

User: fligh 1 book 100
Invalid command. Type 'help' for a list of commands.

User: flight 1 book 100
Booked 100 passengers on flight 1 for a total cost of $88381.66

User: flight 0
Flight 0
Departure:    Wed 06:00 Sydney
Arrival:      Wed 10:31 Perth
Distance:     3,254km
Duration:     4h 31m
Ticket Cost:  $857.27
Passengers:   60/180

User: flight 1
Flight 1
Departure:    Wed 08:00 Sydney
Arrival:      Wed 12:31 Perth
Distance:     3,254km
Duration:     4h 31m
Ticket Cost:  $846.28
Passengers:   100/180

User: flight add wednesday 11:31 perth johannesburg 230
Successfully added Flight 2.

User: fligh 2
Invalid command. Type 'help' for a list of commands.
```

```
User: flight 2
Flight 2
Departure:    Wed 11:31 Perth
Arrival:      Wed 23:03 Johannesburg
Distance:     8,303km
Duration:     11h 32m
Ticket Cost:  $2163.44
Passengers:   0/230

User: flight add thursday 01:00 johannesburg London 220
Successfully added Flight 3.

User: flight add friday 01:00 johannesburg London 220
Successfully added Flight 4.

User: flight add satursday 01:00 johannesburg London 220
Invalid departure time. Use the format <day_of_week> <hour:minute>,
with 24h time.

User: flight add saturday 01:00 johannesburg London 220
Successfully added Flight 5.

User: flights
Flights
-----------------------------------------------------
ID   Departure   Arrival     Source --> Destination
-----------------------------------------------------
   0 Wed 06:00   Wed 10:31   Sydney --> Perth
   1 Wed 08:00   Wed 12:31   Sydney --> Perth
   2 Wed 11:31   Wed 23:03   Perth --> Johannesburg
   3 Thu 01:00   Thu 13:36   Johannesburg --> London
   4 Fri 01:00   Fri 13:36   Johannesburg --> London
   5 Sat 01:00   Sat 13:36   Johannesburg --> London

User: flight export flights3.csv
Exported 6 flights.

User: exit
Application closed.
```

Examples (4)

```
User: location import locations.csv
Imported 51 locations.

User: location import locations4.csv
Imported 2 locations.

User: flight import flights6.csv
Imported 182 flights.

User: travel sydney london
Stopovers:        3
Total Duration:   34h 36m
Total Cost:       $5172.49
-------------------------------------------------------------
ID   Cost      Departure   Arrival     Source --> Destination
```

```
------------------------------------------------------------
   5 $ 3399.00 Wed 10:00   Thu 02:44   Sydney --> AbuDhabi
LAYOVER 1h 16m at AbuDhabi
  10 $ 1384.44 Thu 04:00   Thu 11:11   AbuDhabi --> Oslo
LAYOVER 7h 49m at Oslo
  20 $  389.05 Thu 19:00   Thu 20:36   Oslo --> London

User: exit
Application closed.
```

Examples (5)

```
User: location import locations.csv
Imported 51 locations.

User: location import locations4.csv
Imported 2 locations.

User: flight import flights6.csv
Imported 182 flights.

User: schedule sydney
Sydney
------------------------------------------------------
ID   Time        Departure/Arrival to/from Location
------------------------------------------------------
 166 Mon 10:30   Departure to Dubai
 100 Mon 12:00   Departure to Jakarta
 103 Mon 13:33   Arrival from AbuDhabi
  89 Mon 19:00   Departure to Hobart
  90 Mon 21:30   Departure to Hobart
 173 Tue 02:38   Arrival from AliceSprings
 174 Tue 04:00   Departure to AliceSprings
  69 Tue 05:00   Departure to LosAngeles
  99 Tue 08:27   Arrival from Hobart
   0 Wed 09:00   Departure to Beijing
   5 Wed 10:00   Departure to AbuDhabi
 161 Wed 11:00   Departure to LosAngeles
 162 Wed 13:00   Departure to Dubbo
 165 Wed 15:23   Arrival from Dubbo
 163 Wed 18:00   Departure to Orange
 164 Wed 20:14   Arrival from Orange
   6 Thu 04:44   Arrival from AbuDhabi
   3 Thu 11:11   Arrival from Hanoi
 131 Fri 14:00   Departure to AbuDhabi
 113 Sat 04:00   Departure to Perth
 114 Sat 06:00   Departure to Perth
 112 Sat 09:00   Departure to Perth

User: arrivals sydney
Sydney
------------------------------------------------------
ID   Time        Departure/Arrival to/from Location
------------------------------------------------------
 103 Mon 13:33   Arrival from AbuDhabi
 173 Tue 02:38   Arrival from AliceSprings
  99 Tue 08:27   Arrival from Hobart
 165 Wed 15:23   Arrival from Dubbo
 164 Wed 20:14   Arrival from Orange
   6 Thu 04:44   Arrival from AbuDhabi
```

```
   3 Thu 11:11   Arrival from Hanoi

User: departures sydney
Sydney
-----------------------------------------------------
ID   Time        Departure/Arrival to/from Location
-----------------------------------------------------
 166 Mon 10:30   Departure to Dubai
 100 Mon 12:00   Departure to Jakarta
  89 Mon 19:00   Departure to Hobart
  90 Mon 21:30   Departure to Hobart
 174 Tue 04:00   Departure to AliceSprings
  69 Tue 05:00   Departure to LosAngeles
   0 Wed 09:00   Departure to Beijing
   5 Wed 10:00   Departure to AbuDhabi
 161 Wed 11:00   Departure to LosAngeles
 162 Wed 13:00   Departure to Dubbo
 163 Wed 18:00   Departure to Orange
 131 Fri 14:00   Departure to AbuDhabi
 113 Sat 04:00   Departure to Perth
 114 Sat 06:00   Departure to Perth
 112 Sat 09:00   Departure to Perth

User: arrivals perth
Perth
-----------------------------------------------------
ID   Time        Departure/Arrival to/from Location
-----------------------------------------------------
 169 Mon 17:52   Arrival from AliceSprings
 113 Sat 08:31   Arrival from Sydney
 114 Sat 10:31   Arrival from Sydney
 112 Sat 13:31   Arrival from Sydney

User: departures perth
Perth
-----------------------------------------------------
ID   Time        Departure/Arrival to/from Location
-----------------------------------------------------
 145 Mon 00:00   Departure to Johannesburg
 171 Mon 15:05   Departure to AliceSprings
 170 Mon 16:05   Departure to AliceSprings
 115 Thu 06:00   Departure to Mumbai
 132 Fri 13:00   Departure to AbuDhabi

User: schedule perth
Perth
-----------------------------------------------------
ID   Time        Departure/Arrival to/from Location
-----------------------------------------------------
 145 Mon 00:00   Departure to Johannesburg
 171 Mon 15:05   Departure to AliceSprings
 170 Mon 16:05   Departure to AliceSprings
 169 Mon 17:52   Arrival from AliceSprings
 115 Thu 06:00   Departure to Mumbai
 132 Fri 13:00   Departure to AbuDhabi
 113 Sat 08:31   Arrival from Sydney
 114 Sat 10:31   Arrival from Sydney
 112 Sat 13:31   Arrival from Sydney

User: exit
Application closed.
```

Writing your own testcases

We have provided you with some test cases but these do not test all the functionality described in the assignment. It is important that you thoroughly test your code by writing your own test cases.

You should place all of your test cases in a tests/ directory. Ensure that each test case has a .in input file along with a corresponding .out output file. We require that the names of your test cases are descriptive so that you know what each is testing, e.g. listFlights.in & listFlights.out and we can accurately and quickly assess your test cases. **Note: If you do not format your test case files as explained (where each test case has <name>.in and <name>.out files for input and output, placed inside the tests folder), you shall receive 0 for this component.**

Submission Details

You must submit your code and tests using the assignment page on Ed. To submit, simply place your files and folders into the workspace, click run to check your program works and then click submit.

You are encouraged to submit multiple times, but only your last submission will be considered.

Marking

- 7 marks will be assigned based on the results of the automatic tests and correctness of the program. This component will use hidden test cases that cover every aspect of the specification. Your program must match the exact output in the examples and the test cases on Ed.

- 4 marks will be assigned to the code coverage of the testcases you have written yourself. For this, we will use a script to automatically generate a code coverage report using Jacoco. For this reason, please make sure you structure your testcases in the manner described above.

- 0.5 marks will be assigned based on a manual inspection of the OO design of your program. Being able to apply standard paradigms of Object-Oriented Design such as encapsulation, not repeating code, and separation of methods and attributes into different classes with a single responsibility is part of the learning outcomes of this course.

- 0.5 marks will be assigned based on a manual inspection of the code style. Style will be assessed based on the conventions set out in the Google Java Style Guide (https://google.github.io/styleguide/javaguide.html)

Academic Declaration

By submitting this assignment you declare the following:

I declare that I have read and understood the University of Sydney Student Plagiarism: Coursework Policy and Procedure, and except where specifically acknowledged, the work contained in this assignment/project is my own work, and has not been copied from other sources or been previously submitted for award or assessment.

I understand that failure to comply with the Student Plagiarism: Coursework Policy and Procedure can lead to severe penalties as outlined under Chapter 8 of the University of Sydney By-Law 1999 (as amended). These penalties may be imposed in cases where any significant portion of my submitted work has been copied without proper acknowledgment from other sources, including published works, the Internet, existing programs, the work of other students, or work previously submitted for other awards or assessments.

I realise that I may be asked to identify those portions of the work contributed by me and required to demonstrate my knowledge of the relevant material by answering oral questions or by undertaking supplementary work, either written or in the laboratory, in order to arrive at the final assessment mark.

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