Loughborough University

Students must complete this cover sheet to accompany each piece of assessed coursework submitted.

Student Name:	**Zack Pollard**	ID Number:	B424338

Degree Programme:	Computer Science	Part:	A
Module Title:	OO Programming and Algorithms	Module Code:	COA256
Session:	2014/2015	Semester:	2
Title/Description:	C++ assignment	Part:	1 of 2

This coursework represents 60 % of the module assessment

Staff Member responsible: Gerald Schaefer

Date set: 24/2/2015

Date to be handed in: 25/3/2015 Before 4pm

Specification:	As on learn. Submission via learn.
Method(s) of Presentation:	
Assessment Guidelines:	

If this coursework was part of a group activity, enter the Group No (if relevant): _____

and list the names of the other group members:

_____ _____

_____ _____

_____ _____

DECLARATION:

I certify that the attached coursework is my own work, except that anything which is copied from or based upon the work of others has its source clearly acknowledged.

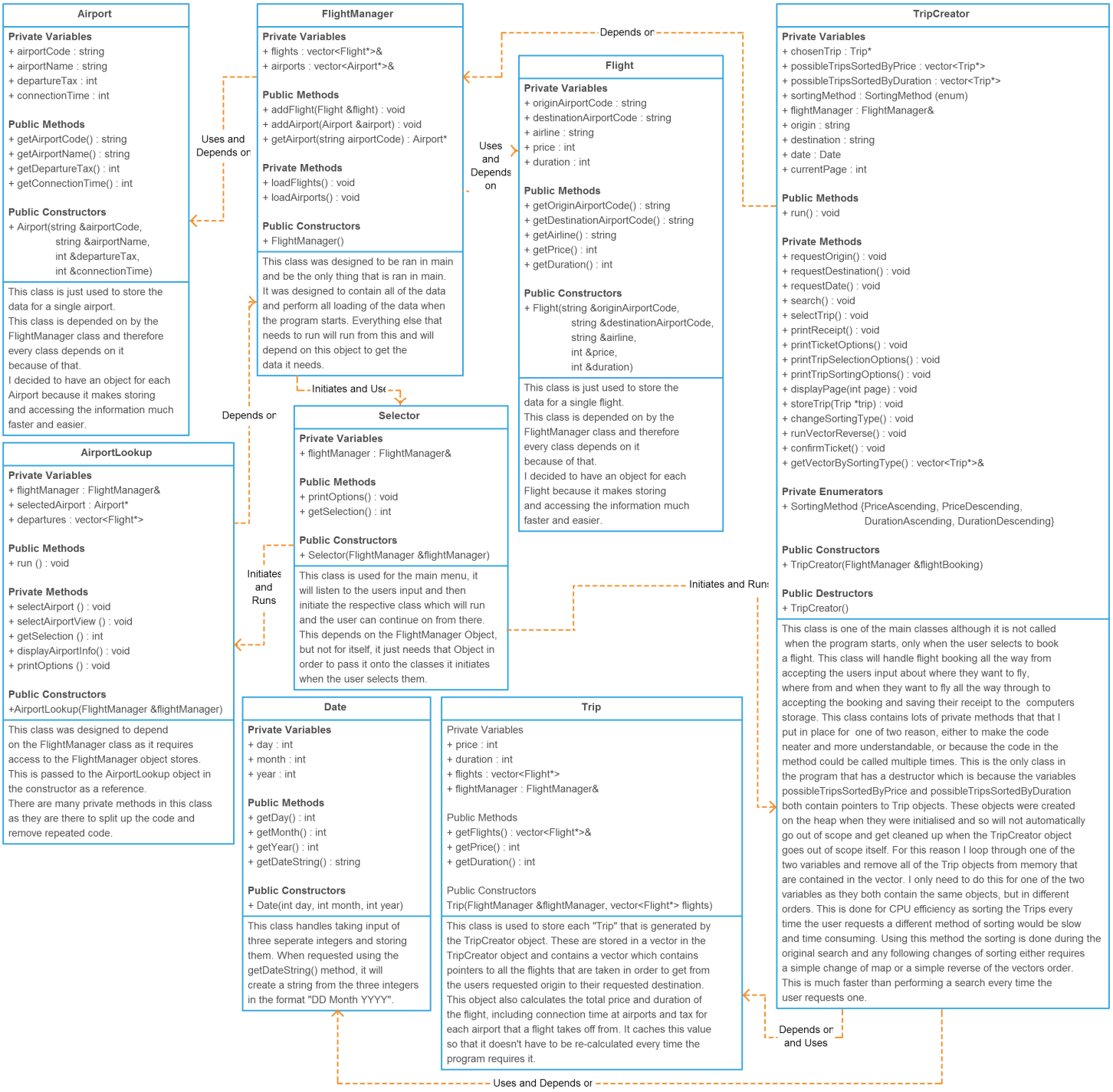
Signature:	Zack Pollard	No. of pages following:	9
Date:	25/03/2015	No. of discs included:	

Object Oriented Programming and Algorithms - Flight Booking System

Zack Pollard

March 25, 2015

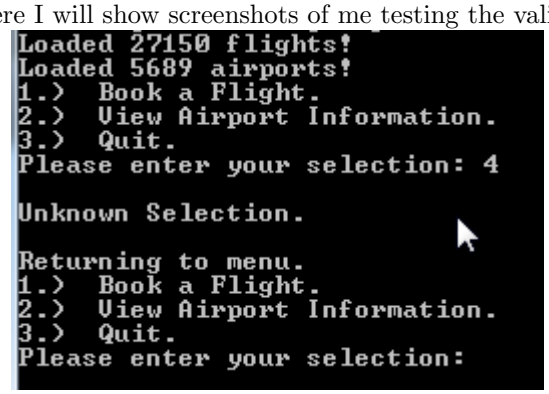
1 UML Diagram for Classes



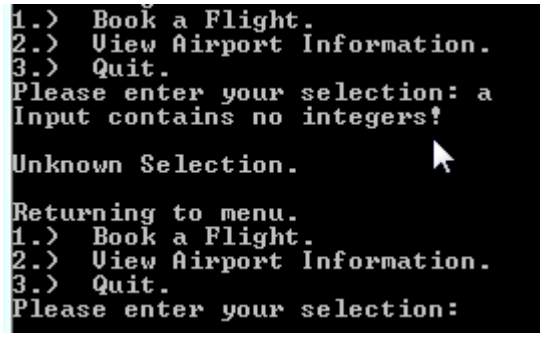
2 Program Testing and Evidence

2.1 Input Data Validation

Here I will show screenshots of me testing the validation checks on data input by the user of my program.

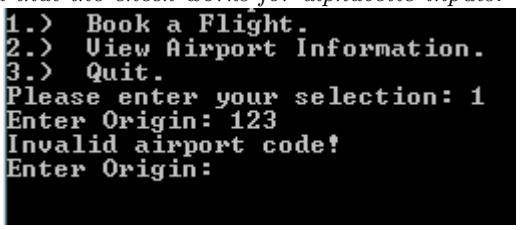


The screenshot above shows that the main menu checks for whether you enter a valid choice from the menu.

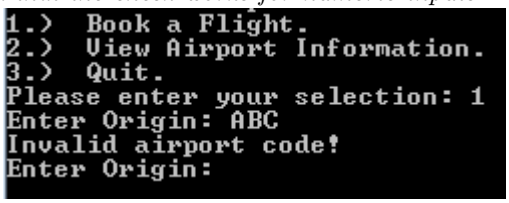


The screenshot above shows that the main menu checks for whether you enter an integer as your selection.

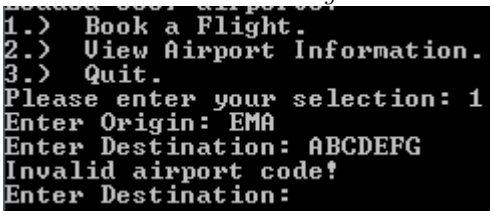
The screenshot above shows that the origin airport code selection checks whether the airport code exists in the loaded data and that the check works for alphabetic inputs.



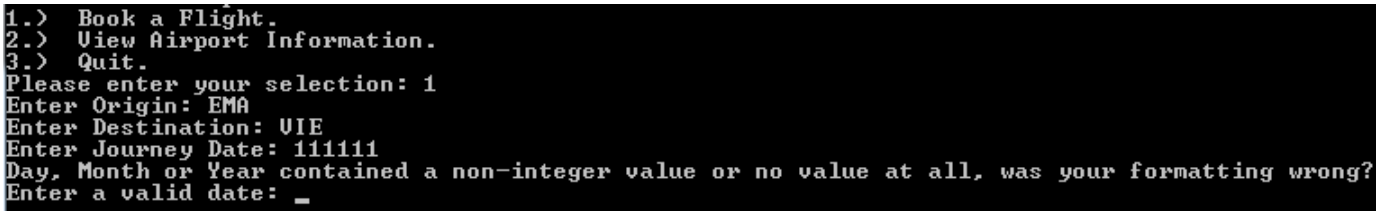
The screenshot above shows that the origin airport code selection checks whether the airport code exists in the loaded data and that the check works for numeric inputs.



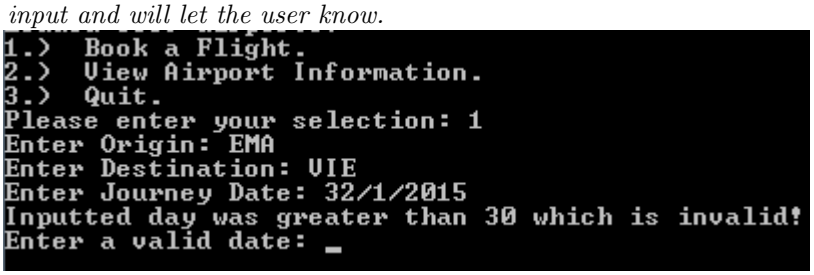
The screenshot above shows that the origin airport code selection will show that the code is invalid even if it is completely alphabetic and 3 characters long in the case that the airport code doesn't exist in the loaded data.



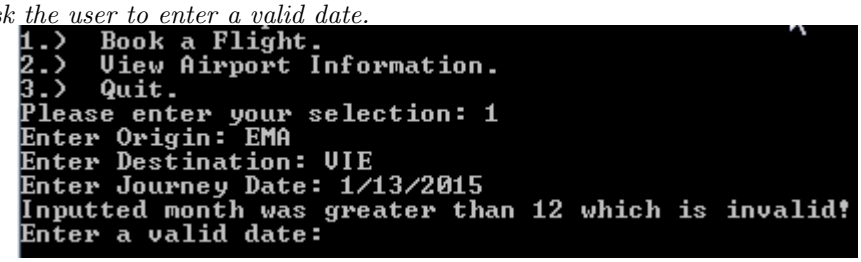
The screenshot above shows that the destination airport code selection also checks and validates input. I decided not to show all different kinds of data in this input as it runs all of the same checks as the origin airport code selection.



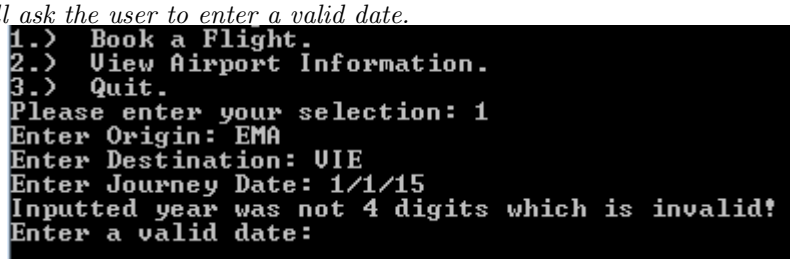
The screenshot above shows that when a date that doesn't follow the format DD/MM/YYYY is inputted, it won't accept the input and will let the user know.



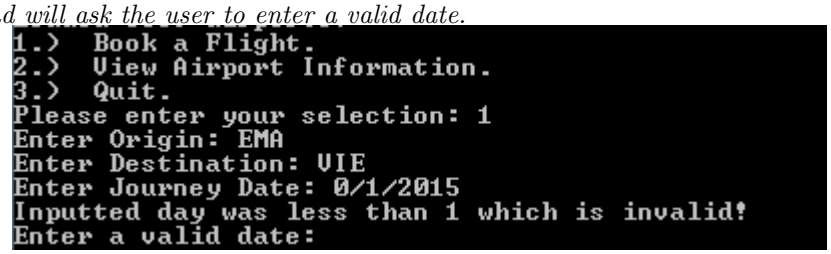
The screenshot above shows that when a day that is greater than 30 is inputted, the program won't accept the input and will ask the user to enter a valid date.



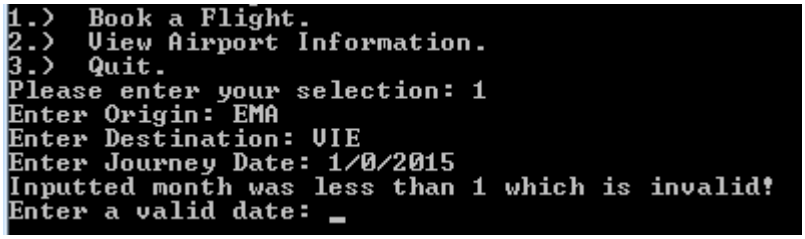
The screenshot above shows that when a month that is greater than 12 is inputted, the program won't accept the input and will ask the user to enter a valid date.



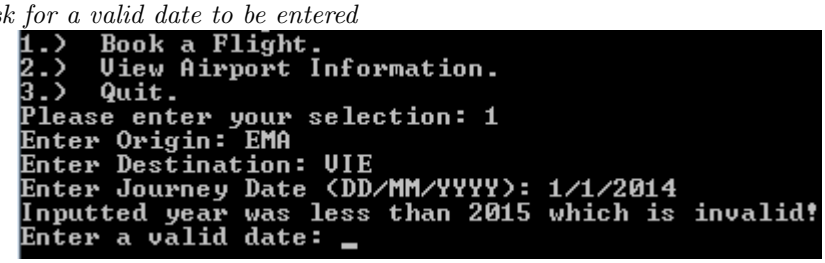
The screenshot above shows that when a year that isn't 4 characters long is inputted, the program won't accept the input and will ask the user to enter a valid date.



The screenshot above shows that when a day that is less than 0 is entered, the program won't accept the input and will ask for a valid date to be entered.



The screenshot above shows that when a month that is less than 0 is entered, the program won't accept the input and will ask for a valid date to be entered



The screenshot above shows that when a year that is less than 2014 is entered, the program won't accept the input and will ask for a valid date to be entered

```
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: 1
Enter Origin: EMA
Enter Destination: VIE
Enter Journey Date: 1/1/-1111
Inputted month was less than 1000 which is invalid!
Enter a valid date: 1/1/2015

Showing results 1 to 10 of 2194
ID        Duration (Minutes)  Price     Connections
1         264                 199       1
2         246                 205       1
3         246                 210       1
4         246                 211       1
5         250                 212       1
6         250                 215       1
7         246                 216       1
8         264                 226       1
9         273                 226       1
10        246                 226       1

1.)  Next Page.
2.)  Previous Page.
3.)  Change Sorting Method.
4.)  Select Flight.

Please type the ID of the menu option that corresponds with what you want to do: 5

Unknown Selection.

Returning to menu.

1.)  Next Page.
2.)  Previous Page.
3.)  Change Sorting Method.
4.)  Select Flight.

Please type the ID of the menu option that corresponds with what you want to do: _
```

The screenshot above shows that when an invalid menu option is selected in the trip display screen, the program will re-display the menu and ask for the input again.

```
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: 1
Enter Origin: EMA
Enter Destination: VIE
Enter Journey Date: 1/1/2015

Showing results 1 to 10 of 2194
ID        Duration (Minutes)  Price     Connections
1         264                 199       1
2         246                 205       1
3         246                 210       1
4         246                 211       1
5         250                 212       1
6         250                 215       1
7         246                 216       1
8         264                 226       1
9         273                 226       1
10        246                 226       1

1.)  Next Page.
2.)  Previous Page.
3.)  Change Sorting Method.
4.)  Select Flight.

Please type the ID of the menu option that corresponds with what you want to do: 2
There are no more pages.

1.)  Next Page.
2.)  Previous Page.
3.)  Change Sorting Method.
4.)  Select Flight.

Please type the ID of the menu option that corresponds with what you want to do:
```

The screenshot above shows that when you select to go to a previous page, but you are already at the first page, it will tell you that there are no more pages.

```
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: 1
Enter Origin: EMA
Enter Destination: VIE
Enter Journey Date: 1/1/2015

Showing results 1 to 10 of 2194
ID        Duration (Minutes)  Price     Connections
1         264                 199       1
2         246                 205       1
3         246                 210       1
4         246                 211       1
5         250                 212       1
6         250                 215       1
7         246                 216       1
8         264                 226       1
9         273                 226       1
10        246                 226       1

1.)  Next Page.
2.)  Previous Page.
3.)  Change Sorting Method.
4.)  Select Flight.

Please type the ID of the menu option that corresponds with what you want to do: 4
Type the ID of the flight you would like to see: 2195

The trip you selected was not valid.
Type the ID of the flight you would like to see:
```

The screenshot above shows that when you enter the ID of a trip that doesn't exist, the program won't accept the input and will alert the user to their mistake and request a different input.

```
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: 2

Please type the code of the airport you want to view: ABC

The airport you specified could not be found.

Please type the code of the airport you want to view:
```

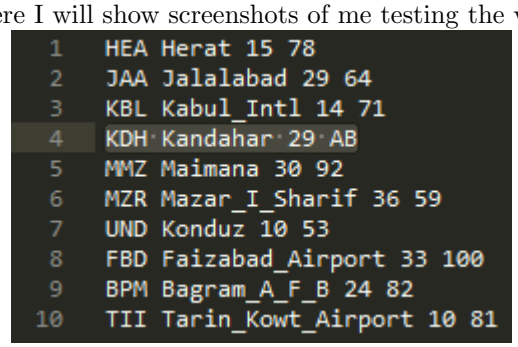
The screenshot above shows that you can't input an airport code that doesn't exist in the data system as the program will ask you to input another airport code.

```
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: 2

Please type the code of the airport you want to view: 123

The airport you specified could not be found.

Please type the code of the airport you want to view: _
```

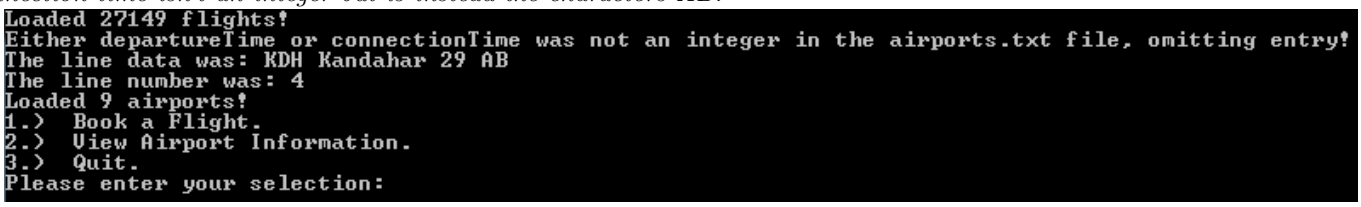
The screenshot above shows that you can't input numeric characters for your airport code as they will be checked against the codes existing in the system and none will be found, therefore the program will ask for you to enter another airport code.

2.2 Airports Data File Validation

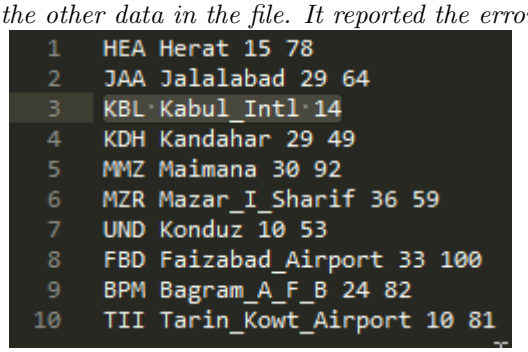
Here I will show screenshots of me testing the validation checks on the airports datafile when it is loaded into my program.



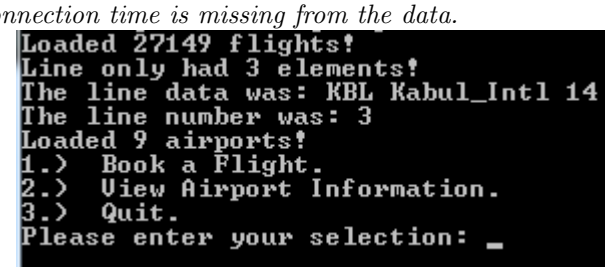
The screenshot above shows the data that will be used in the test below. There is an error in the file on line 4 where the connection time isn't an integer but is instead the characters AB.



The screenshot above shows that the program detected the error in the file and skipped over that line of data but loaded all of the other data in the file. It reported the error in the data so that the user could find it.



The screenshot above shows the data that will be used in the test below. There is an error in the file on line 3 where the connection time is missing from the data.



The screenshot above shows that the program detected the error in the file and skipped over that line of data but loaded all of the other data in the file. It reported the error in the data so that the user could find it.

```
1   HEA Herat 15 78
2   JAA Jalalabad 29 64
3   KBL Kabul_Intl 14 71
4   KDHR Kandahar 29 49
5   MMZ Maimana 30 92
6   MZR Mazar_I_Sharif 36 59
7   UND Konduz 10 53
8   FBD Faizabad_Airport 33 100
9   BPM Bagram_A_F_B 24 82
10  TII Tarin_Kowt_Airport 10 81
```

The screenshot above shows the data that will be used in the test below. There is an error in the file on line 4 where the airport code is 4 characters long rather than the three it is supposed to be.

```
Loaded 27149 flights!
Airport had a code that wasn't 3 characters long!
The line data was: KDHR Kandahar 29 49
The line number was: 4
Loaded 9 airports!
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: _
```

The screenshot above shows that the program detected the error in the file and skipped over that line of data but loaded all of the other data in the file. It reported the error in the data so that the user could find it.

2.3 Flights Data File Validation

Here I will show screenshots of me testing the validation checks on the flights datafile when it is loaded into my program.

```
1   CEK KZN Aerocondor 136 120
2   CEK OVB Aerocondor 82 60
3   EGO KGD Aerocondor 85 HJK
4   KGD EGO Aerocondor 84 60
5   KZN CEK Aerocondor 125 120
6   KZN SVX Aerocondor 127 120
7   NBC SVX Aerocondor 136 120
8   NJC UUA Aerocondor 102 120
9   OVB CEK Aerocondor 100 60
10  OVB SVX Aerocondor 85 60
```

The screenshot above shows the data that will be used in the test below. There is an error in the file on line 4 where the flight duration isn't an integer but is instead the characters HJK.

```
Either price or duration was not an integer in the flights.txt file, omitting entry!
The line data was: EGO KGD Aerocondor 85 HJK
The line number was: 3
Loaded 9 flights!
Loaded 10 airports!
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: _
```

The screenshot above shows that the program detected the error in the file and skipped over that line of data but loaded all of the other data in the file. It reported the error in the data so that the user could find it.

```
1   CEK KZN Aerocondor 136 120
2   CEK OVB Aerocondor 82 60
3   EGO KGD Aerocondor 85
4   KGD EGO Aerocondor 84 60
5   KZN CEK Aerocondor 125 120
6   KZN SVX Aerocondor 127 120
7   NBC SVX Aerocondor 136 120
8   NJC UUA Aerocondor 102 120
9   OVB CEK Aerocondor 100 60
10  OVB SVX Aerocondor 85 60
```

The screenshot above shows the data that will be used in the test below. There is an error in the file on line 3 where the flight duration is missing from the data.

```
Line only had 4 elements!
The line data was: EGO KGD Aerocondor 85
The line number was: 3
Loaded 9 flights!
Loaded 10 airports!
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection:
```

The screenshot above shows that the program detected the error in the file and skipped over that line of data but loaded all of the other data in the file. It reported the error in the data so that the user could find it.

```
1  CEKA KZN Aerocondor 136 120
2  CEK OVB Aerocondor 82 60
3  EGO KGD Aerocondor 85 60
4  KGD EGOF Aerocondor 84 60
5  KZN CEK Aerocondor 125 120
6  KZN SVX Aerocondor 127 120
7  NBC SVX Aerocondor 136 120
8  NJC UUA Aerocondor 102 120
9  OVB CEK Aerocondor 100 60
10 OVB SVX Aerocondor 85 60
```

The screenshot above shows the data that will be used in the test below. There are two errors in this file, one on line 1 and one on line 4. The error on line 1 is with the origin airport code as it is 4 characters long rather than 3. The error on line 4 is with the destination airport code as it is 4 characters long rather than 3.

```
The flight had an airport code that wasn't 3 characters long!
The line data was: CEKA KZN Aerocondor 136 120
The line number was: 1
The flight had an airport code that wasn't 3 characters long!
The line data was: KGD EGOF Aerocondor 84 60
The line number was: 3
Loaded 8 flights!
Loaded 10 airports!
1.)  Book a Flight.
2.)  View Airport Information.
3.)  Quit.
Please enter your selection: _
```

The screenshot above shows that the program detected the two errors in the file and skipped over both lines of data but loaded all of the other data in the file. It reported the errors in the data so that the user could find it.

3 Functionality

Functionality	**Y(Complete) P(Partial) N(None)**	**Comments (e.g. more details on what is not working etc.)**
Data import (from files)	Y	Fully working as expected.
User input (from keyboard)	Y	Fully working as expected.
List flights for an airport	Y	Fully working as expected.
Search for direct flights	Y	Fully working as expected.
Search via 1 connection	Y	Fully working as expected.
Search via 2 connections	Y	Fully working as expected.
Sorting itineraries by cost/time	Y	Fully working as expected.
Book flight/"print" ticket	Y	File is saved to disk under a name specified by the user using keyboard input. Works as expected.
Handling dates correctly	Y	All dates are converted to the format specified in the specification. Works as expected.
Error handling	Y	Lots of validation is done on the data and all errors I can think of have been handled.