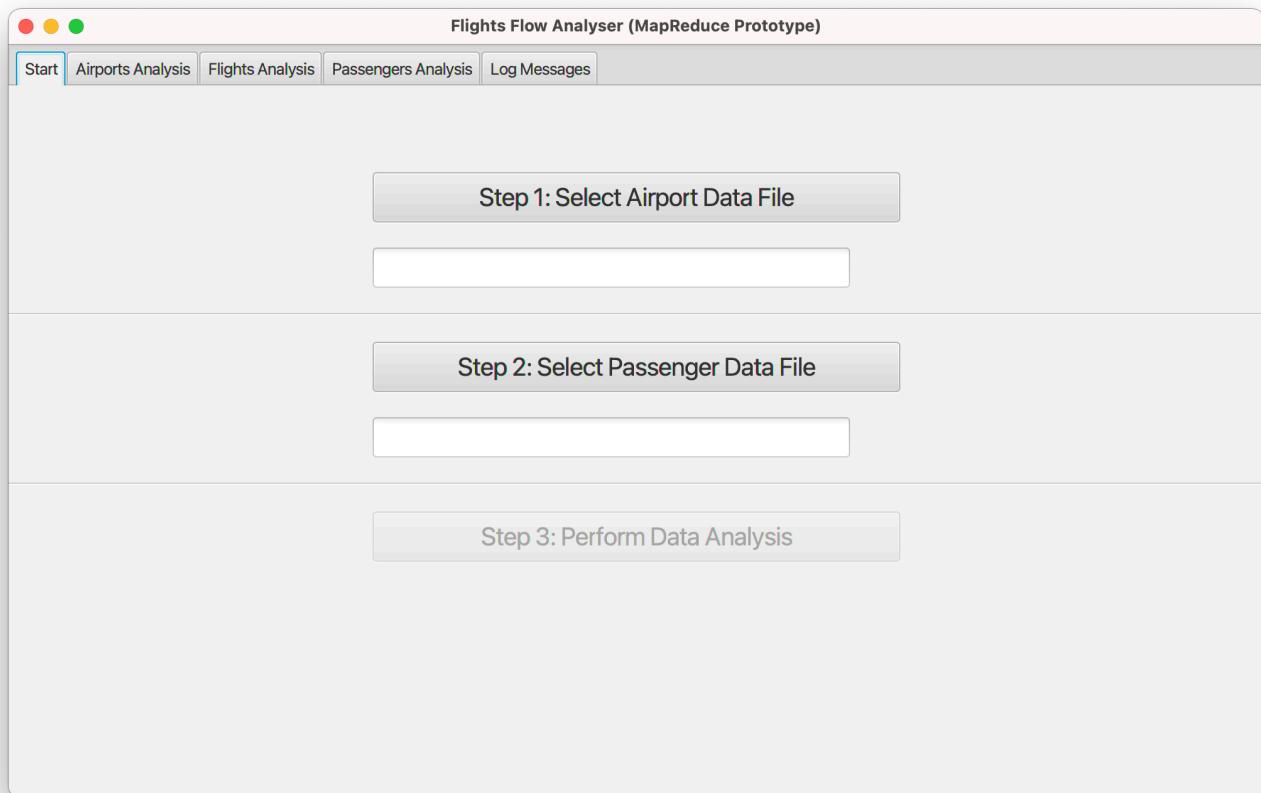
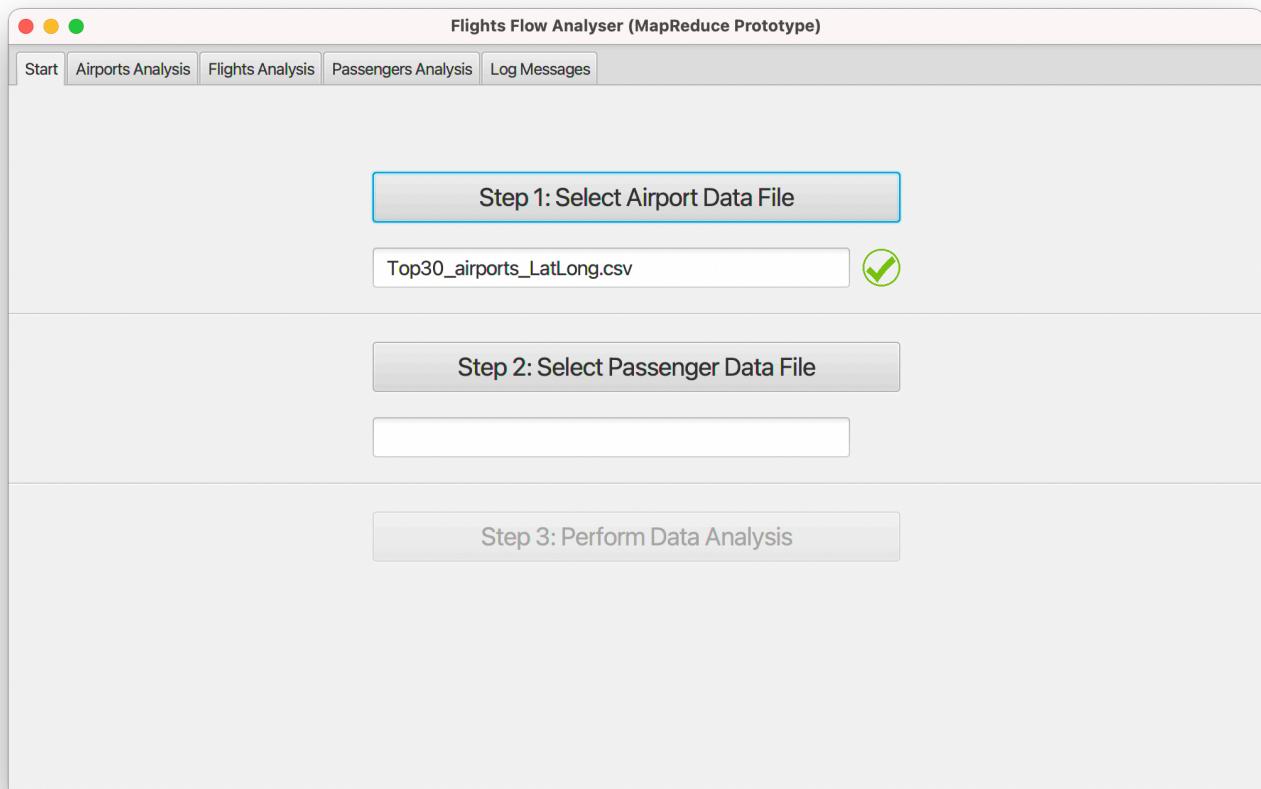


## Screen captures for the application prototype

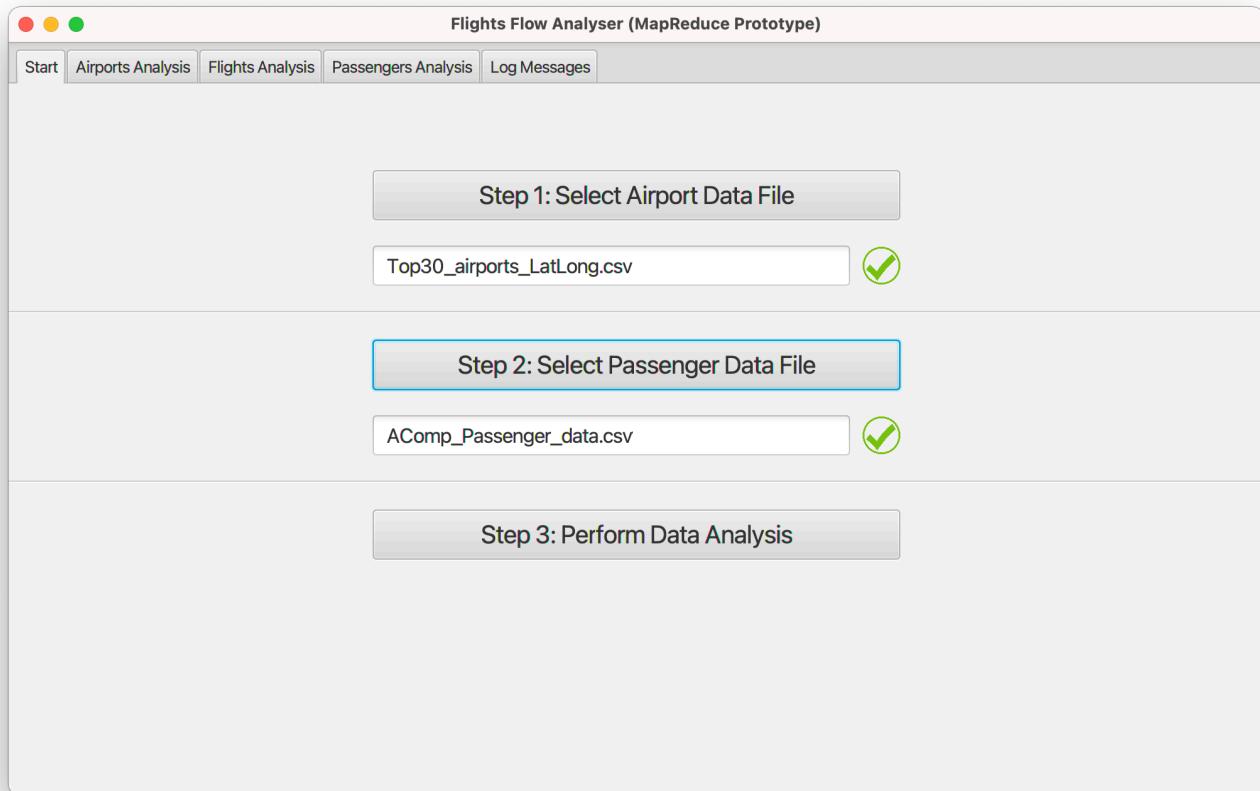
Start tab:



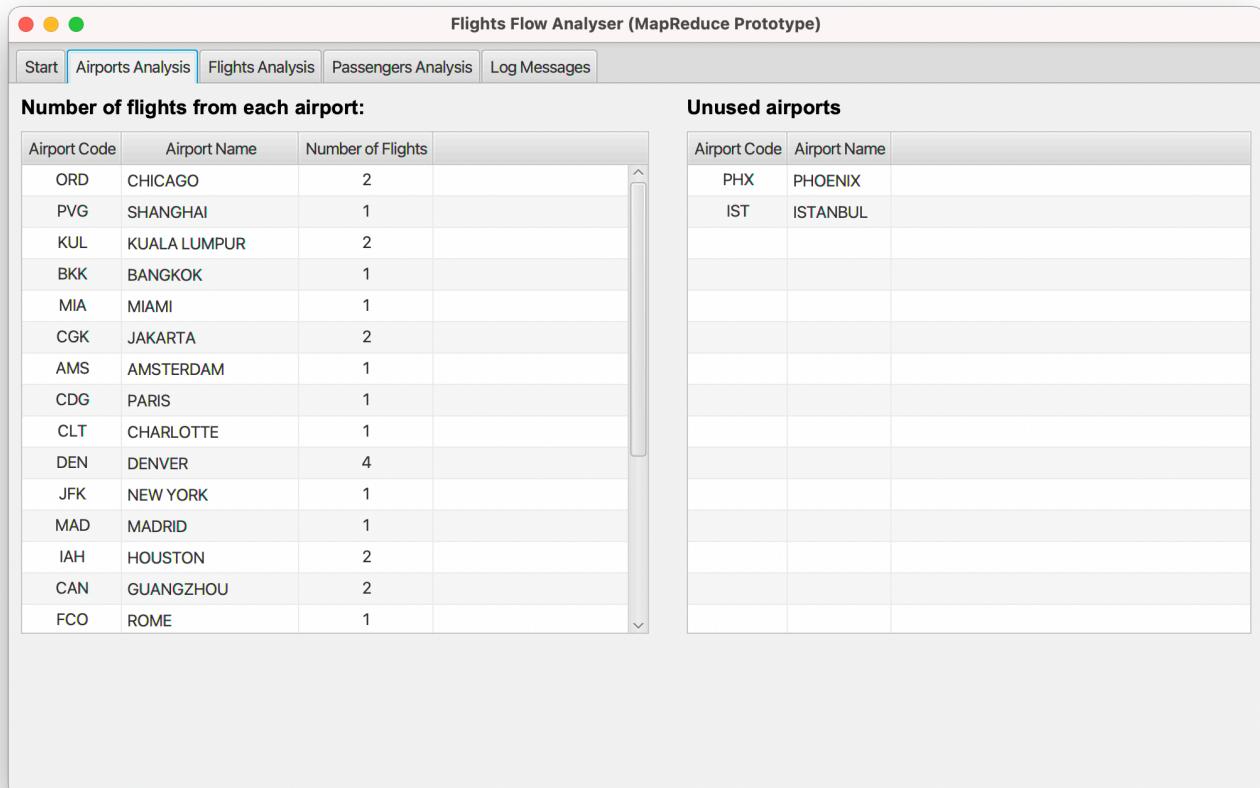
Start tab with Step 1 completed:



Start tab with Step 2 completed:



## Airports Analysis tab with results:



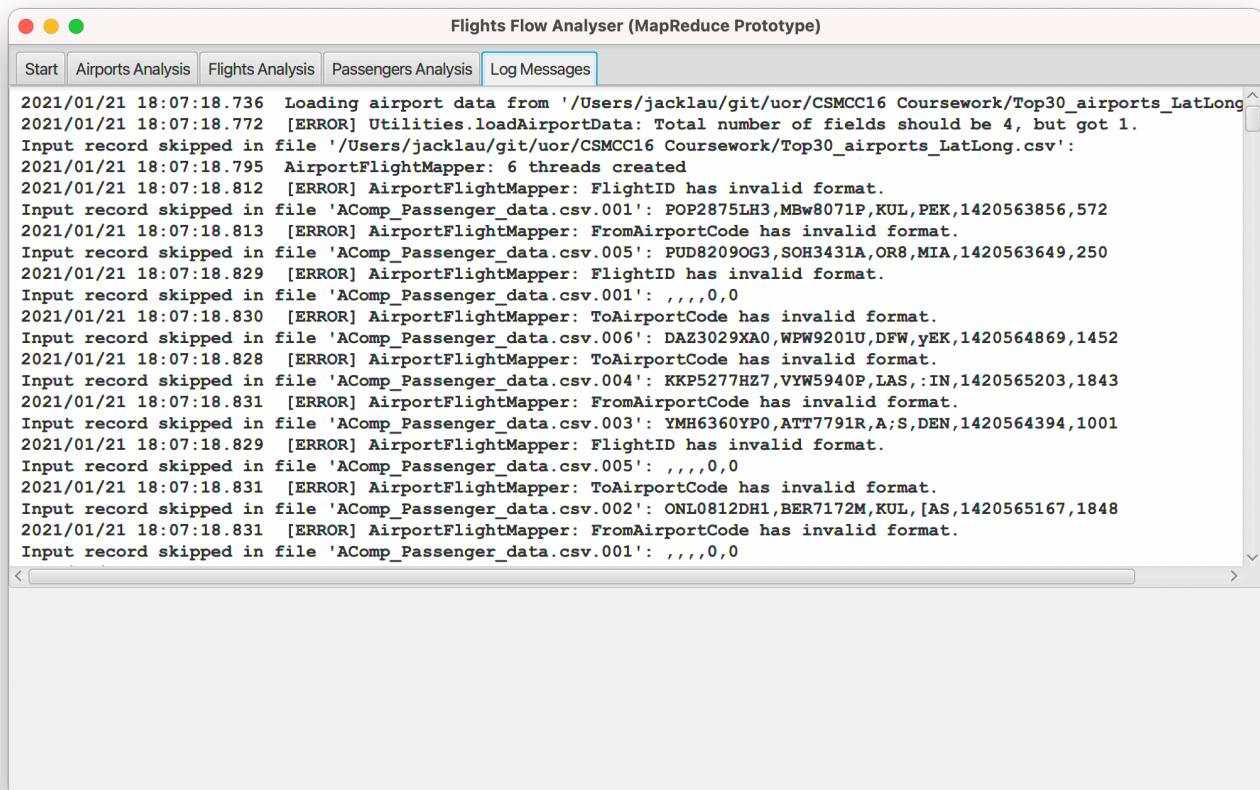
## Flights Analysis tab with results:

Flights Flow Analyser (MapReduce Prototype)										
	Start		Airports Analysis		Flights Analysis		Passengers Analysis		Log Messages	
Flight ID	Passengers		From Airport		To Airport		Flight Mileage	Departure Time	Arrival Time	Flight Duration
	Total	Passenger ID	Code	Name	Code	Name				
► VYW5940P	11		LAS	LAS VEGAS	SIN	SINGAPORE	7,672	17:26:43	00:09:43	30:43:00
► ATT7791R	11		AMS	AMSTERDAM	DEN	DENVER	4,170	17:13:14	09:54:14	16:41:00
▼ HUR0974O	6		DEN	DENVER	PVG	SHANGHAI	5,821	17:15:25	16:33:25	23:18:00
	CYJ0225CH1									
	PUD8209OG3									
	JJM4724RF7									
	CKZ3132BR4									
	XFG5747ZT9									
	EDV2089LK5									
► VDC9164W	10		FCO	ROME	LAS	LAS VEGAS	5,312	17:18:18	14:34:18	21:16:00
► HZT2506M	9		IAH	HOUSTON	AMS	AMSTERDAM	4,346	17:12:04	10:36:04	17:24:00
► WSK1289Z	17		CLT	CHARLOTTE	DEN	DENVER	1,160	16:59:02	21:37:02	4:38:00
► TMV7633W	10		CGK	JAKARTA	DXB	DUBAI	3,535	17:05:58	07:14:58	14:09:00
► FWH6201Y	6		CAN	GUANGZHOU	DFW	DALLAS/FORT WORTH	7,007	17:22:17	21:25:17	28:03:00

## Passengers Analysis tab with results:

Flights Flow Analyser (MapReduce Prototype)										
	Start		Airports Analysis		Flights Analysis		Passengers Analysis		Log Messages	
Passenger ID	Total Mileage	Flight ID	From Airport		To Airport		Flight Mileage	Departure Time	Arrival Time	Flight Duration
			Code	Name	Code	Name				
► UES9151GS5	89,834									
► DAZ3029XA0	80,975									
▼ HCA3158QA6	77,717		RPG3351U	HND TOKYO	CAN	GUANGZHOU	1,558			
		DKZ30420	MIA MIAMI		SFO	SAN FRANCISCO	2,243			
		VYU9214I	ORD CHICAGO		DXB	DUBAI	6,285			
		TMV7633W	CGK JAKARTA		DXB	DUBAI	3,535			
		MOO1786A	MAD MADRID		FRA	FRANKFURT	766			
		ULZ8130D	CAN GUANGZHOU		DFW	DALLAS/FORT WORTH	7,007			
		XXQ4064B	JFK NEW YORK		FRA	FRANKFURT	3,341			
		PME8178S	DEN DENVER		PEK	BEIJING	5,503			
		SQU6245R	DEN DENVER		FRA	FRANKFURT	4,367			
		KJR6646J	IAH HOUSTON		BKK	BANGKOK	8,025			
		BER7172M	KUL KUALA LUMPUR		LAS	LAS VEGAS	7,694			

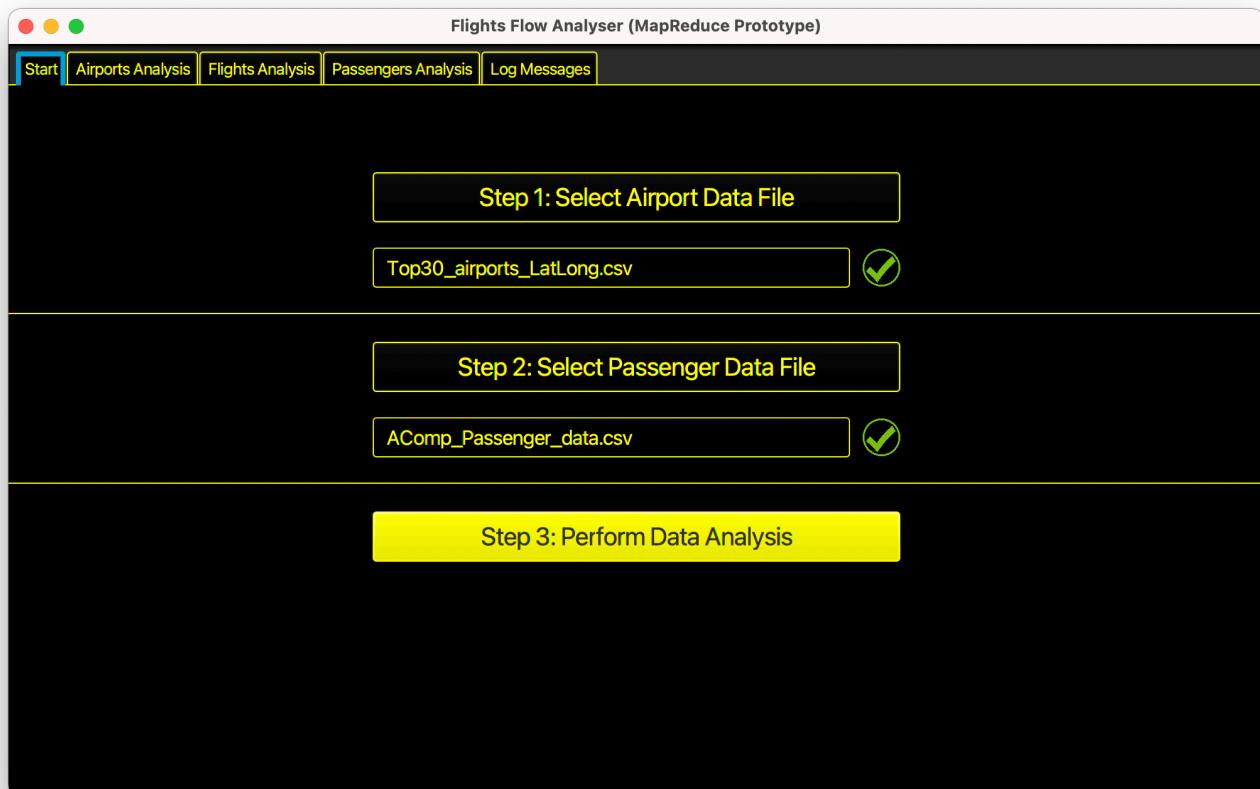
## Log Messages tab:



The screenshot shows the Flights Flow Analyser application window with the title "Flights Flow Analyser (MapReduce Prototype)". The top menu bar includes "Start", "Airports Analysis", "Flights Analysis", "Passengers Analysis", and "Log Messages". The "Log Messages" tab is active, displaying a log of errors from the MapReduce prototype. The log entries are as follows:

```
2021/01/21 18:07:18.736 Loading airport data from '/Users/jacklau/git/uor/CSMCC16 Coursework/Top30_airports_LatLong.csv'
2021/01/21 18:07:18.772 [ERROR] Utilities.loadAirportData: Total number of fields should be 4, but got 1.
Input record skipped in file '/Users/jacklau/git/uor/CSMCC16 Coursework/Top30_airports_LatLong.csv':
2021/01/21 18:07:18.795 AirportFlightMapper: 6 threads created
2021/01/21 18:07:18.812 [ERROR] AirportFlightMapper: FlightID has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.001': POP2875LH3,MBw8071P,KUL,PEK,1420563856,572
2021/01/21 18:07:18.813 [ERROR] AirportFlightMapper: FromAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.005': PUD8209OG3,SOH3431A,OR8,MIA,1420563649,250
2021/01/21 18:07:18.829 [ERROR] AirportFlightMapper: FlightID has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.001': ,,,0,0
2021/01/21 18:07:18.830 [ERROR] AirportFlightMapper: ToAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.006': DAZ3029XAO,WPW9201U,DFW,yEK,1420564869,1452
2021/01/21 18:07:18.828 [ERROR] AirportFlightMapper: ToAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.004': KKP5277HZ7,VYW5940P,LAS,:IN,1420565203,1843
2021/01/21 18:07:18.831 [ERROR] AirportFlightMapper: FromAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.003': YMH6360YPO,ATT7791R,A;S,DEN,1420564394,1001
2021/01/21 18:07:18.829 [ERROR] AirportFlightMapper: FlightID has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.005': ,,,0,0
2021/01/21 18:07:18.831 [ERROR] AirportFlightMapper: ToAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.002': ONL0812DH1,BER7172M,KUL,[AS,1420565167,1848
2021/01/21 18:07:18.831 [ERROR] AirportFlightMapper: FromAirportCode has invalid format.
Input record skipped in file 'AComp_Passenger_data.csv.001': ,,,0,0
```

## High Contrast Mode: Start tab



High Contrast Mode: Airports Analysis tab

High Contrast Mode: Flights Analysis tab

Flights Flow Analyser (MapReduce Prototype)										
Start	Airports Analysis		Flights Analysis		Passengers Analysis		Log Messages			
Flight ID	Passengers		From Airport		To Airport		Flight Mileage	Departure Time	Arrival Time	Flight Duration
	Total	Passenger ID	Code	Name	Code	Name				
► QHU11400	13		CDG	PARIS	LAS	LAS VEGAS	4,718	17:14:58	12:07:58	18:53:00
► FYL5866L	14		ATL	ATLANTA	HKG	HONG KONG	7,288	17:25:40	22:36:40	29:11:00
► BER7172M	11		KUL	KUALA LUMPUR	LAS	LAS VEGAS	7,694	17:26:07	00:14:07	30:48:00
► RPG3351U	11		HND	TOKYO	CAN	GUANGZHOU	1,558	16:59:29	23:13:29	6:14:00
► KJR6646J	15		IAH	HOUSTON	BKK	BANGKOK	8,025	17:26:43	01:34:43	32:08:00
► ATT7791R	11		AMS	AMSTERDAM	DEN	DENVER	4,170	17:13:14	09:54:14	16:41:00
▼ HUR09740	6		DEN	DENVER	PVG	SHANGHAI	5,821	17:15:25	16:33:25	23:18:00
		CYJ0225CH1								
		PUD8209OG3								
		JJM4724RF7								
		CKZ3132BR4								
		XFG5747ZT9								
		EDV2089LK5								
► VYW5940P	11	LAS	LAS VEGAS	SIN	SINGAPORE		7,672	17:26:43	00:09:43	30:43:00

## High Contrast Mode: Passengers Analysis tab

Flights Flow Analyser (MapReduce Prototype)							
Start		Airports Analysis		Flights Analysis		Passengers Analysis	
Passenger ID	Total Mileage	Flight ID	From Airport		To Airport		Flight Mileage
			Code	Name	Code	Name	
▶ UES9151GS5	89,834						
			GMO5938W	LHR LONDON	PEK BEIJING	4,402	
			FYL5866L	ATL ATLANTA	HKG HONG KONG	7,288	
			SQU6245R	DEN DENVER	FRA FRANKFURT	4,367	
			VYW5940P	LAS LAS VEGAS	SIN SINGAPORE	7,672	
			VDC9164W	FCO ROME	LAS LAS VEGAS	5,312	
			BER7172M	KUL KUALA LUMPUR	LAS LAS VEGAS	7,694	
			KJR6646J	IAH HOUSTON	BKK BANGKOK	8,025	
			ULZ8130D	CAN GUANGZHOU	DFW DALLAS/FORT WORTH	7,007	
			XOY7948U	ATL ATLANTA	LHR LONDON	3,650	
			JVY9791G	PVG SHANGHAI	FCO ROME	4,951	

## High Contrast Mode: Log Messages tab

Flights Flow Analyser (MapReduce Prototype)							
Start		Airports Analysis		Flights Analysis		Passengers Analysis	
2021/01/21 18:14:12.854	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'WPW9201U'	,	record skipped.		
2021/01/21 18:14:12.867	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'SQU6245R'	,	record skipped.		
2021/01/21 18:14:12.866	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'BER7172M'	,	record skipped.		
2021/01/21 18:14:12.866	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'VDC9164W'	,	record skipped.		
2021/01/21 18:14:12.865	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'VYU9214I'	,	record skipped.		
2021/01/21 18:14:12.865	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'MBA8071P'	,	record skipped.		
2021/01/21 18:14:12.864	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'HZT2506M'	,	record skipped.		
2021/01/21 18:14:12.864	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'XKQ4064B'	,	record skipped.		
2021/01/21 18:14:12.864	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'BER7172M'	,	record skipped.		
2021/01/21 18:14:12.873	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'ATT7791R'	,	record skipped.		
2021/01/21 18:14:12.872	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'VDC9164W'	,	record skipped.		
2021/01/21 18:14:12.872	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'BER7172M'	,	record skipped.		
2021/01/21 18:14:12.871	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'RUM0422W'	,	record skipped.		
2021/01/21 18:14:12.868	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'HZT2506M'	,	record skipped.		
2021/01/21 18:14:12.875	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'BER7172M'	,	record skipped.		
2021/01/21 18:14:12.875	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'VYW5940P'	,	record skipped.		
2021/01/21 18:14:12.874	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'KJR6646J'	,	record skipped.		
2021/01/21 18:14:12.874	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'MBA8071P'	,	record skipped.		
2021/01/21 18:14:12.877	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'SOH3431A'	,	record skipped.		
2021/01/21 18:14:12.881	[WARNING]	PassengerMileageReducer:	Duplicated FlightID 'WSK1289Z'	,	record skipped.		
2021/01/21 18:14:12.882		PassengerMileageReducer:	all threads completed				