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431 Python Project

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DESCRIPTION OF ALGORITHMS

Individual Flight Score

Most evaluation criteria the program provides for is based on individual flight scores.

Every flight in the database is given a score so flights can be compared against each other, the higher the score the more likely the user is to have a successful flight. Score is determined by multiplying the number of seats on a flight by the success rate of the flight. The success rate of a flight is determined by the dividing the number of departures performed over the number of departures scheduled.

Best Carrier

First a table is made with each unique carrier name in a column called "NAME". Next a column called "SCORE" is made which will hold the aggregate score for each carrier. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the carrier it had. This table is sorted for score and the top result with the highest score is the best carrier.

Best Aircraft

First a table is made with each unique aircraft type in a column called "NAME". Next a column called "SCORE" is made which will hold the aggregate score for each aircraft. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the aircraft type number it had. This table is sorted for score and the top result with the highest score is the best aircraft.

Best State

First a table is made with each unique state abbreviation in a column called "NAME".

Next a column called "SCORE" is made which will hold the aggregate score for each destination state. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the state destination it had. This table is sorted for score and the top result with the highest score is the best state.

Best Destination

First a table is made with each unique destination city in a column called "NAME". Next a column called "SCORE" is made which will hold the aggregate score for each destination.

Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the destination it had. This table is sorted for score and the top result with the highest score is the best destination city.

Best Origin

First a table is made with each unique origin city in a column called "NAME". Next a column called "SCORE" is made which will hold the aggregate score for each origin city. Then the database is read and, for every flight, its score is added to the appropriate place in the score column for the origin city it had. This table is sorted for score and the top result with the highest score is the best origin city.

Best Month

First the best flights for each month is determined (flights with the best score) and stored in a table. Then each month is given a score by finding the mean of the best flight scores for the month and that is added to the table. The table is read and the highest month score determines the best month. Each month's name and average score is also displayed.

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Combination 1: Best Destination & Month

First the best month is determined using the algorithm for best month above. Then the

best destination city is determined using the best destination algorithm above. These results are

displayed onscreen along with flights that belong to the two categories.

Combination 2: Best Carrier & Month

First the best month is determined using the algorithm for best month above. Then the

best carrier is determined using the best destination algorithm above. These results are displayed

onscreen along with flights that belong to the two categories.

Combination 3: Best Aircraft & Month

First the best month is determined using the algorithm for best month above. Then the

best aircraft is determined using the best destination algorithm above. These results are

displayed onscreen along with flights that belong to the two categories.

DEVELOPMENT ENVIRONMENT

OS: Windows 8.1

Python version: 3.6.4.final.0 32bits

GUI: Tkinter

Tkinter version: 8.6

Required external librarys: Pandas

Pandas version: 0.22.0

RESULTS OF AUTOMATIC MODE (MODE 1)

Below are the results of automatic mode. Automatic mode displays the best aircraft type, carrier, destination city, and month to fly to the user. Each result is determined by the appropriate algorithm from the DESCRIPTION OF ALGORITHMS section.

BEST AIRCRAFT IS TYPE: 638

This aircraft type had the higher total score of all flight data.

BEST CARRIER IS TYPE: American Airlines Inc.

This carrier type had the higher total score of all flight data.

BEST DESTINATION IS TYPE : Charlotte, NC

This destination had the higher total score of all flight data.

BEST MONTH IS: July

Best Month average score: 5438.375321961423 is higher that every other month.

The flights with the best score are listed below.

	SCORE SUC	CESS_RATE DIS	STANCE_RAN	GE AIRC	RAFT_TYPE N	MONTH	UNIQUE_CARRIER_NAME
0	57035.609121	0.996743	500-999	699	11	American	Airlines Inc. 57222
1	57035.609121	0.996743	500-999	699	11	American	Airlines Inc. 57222
2	54619.480132	0.983444	500-999	699	1	American	Airlines Inc. 55539
3	54235.685811	0.989865	500-999	699	6	American	Airlines Inc. 54791
4	53871.687919	0.983221	500-999	699	1	American	Airlines Inc. 54791
5	53866.108108	0.986486	500-999	699	6	American	Airlines Inc. 54604

RESULTS OF BEST AIRCRAFT

BEST AIRCRAFT IS TYPE: 0 638

This aircraft type had the higher total score of all flight data.

All aircraft type numbers and there scores are shown below.

NAME SCORE

0 638 6.256918e+06

1 699 6.135971e+06

2 698 3.592620e+06

3 629 2.618150e+06

4 655 2.221291e+06

5 694 1.914051e+06

RESULTS OF BEST CARRIER

SCORE

BEST CARRIER IS: 0 American Airlines Inc.

This carrier had the higher total score of all flight data.

All carriers and there scores are shown below.

NAME

0	American Airlines Inc. 1.307603e+07
1	PSA Airlines Inc. 7.182152e+06
2	Delta Air Lines Inc. 3.433461e+06
3	Southwest Airlines Co. 1.442914e+06
4	Piedmont Airlines 1.307447e+06
5	Republic Airlines 1.197330e+06

RESULTS OF BEST MONTH

BEST MONTH IS: July

Best Month average score: 6383.91144490684 is higher that every other month.

January: 4832.467628747752

February: 4429.10755399997

March: 5453.916520713357

April: 5470.787452791895

May: 5572.926346229557

June: 6159.453268176186

July: 6383.91144490684

August: 5767.647846025704

September: 4854.268121175185

October: 6079.759318447531

November: 5532.805199237318

December: 4995.835095388776

Best month flights shown below.

	SCORE SUC	CESS_RATE I	DISTANCE_RA	NGE MON	TH UNIQUE_CARR	IER_NAME	SEATS DISTANCE
0	53311.787879	0.979798	500-999	7	American Airlines In	nc. 54411 93	36
1	52753.239865	0.976351	500-999	7	American Airlines In	nc. 54031 93	86
2	48840.320000	0.974545	1500-1999	7	American Airlines	Inc. 50116 1	773
3	47897.119403	0.977612	400-499	7	American Airlines In	nc. 48994 46	58
4	45085.625498	0.980080	1500-1999	7	American Airlines	Inc. 46002 1	773
5	41739.662447	0.970464	400-499	7	American Airlines In	nc. 43010 46	58

RESULTS OF BEST DESTINATION CITY

RFST	CITY TO) FLY TO	15 · 0	Charlotte.	NC

This destination had the higher total score of all flight data.

All city destinations and there scores are shown below.

	NAME	SCORE
0	Charlotte	e, NC 1.265756e+07
1	Raleigh/Du	rham, NC 2.616525e+06
2	Atlanta	GA 1.774606e+06
3	New Yo	k, NY 1.674746e+06
4	Charlesto	n, SC 1.102055e+06
5	Chicago	, IL 7.795411e+05

RESULTS OF BEST ORIGIN CITY

This origin city had the higher total score of all flight data.

SCORE

All origin cites and there scores are shown below.

NAME

0	Charlotte, NC 1.086042e+07
1	Raleigh/Durham, NC 2.791630e+06
2	Atlanta, GA 1.947770e+06
3	New York, NY 1.663903e+06
4	Charleston, SC 1.187529e+06
5	Washington, DC 8.162673e+05

RESULTS FOR DISTANCE

The flights below are sorted from shorted travel distance to longest.									
	SCORE SUCCES	S_RATE DISTANC	E_RANGE MONTH	UNIQUE_CARRIER_	NAME	SEATS DISTANCE			
0	10412.546763 0.5	992806 0-9	9 10	PSA Airlines Inc. 1048	8 75				
1	2877.065217 0.9	978261 0-99	9 4	PSA Airlines Inc. 2941	75				
2	2877.065217 0.9	978261 0-99	9 4	PSA Airlines Inc. 2941	75				
3	543.333333 0.83	33333 0-99	7	PSA Airlines Inc. 652	75				
4	478.636364 0.83	18182 0-99	7	PSA Airlines Inc. 585	75				
5	6995.166667 0.9	979167 0-99	9 8	PSA Airlines Inc. 7144	75				

RESULTS FOR BEST STATE

BEST STATE TO FLY TO IS: 0 NC

This state had the higher total score of all flight data.

All state destinations and there scores are shown below.

NAME SCORE

- 0 NC 1.661213e+07
- 1 SC 2.233011e+06
- 2 GA 1.978517e+06
- 3 NY 1.851848e+06
- 4 FL 1.471542e+06
- 5 VA 1.333234e+06

RESULTS FOR BEST AIRCRAFT AND MONTH

BEST AIRCRAFT IS TYPE: 638

This aircraft type had the higher total score of all flight data.

BEST MONTH IS: July

Best Month average score: 6014.643646263518 is higher that every other month.

The flights for this aircraft during the best month are listed below.

	SCORE SUC	CESS_RATE DIS	STANCE_RAN	GE AIRCI	RAFT_TYPE M	MONTH UNIQUE_CARRIER_NAME SEATS	
0	17947.032258	0.975806	100-199	638	7	PSA Airlines Inc. 18392	
1	17799.016129	0.971774	100-199	638	7	PSA Airlines Inc. 18316	
2	17102.961039	0.987013	300-399	638	7	PSA Airlines Inc. 17328	
3	16804.225108	0.978355	300-399	638	7	PSA Airlines Inc. 17176	
4	16280.333333	0.969298	200-299	638	7	PSA Airlines Inc. 16796	
5	15975.656250	0.968750	300-399	638	7	PSA Airlines Inc. 16491	

RESULTS FOR BEST CARRIER AND MONTH

BEST CARRIER IS TYPE: American Airlines Inc.

This carrier type had the higher total score of all flight data.

BEST MONTH IS: July

Best Month average score: 12837.370943467284 is higher that every other month.

The flights for this carrier during the best month are listed below.

SCORE SUCCESS_RATE DISTANCE_RANGE AIRCRAFT_TYPE MONTH UNIQUE_CARRIER_NAME SEATS

0	53311.787879	0.979798	500-999	699	7 American Airlines Inc. 54411
1	52753.239865	0.976351	500-999	699	7 American Airlines Inc. 54031
2	48840.320000	0.974545	1500-1999	699	7 American Airlines Inc. 50116
3	47897.119403	0.977612	400-499	699	7 American Airlines Inc. 48994
4	45085.625498	0.980080	1500-1999	699	7 American Airlines Inc. 46002
5	41739.662447	0.970464	400-499	699	7 American Airlines Inc. 43010

RESULTS FOR BEST DESTINATION AND MONTH

BEST DESTINATION IS TYPE: Charlotte, NC

This destination had the higher total score of all flight data.

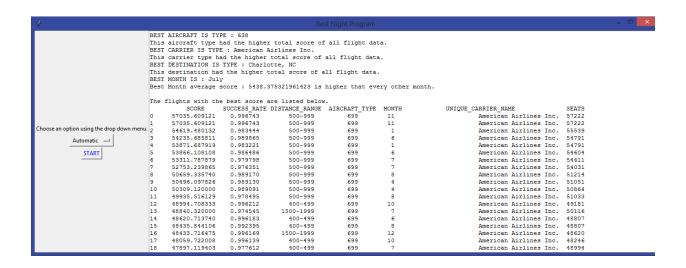
BEST MONTH IS: July

Best Month average score: 7313.977991887215 is higher that every other month.

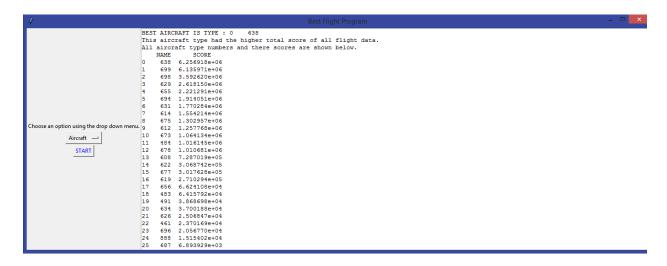
The flights to this city during the best month are listed below.

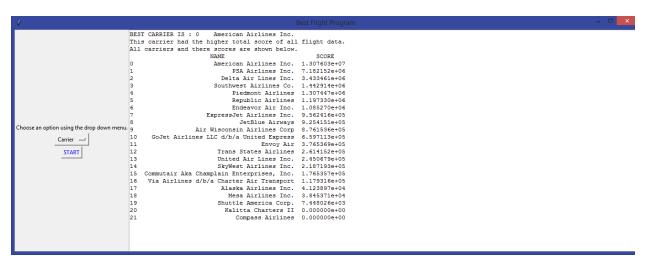
	SCORE SUC	CESS_RATE D	ISTANCE_RAN	GE DEST_CITY	_NAME	MONTH	UNIQUE_CARRIER_NAME	SEATS
0	53311.787879	0.979798	500-999 CI	harlotte, NC	7	America	an Airlines Inc. 54411	
1	48840.320000	0.974545	1500-1999	Charlotte, NC	7	Ameri	can Airlines Inc. 50116	
2	41739.662447	0.970464	400-499 CI	harlotte, NC	7	America	an Airlines Inc. 43010	
3	33477.087432	0.989071	1000-1499	Charlotte, NC	7	Ameri	can Airlines Inc. 33847	
4	33310.867021	0.973404	2000-2499	Charlotte, NC	7	Ameri	can Airlines Inc. 34221	
5	32916.155556	0.988889	2000-2499	Charlotte, NC	7	Ameri	can Airlines Inc. 33286	

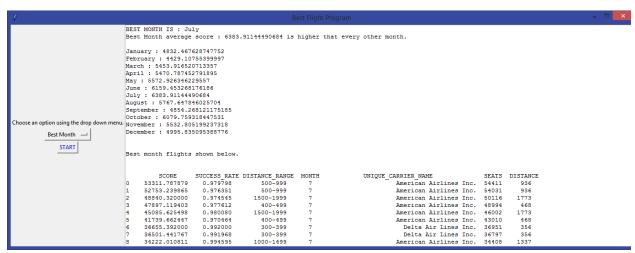
TEST OF MODE 1

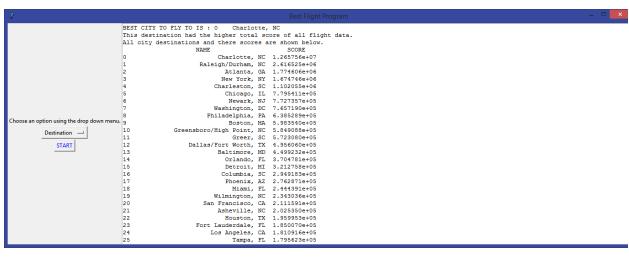


TESTS OF MODE 2

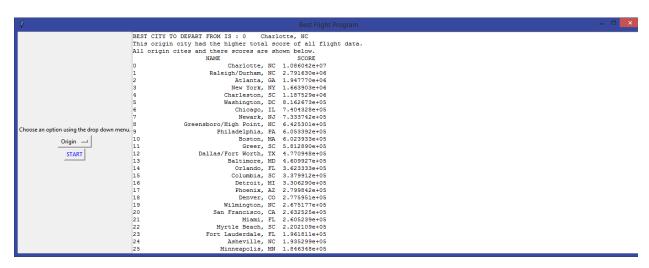


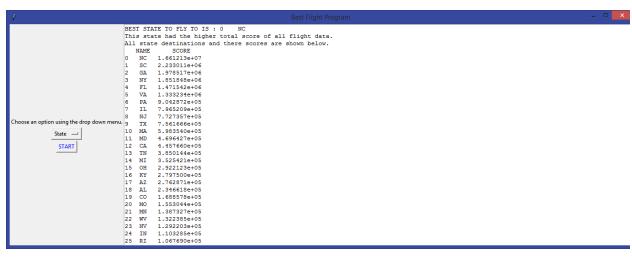


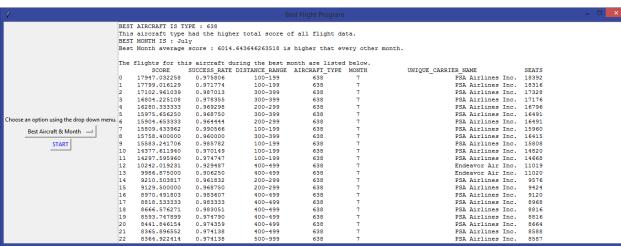


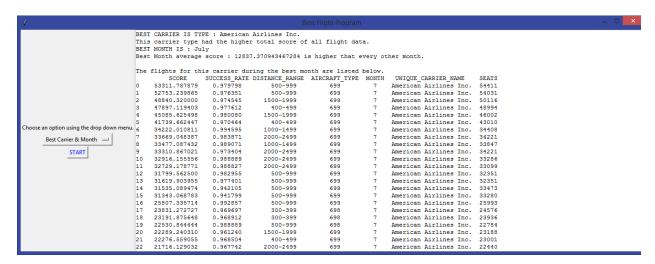


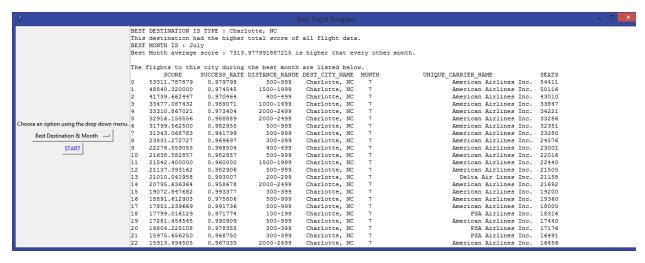
0	Best Flight Program												
·	The	flights below a	re sorted fro	m shorted travel									
	THE	SCORE SCORE		DISTANCE RANGE	MONTH	UNIQUE CARRIER NAME SEATS DISTANCE							
	0	10412.546763	0.992806	0-99	10	PSA Airlines Inc. 10488 75							
	1	2877.065217	0.978261	0-99	4	PSA Airlines Inc. 2941 75							
	2	2877.065217	0.978261	0-99	4	PSA Airlines Inc. 2941 75							
	3	543.333333	0.833333	0-99	7	PSA Airlines Inc. 652 75							
	4	478.636364	0.818182	0-99	7	PSA Airlines Inc. 585 75							
	5	6995.166667	0.979167	0-99	8	PSA Airlines Inc. 7144 75							
	6	2530.731707	0.975610	0-99	8	PSA Airlines Inc. 2594 75							
	7	2530.731707	0.975610	0-99	8	PSA Airlines Inc. 2594 75							
	8	5853.658537	0.975610	0-99	6	PSA Airlines Inc. 6000 75							
	9	1106.823529	0.823529	0-99	9	Piedmont Airlines 1344 75							
	10	1187.294118	0.852941	0-99	9	Piedmont Airlines 1392 75							
Choose an option using the drop down menu. Distance START	11	1505.882353	0.941176	0-99	4	PSA Airlines Inc. 1600 75							
	12	1601.470588	0.970588	0-99	4	PSA Airlines Inc. 1650 75							
	13	8057.781818	0.981818	0-99	1	PSA Airlines Inc. 8207 75							
	14	9576.593750	0.992188	0-99	12	PSA Airlines Inc. 9652 75							
	15	9576.593750	0.992188	0-99	12	PSA Airlines Inc. 9652 75							
	16	1451.612903	0.967742	0-99	3	Air Wisconsin Airlines Corp 1500 75							
	17	1451.612903	0.967742	0-99	3	Air Wisconsin Airlines Corp 1500 75							
	18	7910.218182	0.972727	0-99	1	PSA Airlines Inc. 8132 75							
	19	7068.800000	0.989474	0-99	4	PSA Airlines Inc. 7144 75							
	20	7068.800000	0.989474	0-99	4	PSA Airlines Inc. 7144 75							
	21	704.347826	0.782609	0-99	7	Piedmont Airlines 900 75							
	22	902.500000	0.950000	0-99	9	Piedmont Airlines 950 75							
	23	1306.666667	0.933333	0-99	4	Air Wisconsin Airlines Corp 1400 75							
	24	902.500000	0.950000	0-99	9	Piedmont Airlines 950 75							
	25	200.000000	0.833333	0-99	10	Piedmont Airlines 240 75							
	26	8906.960630	0.960630	0-99	9	PSA Airlines Inc. 9272 75							
	27	6250.393701	0.992126	0-99	7	PSA Airlines Inc. 6300 75							











0					Best Flight Program			_ 🗆 🗙
		SCORE	SUCCESS RATE	MONTH	UNIQUE CARRIER NAME	SEATS	DEPARTURES SCHEDULED	DEPARTURES PERFORMED
)	53311.787879	0.979798	7	American Airlines Inc.	54411	297	291
	1	52753.239865	0.976351	7	American Airlines Inc.	54031	296	289
	2	48840.320000	0.974545	7	American Airlines Inc.	50116	275	268
	3	47897.119403	0.977612	7	American Airlines Inc.	48994	268	262
	4	45085.625498	0.980080	7	American Airlines Inc.	46002	251	246
	5	41739.662447	0.970464	7	American Airlines Inc.	43010	237	230
6	5	36655.392000	0.992000	7	Delta Air Lines Inc.	36951	250	248
7	7	36501.441767	0.991968	7	Delta Air Lines Inc.	36797	249	247
8	В	34222.010811	0.994595	7	American Airlines Inc.	34408	185	184
9	9	33669.048387	0.983871	7	American Airlines Inc.	34221	186	183
1	10	33477.087432	0.989071	7	American Airlines Inc.	33847	183	181
	11	33310.867021	0.973404	7	American Airlines Inc.	34221	188	183
Choose an option using the drop down menu.	12	32916.155556	0.988889	7	American Airlines Inc.	33286	180	178
July — 1	13	32729.178771	0.988827	7	American Airlines Inc.	33099	179	177
START	14	31799.562500	0.982955	7	American Airlines Inc.	32351	176	173
	15	31619.903955	0.977401	7	American Airlines Inc.	32351	177	173
	16	31535.089474	0.942105	7	American Airlines Inc.	33473	190	179
	17	31343.068783	0.941799	7	American Airlines Inc.	33280	189	178
1	18	25807.335714	0.992857	7	American Airlines Inc.	25993	140	139
	19	23831.272727	0.969697	7	American Airlines Inc.	24576	198	192
	20	23191.875648	0.968912	7	American Airlines Inc.	23936	193	187
	21	22530.844444	0.988889	7	American Airlines Inc.	22784	180	178
	22	22289.240310	0.961240	7	American Airlines Inc.	23188	129	124
	23	22276.559055	0.968504	7	American Airlines Inc.	23001	127	123
	24	21716.129032	0.967742	7	American Airlines Inc.	22440	124	120
	25	21638.582857	0.982857	7	American Airlines Inc.	22016	175	172
	26	21542.400000	0.960000	7	American Airlines Inc.	22440	125	120
2	27	21137.393162	0.982906	7	American Airlines Inc.	21505	117	115
2	28	21010.041958	0.993007	7	Delta Air Lines Inc.	21158	143	142