

User Manual and Demo

Although we describe how to run the program in the README, I have added a short demo to help walk the user through the program.

First run the program. When you do so, you will see the below output:

```
Loading data...
- Added 1000 cities...
- Added 2000 cities...
- Added 3000 cities...
- Added 4000 cities...

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INTERNATIONAL ROUTE PLANNER
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Please refer to the list of all cities in the csv file
Input a start city:
```

The loading data portion tells the user that the data is being parsed from the file.

Then refer to the csv file to see the list of all cities.

The CSV file should look like this:

city_ascii	lat	lng	pop	country	iso2	iso3
Tokyo	35.6850169	139.751407	22006300	Japan	JP	JPN
Mumbai	19.0169904	72.8569893	15834918	India	IN	IND
Mexico City	19.4424424	-99.130988	14919501	Mexico	MX	MEX
Shanghai	31.2164525	121.436505	14797756	China	CN	CHN
Sao Paulo	-23.55868	-46.62502	14433148	Brazil	BR	BRA
New York	40.7499791	-73.980017	13524139	United States	US	USA
Karachi	24.8699923	66.9900089	11877110	Pakistan	PK	PAK
Buenos Aires	-34.602502	-58.397531	11862073	Argentina	AR	ARG
Delhi	28.6699929	77.230004	11779607	India	IN	IND
Moscow	55.7521641	37.6155228	10452000	Russia	RU	RUS
Istanbul	41.1049962	29.0100016	10003305	Turkey	TR	TUR
Dhaka	23.7230597	90.4085795	9899167	Bangladesh	BD	BGD
Cairo	30.0499604	31.2499682	9813807	Egypt	EG	EGY
Seoul	37.5663491	126.999731	9796000	South Korea	KR	KOR
Kolkata	22.4949693	88.3246757	9709196	India	IN	IND
Beijing	39.9288922	116.388286	9293301	China	CN	CHN
Jakarta	-6.1744177	106.829438	8832561	Indonesia	ID	IDN
Los Angeles	33.9899783	-118.17998	8097410	United States	US	USA
London	51.4999947	-0.1167218	7994105	United Kingdom	GB	GBR
Tehran	35.6719428	51.424344	7513155	Iran	IR	IRN

Pick one start city and one destination city. Use the same formatting as shown in the file.

Let's say we choose Dubai and Phoenix as our start and destination cities:

```
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INTERNATIONAL ROUTE PLANNER
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Please refer to the list of all cities in the csv file
Input a start city: Dubai
Input a destination city: Phoenix
Criteria One: Minimum Population of Stopover Cities
Enter the minimum population for cities on the route (not including source and destination). Please enter an integer:
```

Now we enter the criteria that we want this route to follow. As mentioned in the summary.txt file, the first criteria will basically be the minimum population of all the stopover cities on this path (all the cities not including the source and destination). Let's try 1000000 in this case.

```
Please refer to the list of all cities in the csv file
Input a start city: Dubai
Input a destination city: Phoenix
Criteria One: Minimum Population of Stopover Cities
Enter the minimum population for cities on the route (not including source and destination). Please enter an integer:
1000000
Criteria Two: Maximum Distance Covered Between Two Cities On Route in Kilometers
Enter the maximum distance covered between any two cities on the path. Enter a double or an integer:
```

The second criteria will basically be the maximum distance between any two adjacent cities on the path. This will be in kilometers. If the max distance is more than the actual distance between the two cities, then the algorithm will just print start and end city. Let's do 4000 km in this case:

```
Criteria One: Minimum Population of Stopover Cities
Enter the minimum population for cities on the route (not including source and destination). Please enter an integer:
1000000
Criteria Two: Maximum Distance Covered Between Two Cities On Route in Kilometers
Enter the maximum distance covered between any two cities on the path. Enter a double or an integer:
4000
Criteria Three: Countries to Avoid on the Route
First enter the number of countries you want to avoid:
```

The third criteria will basically be the countries you want to avoid on the route. In this case, let's say we want to avoid 0 countries.

Now it will calculate the shortest path based on these criteria. This is the output in this case:

```
Enter the maximum distance covered between any two cities on the path. Enter a double or an integer:
4000
Criteria Three: Countries to Avoid on the Route
First enter the number of countries you want to avoid:
0
Finding the optimal route...
-----
From: Dubai, to: Phoenix
-----
Start: Dubai, United Arab Emirates
--> Jeddah, Saudi Arabia
--> Kaduna, Nigeria
--> Abidjan, Ivory Coast
--> Fortaleza, Brazil
--> San Juan, Puerto Rico
--> Houston, United States of America
--> Phoenix, United States of America
We wish you a safe trip!
Your conditions were:
- Minimum population: 1000000
- Maximum distance: 4000.0 km
-----
Would you like to find another route? Please enter YES or NO?
```

Now let's take out some countries and see if we get a different path. I am going to avoid two countries: Saudi Arabia and Nigeria. Here is the output:

```
Input a start city: Dubai
Input a destination city: Phoenix
Criteria One: Minumum Population of Stopover Cities
Enter the minimum population for cities on the route (not including source and destination). Please enter an integer:
1000000
Criteria Two: Maximum Distance Covered Between Two Cities On Route in Kilometers
Enter the maximum distance covered between any two cities on the path. Enter a double or an integer:
4000
Criteria Three: Countries to Avoid on the Route
First enter the number of countries you want to avoid:
2
Enter Country Number 1 To Avoid. Please Refer to the format of the country in the csv file.
Saudi Arabia
Enter Country Number 2 To Avoid. Please Refer to the format of the country in the csv file.
Nigeria
Finding the optimal route...
-----
From: Dubai, to: Phoenix
-----
Start: Dubai, United Arab Emirates
--> Alexandria, Egypt
--> Tripoli, Libya
--> Dakar, Senegal
--> Belem, Brazil
--> Caracas, Venezuela
--> San Antonio, United States of America
--> Phoenix, United States of America
We wish you a safe trip!
Your conditions were:
- Minimum population: 1000000
- Maximum distance: 4000.0 km
- Countries to avoid: Saudi Arabia Nigeria
-----
```

As you can the shortest path is different in this case.