#### Project: Trip Tik

##### Description

A mileage chart, which contains the distances between any two given cities, can be represented as an apmatrix. The following table is the data for this project. The mileage between any two cities can be read at the intersection of the two city names. If the reading is taken from a cell above the zero-mileage diagonal, the distance is in miles. Below, in the lower left of the table, distances are in kilometers. For example, from Denver to Atlanta is 1405 miles or 2260 kilometers.

| � | Atlanta, GA | Chicago, IL | Denver, CO | Houston, TX | Kansas City, MO | Los Angeles, CA | Minneapolis, MN | Miami, FL | New York, NY | San Francisco, CA | Seattle, WA |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Atlanta, GA | 0 | 715 | 1405 | 800 | 805 | 2185 | 1135 | 665 | 865 | 2495 | 2785 |
| Chicago, IL | 1150 | 0 | 1000 | 1085 | 525 | 2020 | 410 | 1380 | 795 | 2135 | 2070 |
| Denver, CO | 2260 | 1615 | 0 | 1120 | 600 | 1025 | 915 | 2065 | 1780 | 1270 | 1335 |
| Houston, TX | 1285 | 1750 | 1805 | 0 | 795 | 1550 | 1230 | 1190 | 1635 | 1930 | 2450 |
| Kansas City, MO | 1295 | 850 | 965 | 1280 | 0 | 1625 | 440 | 1470 | 1195 | 1865 | 1900 |
| Los Angeles, CA | 3515 | 3250 | 1650 | 2495 | 2610 | 0 | 1935 | 2740 | 2800 | 385 | 1140 |
| Minneapolis, MN | 1825 | 665 | 1470 | 1980 | 680 | 3110 | 0 | 1795 | 1200 | 2010 | 2015 |
| Miami, FL | 1070 | 2220 | 3320 | 1915 | 2365 | 4405 | 2885 | 0 | 1280 | 3115 | 3365 |
| New York, NY | 1390 | 1275 | 2865 | 2630 | 1925 | 4505 | 1935 | 2060 | 0 | 3055 | 2860 |
| San Francisco, CA | 4015 | 3435 | 2040 | 3105 | 3000 | 615 | 3240 | 5015 | 4915 | 0 | 810 |
| Seattle, WA | 4485 | 3330 | 2140 | 3940 | 3060 | 1835 | 2675 | 5415 | 4600 | 1305 | 0 |

##### Assignment

Write a program that will input and analyze a mileage chart. The data for the chart is contained in a text file *cities.dat*. Here are the first few lines:

Atlanta, GA 0 715 1405 800 805 2185 1135 665 865 2495 2785   
Chicago, IL 1150 0 1000 1085 525 2020 410 1380 795 2135 2070   
Denver, CO 2260 1615 0 1120 600 1025 915 2065 1780 1270 1335   
Houston, TX 1285 1750 1805 0 795 1550 1230 1190 1635 1930 2450   
...other lines follow

Your program should read the names of the cities into a apvector of apstrings and the mileage chart into a apmatrix of ints and then display the above chart using that apvector and apmatrix. Next, find and display the two cities with the largest distance between them and the two cities with the shortest distance between them. Finally, allow the user to input their travel plans and tell them the total distance they will cover. All results should be reported in miles, not kilometers. For extra credit give them a choice of kilometers or miles.

##### Sample Output

Chart:see above  
  
  
 Longest distance in chart between Seattle, WA and Miami, FL (3365 miles)  
 Shortest distance in chart between Los Angeles, CA and San Francisco, CA (385 miles)  
  
 MENU OF CITIES  
 --------------  
 0) Atlanta, GA  
 1) Chicago, IL  
 2) Denver, CO  
 ...list all cities here by reading the apvector of apstring city names  
  
 Where will you be departing from? **2**  
 Next stop after Denver, CO (-1 if final destination)? **1**  
 Next stop after Chicago, IL (-1 if final destination)? **6**  
 Next stop after Minneapolis, MN (-1 if final destination)? **-1**  
  
 Your trip will be 1410 miles. Drive safely.

##### Files

[cities.dat](http://docs.google.com/cities.dat) mileage data file.