**User Manual for Travelling Salesman Problem - Genetic Algorithm**

*Zachary Petrusch, Nicklaus Benedict, Eric McAlpine, and Alex Lee*

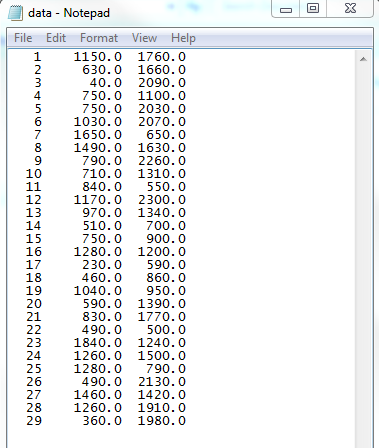
The code is set up to run in Visual Studio with debug mode on. Running the code requires a text file with TSPLIB formatted data. The text file should only contain the city data from the TSPLIB file; the header and EOF should be removed. The picture below shows an example of the correct format.

Figure 1 The Correct Format for City Data File

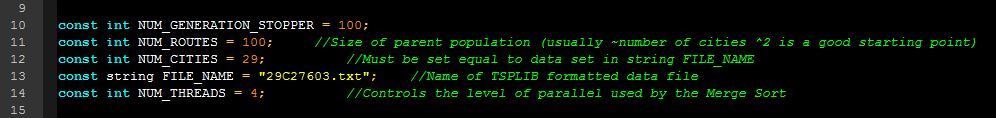
There is also a global variable named NUM\_CITIES that must be set equal to the number of cities in that data set. Provided with the code base are a few sample data files; 29 cities and 51 cities. The name of the provided files states how many cities are in the data and the length of the optimal solution. For example, the file below has an optimal path of 27,603. The file that is read from can be edited by changing the global variable FILE\_NAME.

Figure 2: Editable Global Variables to Control Program Execution Heuristics

The parallel solution can be turned on or off by using the Visual Studio master-switch for parallel OMP. This setting can be found under Project Properties -> C/C++ -> Language -> Open MP Support -> Yes. Another option for turning some parallel on or off is the global variable NUM\_THREADS can be set to 1. It should be noted that this will only turn of certain sections of parallel code in our code, and that some aspects will still run in parallel. Therefore turning the master-switch inside Visual Studio is the best way to turn parallel on or off.

The size of the population is controlled by the NUM\_ROUTES variable. This is the size of the initial and any subsequent generations. We usually set NUM\_ROUTES to the number of cities squared to begin with. NUM\_GENERATION\_STOPPER controls how many subsequent generations of no improvement it takes for the program to stop running.

The entire code base for the project and the sample data files can be found on GitHub under the following repository: <https://github.com/zgp1001/Genetic-Alg>.