# Contributions

Everything in the assignment was done by me with some references to stackoverflow answers, the reference links are in the source code.

# Problems Encountered

At first I had some problems getting the printing of Summary report to be formatted properly, however after reading more about format() it was easily solved.

For the first version of the programs I used an inefficient algorithm to write the report out to disk, which had to loop over the data multiple times. It took about 39 seconds to complete running with purchases.txt as input. I then improved the algorithm by looping over the data only once and storing each city’s report into their respective list. This improved the runtime to 16 seconds.

I then realized that I had some functions that does the same thing except it is using different values, so I combined the functions to a single function which helped to reduce the lines of code.

# Knowledge Gained

I learned about nsmallest and nlargest