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Heuristic Algorithms

Transportation Assignment Algorithm Write Up

My algorithm definitely isn’t optimal, but I feel it gives a decent result very quickly. I considered the use of multilayer sorts, rounding to create layers, and re-sorting according to changing running totals to produce my result.

Steps to my algorithm:

1. Create two blank dictionaries. The first will keep track of running totals for capacity, truck drivers, and door usage at each DC. The second will just be a dictionary that makes it easier to keep track of the daily capacity each store requires.
2. Create a sorted list of the distance dictionary keys in a two-layer sort, thus giving a list of store and DC pairs. The first layer is by distance between a DC and a store at rounded to the nearest ten, and the second layer is by the remaining capacity of a given DC using the running total dictionary.
3. Set some counter variable equal to 0.
4. While there are still stores that need to be covered:
   1. Consider the “counter variable”-ith entry in the store-DC pair list. Collect the required store volume, required number of drivers as a result of the volume, and required doors from the DC.
   2. If the DC has enough capacity in all regards for the store currently being examined according to its running totals:
      1. Match that store with that DC, and append the tuple to the results list.
      2. Adjust the running totals dictionary for the given DC to indicate how much of its capacity is being used.
      3. Re-sort the store and DC pair list according to the aforementioned two layer sort.
      4. Reset the counter variable to equal 0 and continue at the start of the while loop.
   3. Increment the counter variable by one.
5. Return the results list.