Aleksandra Koroza; Kevin Lin
Mr. Brooks Pd. 9
11/4/18
Wordladders Exploration

To begin our exploration, we set up a few different input files containing words with different relationships and let our code do its thing.

Question 1: What do we notice about anagrams and their wordladders?

We found the wordladders of several sets of anagrams. One of such sets is listed below:

elbow,below
state,taste
cider,cried
dusty,study
night,thing
bored,robed
angel,glean

The output for this input file was:

elbow
state,stats,seats,beats,bests,basts,baste,taste
cider,coder,coyer,foyer,fryer,frier,fried,cried
dusty,dusts,duets,suets,stets,stats,stabs,stubs,studs,study
night,bight,bigot,begot,beget,beset,reset,resew,renew
bored,bowed,rowed,robed
angel,anger,auger,huger

In bold are the anagram pairs that did not result in a valid wordladder. The target was not reached in several anagram pairs across all of the input files that we've tried. Reversing these pairs produced similar results. This failure was attributed to the limited nature of the dictionary used for this assignment.

After running anagram pairs, we took subsets from the valid wordladders and looked to see if the same wordladder would be produced. For example, the input file listed below...

stats,baste
coder,fried
dusts,studs
bight,resew
bowed,robed
anger,huger

… generated the following wordladders:

stats,seats,beats,bests,basts,baste
coder,coyer,foyer,fryer,frier,fried
dusts,duets,suets,stets,stats,stabs,stubs,studs
bight,bigot,begot,beget,beset,reset,resew
bowed,rowed,robed
anger,auger,huger

Thus, we can generalize that any wordladder containing some word that is followed by its target provides the shortest path between the two words. It should be noted, however, that this pattern is not specific to anagrams.

Question 2: What do we notice about rhymes?

Next we looked at rhyming words and their wordladders. A snippet of one input file that we used is:

kale,male
tail,rail
kale,fail
rail,pale

As expected, the output for the first two lines was:

kale,male
tail,rail

The output for the next two lines was a bit more interesting:

kale,bale,ball,bail,fail
rail,pail,pall,pale

Thus, we see that rhyming inputs and targets often generate wordladders that contain other rhymes. Upon further reflection, we observed that rhyming words appear in most ladders that we've seen.

Question 3: What do we notice about homophones?

Homophones are words that sound the same but have different spellings. Examination of homophone pairs did not produce very interesting results. Since homophones often have very similar spelling, word ladders were often short. No other homophones were produced.

Question: Do words of similar meanings have similar word ladder lengths to other words?

We guessed that words with similar meanings will have similar word ladder lengths to other words. The testing of this was done by generating random sample words to find the word

ladders to the synonyms. The difference of the word ladder lengths are then averaged out over ten trials. If both of the words do not have a word ladder to the randomly chosen word, the trial is not counted.

Results:
Average difference in lengths for “clever” and “bright”: 14.7 steps
For “swift” and “rapid”: 4.0 steps
For “tilt” and “lean”: 1.6 steps
For “dash” and “rush”: 0.4 steps
For “dumb” and “daft”: 1.4 steps

It seems that there is a correlation between word meaning and word ladder distances, but the results are inconclusive. There are some words such as “clever” and “bright” with large differences, but others such as “dash” and “rush” with very few. More accurate results can be found with a larger sample size, but that would take a lot of time to run.