Week 4 Report

Similar Product URLs:

- https://playscrabble.com/play/ai
    - No hints
- Wordswithfriends.com (requires sign up)
    - Provides hints for highest scoring words

Algorithm

Say that we have array L[1…n] letters. We also have access to B[1…n] bonuses to indicate where our scrabble word will receive a bonus.

We can create a recursive function:

maxScore(S, H) = the maximum score possibly derived from the sequence of letters in S, given a current hand of H

We wish to compute maxScore(L, H[7] = 0), which will return the maximum score for the whole sequence.

Recursive Algorithm

Base Case

- If len(L) = 0: MaxScore(L) = 0, since we have played the whole sequence
- If len(H) = 7, since we have passed a turn playing nothing (no words possible)

Recursive Case

We can create a helper function to derive all possible words given our hand. This would iterate through our hand in O(n) time, and recursively call for more possible words until our hand is empty, so it would be an O(n^2) function. We'll call this function PossibleWords(H).

We'll also have a GetScore(w, H, L) function to determine the score of the word, given its placement. This should run in O(1) time.

MaxScore (L, H) = max_(w in PossibleWords(H))_(GetScore(w, H, L) + MaxScore(L, H - {w}))

The function should operate in O(n^3) time.

This solution may not be optimal, as it may be possible to save our recursive result in some iterative structure. However, I cannot imagine one, since I'm not sure how our sequence (L) and hand (H) might repeat iteratively.