ES112 Practice Problems: Challenge set

October 21, 2015

1. First read in a list of common words from the user, e.g. "hello", "world", "a", "1234". Then write a checker that does the following. The user should enter a proposed password. The program then tells her whether this password is strong or weak. A password is weak if any of the following holds:

   - it corresponds to a common word or its reverse.
   - it corresponds to two common words concatenated.
   - it is a word in the common list followed by a digit 0-9 (e.g., `hello5`)

2. Implement a sparse matrix using a dictionary. You should be able to access an entry as $S[i][j]$. Furthermore, you should have the following functions:

   - Function `set(S, i, j, v)` that sets $S[i][j] = v$.
   - Function `delete(S, i, j)` that deletes the (i, j) entry.
   - Function `mult(S1, S2)` that returns another data structure that holds the matrix multiplication of `S1` and `S2`.
   - Function `nonzeros(S)` that returns the number of nonzero entries of `S`.