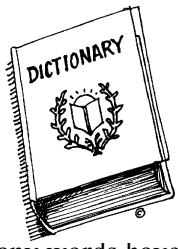

Weekly Project 15
Words!

Background:

The English language contains many fascinating and curious properties. For example, how many words have at least one of each of the vowels (a, e, i, o, u)? Are there any words that contain none of the vowels? Or what is the most common first or last letter in a word?

This lab will not only test your programming skills attained in the course, but will also let you learn something new about words that you probably didn't learn in English class (no disrespect to English teachers of course).

Assignment:

On Schoology, you will find the "dictionary.txt" file, which is the official Scrabble © dictionary. We will consider this to be the set of all words in the English language. Working alone, you are to write methods that determine answers to the following questions. Questions are grouped by difficulty and point value. Your final grade out of 30 points will be based on how many total points you earn with supporting code and correct answers.

Level 1: **(2 points each)**

1. How many words are there in the English language?

2. What is the longest word in the English language? (If there is a tie, please list all words of that length.)

3. Which words contain no vowels (a, e, i, o, u)? Are there any that are also missing a y?

4. What is the average word length of all words in the English language?

5. How many words start and end with the same letter? (An example would be "sassafras")

Level 2: **(4 points each)**

1. Is the letter ***e*** really the most common letter in the English language? What percentage does it hold? List the 26 letters of the alphabet starting with the most frequent together with their respective percentages.

2. What is the most common word length? How many words are there of that length?

3. What is the most common first letter? What is the most common last letter? What percentages do these occur?

4. List all palindromes in the English language. Recall a palindrome is a word that reads the same when it is written backwards, e.g. radar. [Can you do this with recursion?] You can use your previous Palindrome Weekly Project and call your palindrome method.

5. What is the most common two-letter combination?

Level 3: **(6 points each)**

1. Given that the most common letter should be worth 1 point, assign point values to the rest of the letters. For instance, if the letter 'n' occurs half as often as the most common letter, it should be worth 2 points. You should round to the nearest whole point value. How do these values compare to the values that Scrabble© assigns to the letters?

2. How many four-letter words are formed using 2 or less different letters, e.g. peep. Are there any words longer than 4 letters that have the same property?

3. Suppose that we assign the value 1 to the letter ‘a’, 2 to the letter ‘b’, and so on. A *dollar word* is a word whose values add up to exactly 100. An example is “wizards” whose sum is 23 + 9 + 26 + 1 + 18 + 4 + 19 = 100. Find all the dollar words in the English language. What is the shortest dollar word?

4. Find all the words whose letters are in non-descending alphabetical order (“annoy” counts despite the double ‘n’) then find all the words that are in strictly ascending alphabetical order (“annoy” now does not count due to the double ‘n’.)

5. Find all the words (if any) that have the vowels ‘a’, ‘e’, ‘i’, ‘o’, ‘u’ occur exactly once in that order (though not necessarily consecutive)? Are there any words with the same property for ‘a’, ‘e’, ‘i’, ‘o’, ‘u’, ‘y’? What about ‘u’, ‘o’, ‘i’, ‘e’, ‘a’?

Instructions:

Write clear and functional code that answers as many questions as possible. It would help to print what level and problem you are solving for reference and its point value (Example: //Level 1 #2 – 2 points). A maximum of 10 points extra credit will be allowed. Zip this with your code to submit to Schoology. Good luck and have fun!