CSC 241 Section 504 Winter 2017
Homework Assignment 1

Due: As specified on D2L

The purpose of this assignment is to review the Python container classes `list`, `set`, and `dict`. The assignment is worth 4 points.

Please upload a .py file containing your solution to this assignment to D2L. Include a comment at the top with your name. Your submission must be uploaded by the above date and time in order to be considered on time. Please see the course syllabus for my late submission policy.

I have placed a file named `hw1.py` in the D2L HW 1 dropbox folder. You may use this is a starting point for your program. **You must write the rest of your code by yourself. Do not copy a solution, or any part of it from any source, including (but not limited to) other students or the Internet... doing so would be plagiarism.**

1. (1 point) Write a function called `factors`. This function is passed an integer `x` and returns a list of its factors; that is, the numbers which divide evenly into `x`. For example:

```
>>> factors(10)
[1, 2, 5, 10]
>>> factors(23)
[1, 23]
>>> factors(242)
[1, 2, 11, 22, 121, 242]
```

   Note 1 and `x` are both considered to be factors of `x`.

2. (.5 point) Write a function called `factors_set`. It is also passed a paramemeter `x` and returns its factors in the form of a Python set (rather than a list).

3. (1 point) You will find a file called `wiktionary.txt` in the D2L HW 1 dropbox folder. This file contains information about the frequency of use of English words. Each line in the file consists of a word, followed by a space, then a floating point number. The number is an estimate of the number of times the word appears (per billion words) in a typical English text. For example, according to this file, the most commonly used word in English is "the", with a frequency of 56271872, meaning that over 56 million out of 1 billion words (more than 1 in 20) in a typical English text are the word "the". The file contains only words whose frequency is greater than or equal to 500000.

   Write a function called `read_wiktionary`. This function takes no parameters, and should return a dictionary whose keys are the words in `wiktionary.txt` and whose values are their frequencies. Here are some examples of input/output:

```
>>> freq = read_wiktionary()
>>> freq['the']
56271872.0
>>> freq['my']
3277699.0
>>> freq['computer']
Traceback (most recent call last):
  File "", line 1, in
    word_frequency['computer']
KeyError: 'computer'
```

4. (1.5 points) Write a function called `count_words`. This function is passed the name of a file, and should count the number of times each word occurs in the file. A dictionary should be returned, whose keys are words, and whose values are their counts. For example:

```
>>> freq = count_words('hamlet.txt') # this file is in the D2L HW 1
dropbox folder
>>> freq['to']
13
>>> freq['be']
3
>>> freq['or']
2
>>> freq['hamlet']
Traceback (most recent call last):
  File "", line 1, in
    freq['hamlet']
KeyError: 'hamlet'
```