HOMEWORK 11

CS 125

due at 12:45pm (classtime) on Thursday, October 1

Write a Python *function* to solve each of the following problems. Plan each function on paper before you implement it in code.

Prepare your solutions in a single Python file. Use comments to clearly state the problem number for each of your solutions. Provide test cases to show that your functions produce the desired output. Upload your file to the Homework 11 assignment on Moodle.

Unfortunately, it's difficult to do this homework on the Runestone site because the necessary files are not available in the active code boxes. It is best to do this homework (and other assignments involving files) on your computer or a lab computer. To access a data file, first save it to your computer, preferably into the same folder where you will write your Python program. If you have trouble with this, talk with Prof. Wright.

1. **Mean and Standard Deviation**: Write a function `stats(filename)` that accepts the name of a file containing numbers. Your function should read all of the numbers in the file and return the mean and standard deviation of the numbers. The file may have all of the numbers on the same line (separated by spaces) or have numbers on many lines; regardless of this, your function should read all of the numbers in the file.

   You may use the `meanSD` function from class on September 24.

2. **Unique Words**: Write a function `readWords(filename)` that accepts the name of a file and returns a list of all the unique words in the file. While reading the words in the file, your function should convert each word to lower case (*hint*: review Python string methods). Your function header should be:

   For example, suppose the file `pat_sat.txt` contains the following text:

   ```
   PAT SAT Pat sat on hat
   PAT CAT Pat sat on cat
   ```

   A call to `readWords("pat_sat.txt")` should return the following list:

   ```
   ['pat', 'sat', 'on', 'hat', 'cat']
   ```

   Make sure your function properly opens and closes the file. You may assume that

the file contains only alphabetic characters, space characters, and line breaks.

3. **Movie Data:** The file `movie_data.txt` contains information about popular movies from 2015. Each line of the file gives the release date, title, worldwide gross revenue (in US dollars), and director for a particular movie. These fields are separated by tab characters. Here is a sample line, with tab characters printed `\t`:

   ```
   12 June 2015\tJurassic World\t1670400637\tColin Trevorrow
   ```

   This line indicates that Jurassic World was released on June 12, directed by Colin Trevorrow, and grossed $1,670,400,637.

   Write a function `findBillions(filename)` that reads such a file and writes a new file called `billions.txt` containing only the titles of the movies that grossed more than one billion dollars (one movie per line).

4. **Line Numbers**: Write a function that adds line numbers to a file. Your function should be `lineNumbers(inFile, outFile)`. The function reads the file `inFile` and write a new file `outFile`. Each line of `outFile` should begin with the line number, followed by a colon and a space, then the text from the corresponding line of `inFile`.