Lab Assignment

Question 1.

(a) The file studentDetails.txt contains the details of some students. Each line contains the student surname and the numerical grade achieved by this student in three modules. Write a program that will read this data from the file and output the name and average grade of each student.

(b) Alter the program above so that rather than directly printing out the average grade for every student it will instead store this information in a dictionary. The program should then ask the user to enter the name of one of the students. The program will then print out the average grade of that specific student. The program should give an option to the user if he/she wants to check student's average using a while loop. The while loop terminates if the user enters ***n*** .

Question 2.

AirPassengers.csv contains Monthly Airline Passenger Numbers 1949-1960. Notice the year is encoded as a float.

	time	AirPassengers
1	1949	112
2	1949.083	118
3	1949.167	132
4	1949.25	129
5	1949.333	121

a)

(i) Write a function that will open the file and calculate the average number of monthly air passengers over this time period. The function should return this average value.

(ii) Write a second function that will take in the average value calculate in part (i) as an argument. You should open the file and print out all years in the file that exceeded the average value.

b)

In this section we will rewrite the program from part a).

(i) Write a function that will open the data file and create and populate a dictionary data structure so that the keys of the dictionary will be the years and the associated values will be the number of passengers in that year. The function should return the populated dictionary.

(ii) Write a function that will take in the dictionary (created in part i) as an argument and calculate the average number of passengers.

(iii) Write a third function that will take in the average value calculated in part (ii) and the dictionary (in part i) as arguments. The function should print out all years in the dictionary where the number of passengers exceeded the average value.

Question 3.

(a) Write a program that reads the contents of one of the novels in files subfolder on Canvas.

The objective of this program is to read all the data from this file and output words that occur at a specific frequency within the text.

You will first need to define two variables called *upperFreq* and *characterLength* within your code.

Your program should read all words from the chosen novel file. It should record all words that have a character length of *characterLength* along with their frequency of occurrence. For example if you have set *characterLength* to be 10, then your program should only store all words that have a length of exactly 10 characters. Your code should also record the number of times this word occurs in the novel.

Your program should then print each word along with the frequency of the word, such that the frequency of the word within the novel exceeds the value of your variable *characterLength*

The following is the output of the code if I set the variable *upperFreq* to 10 and *characterLength* to 10 for the Sherlock Holmes books. Notice all words have exactly ten characters and their frequency of occurrence is greater or equal to 10.

```
remarkable -- 17
experience -- 13
therefore, -- 11
photograph -- 10
determined -- 14
impression -- 15
connection -- 10
afterwards -- 15
understand -- 23
red-headed -- 10
absolutely -- 24
everything -- 14
companion. -- 10
```