Problem Solving Steps

Program Assignment #4

**Problem #1**

* Part one is basically making a program that can read an input file “students.dat” using open function to open the file and then choosing the mode which is going to be “r” like the following example open(“filename”, “r”) because there are multiple modes. Then use the .readlines() function which is going to read and store the input of the file line by line and then I used a for loop to read into these lines, I had 10 lines and each lines has Student Name, Classification, and Grade. After that I have to remove the \t which is the TAB and store it into a variable called student\_list which will hold the value for little while and after I split the line to three separate line I have to identify the name, classification and grade for each students and push these data to my list of dict “students” which I created earlier which it has a key and value.
* I created a counter for each classification and every loop I get a classification = freshmen, sophomore, junior, or senior I have to add +1 to my counter depends on the classification.
* Counting the number of the students which is equal to the length of the list (lines) which I will use later to find out the average grade of the class.
* The average is simply adding all the grades together divided by the number of student, which I used a “(average grade=average+grade)/number of student
* Counting the highest grade with if statement which will see if my grade is bigger than my highest grade which is started as 0 and if YES then the highest grade = grade and then save the name of the student with highest grade which I made a variable to store.
* Count the lowest grade which is equal to “the first grade in class/or the list) which it was 97 and using if statement to see if there is any lower grade than this and if GRADE < LOWEST then the lowest = grade
* Finally is open another file with different mode which I will be using now “w” means writing to write a new file with required details. File called “student\_statistics.txt” and print name of the student with highest grade, highest grade, lowest grade, average grade, number of freshmen, sophomore, junior, and senior in the class printed into that file.

**Problem #2**

* Making a program that will read a list of words, find anagram and group them together.
* Created a dict and called it groupAnagram.
* I made sorting function to sort my word and it take down the word and converts it into a list and then loop through that list and rearrange the word, example:
  + eat it will take the first letter e then compare it with others and it will start with e, a, t and if that letter is smaller it will swap it, and then returned the value sorted “aet”.
* In my main thing I have to make a for loop to go through the words word by word and then put if statement that will ask if the sorted word exist as key in groupAnagram and if not then add the sorted word as key and the word as value and so on.
* So if we have multiple words with same key (word after sorted) it will add that word as value to which will a list.
* Finally print out the list values of groupAnagram dict.

**Problem #3**

* In this program I have to make a banking system implement the scenario of OOP
* I made file different files
  + main.py > to run the program
  + account.py > Bank account class [ parent class for both saving and checking]
  + saving.py > Saving account class [ child class for bank account]
  + checking.py > Checking account class [ child class for bank account]
  + customer.py > Customer class [different class]

In my main program I have created three different objects one for the customer which is going to be me

Customer object for customer class will hold the following

First name: Fowzy

Last name: Sas

Age: 25

List of accounts ( which a list of account object)

In my second object which is will be checking I have take pass few info like:

Account number which is acct #1

Balance to start with which is will be $100

Then third object to create a saving account which will take the attributes as checking but with different values

Account number which is account #2

Balance is $100000

Then whenever I created an account [checking and saving] I have to store and pass to my customer details which I have created a function called “Add account” in case we need to add account later.

In checking and saving account classes both inherited from bank account class which will take balance and account number, but in our saving and checking I added an attribute called “account type” which will hold the type of the account that customer has or created. Of course I have to add some getter and accessor to my account class that will allow the user to view get info like account number and balance and withdraw money which is basically a subtracting from the balance if there is enough balance in the customer account, and deposite amount which will increment the balance by the value that we passed it.

In both Saving and Checking classes I have created a function to get the information with more details which will add the account type to it to be able for us to differentiate both accounts. In the customer classs I have created some getter and accessor like addAccounts or getAccounts (to get accounts info) and setInfo(to update information if need it.

So now I explained what I did in my program now I have to implement OOP concepts in my program, which we going to use Bank Account Classes to abstract base class work by using “*from abc import ABC, abstractmethod*” to abstract the class that we want and then add to my BankAccount class (ABC) to inherite from the abc class and add this to the top @abstractclassmethod, to prevent creating an object for the BankAccount itself.

Encapsulation: which basically making a class to encapsulate the variables and methods into a class, which I did in Saving, Checking, and Customer class.

Polymorphism which I override a method (runtime) called getInfo into both classes Saving and Account, which both are existing into the parent class as well.

Inheritance: Which I made class Saving (child1) and Checking(child2) both inherited from BankAccount class.