CSD3464-Test 01

Part A (40 marks)

The first part of your test is to develop a grade statistics tool. The program should continuously ask the user if they would like to enter another student into the system until they are finished.

- If they type "Y" for yes, the program should then ask the user to enter a student's ID as well as their individual final percentage grades as marks out of 100, decimal values are permitted (i.e. 93.2).
- If the use enters "N" for no, then the program should then ask the user if they would like to include standard deviation as part of their output statistics
    1. If the user enters "N", then simply display max, min, and average of the grades
    2. If user enters "Y", they must re-enter the same grades as before **(Hint: use a count-based loop)** and then the program should display max, min, average, and standard deviation of the grades

Helpful Comments on Standard Deviation:

- The formula for standard deviation is defined as:

$$S = \sqrt{\frac{\Sigma(X - \overline{X})^2}{N}}$$

where S = the standard deviation of a sample,
Σ means "sum of,"
X = each value in the data set,
$\overline{X}$ = mean of all values in the data set,
N = number of values in the data set.

- X in the formula above is each percentage grade. $\overline{x}$ in the above formula is the class average. Thus to calculate the numerator you need to sum the difference each grade is from the average. You **could** store this result in the variable.
- N in the above formula is the population (i.e. number of student you entered).
- For calculating standard deviation, you may find *sqrt(value)* from the math module helpful.
    - Include the following at the top of your file:

    "from math import sqrt"

**********SAMPLE INPUT/OUTPUT CAN BE FOUND ON THE FOLLOWING PAGE**********

Do you have another student to enter [Y/N]? Y

Enter Student 1's final percentage grade: 93.1

Do you have another student to enter [Y/N]? Y

Enter Student 2's final percentage grade: 67.2

Do you have another student to enter [Y/N]? N

Enter Student 3's final percentage grade: 75.3

Do you have another student to enter [Y/N]? N

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Would you like to include standard deviation in?

your summary statistics [Y/N]? Y

Please re-enter the same percentage grades as you previously did for each student.

Student 1: 93.1

Student 2: 67.2

Student 3: 75.3

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MAX: 93.1%

MIN: 67.2%

AVG: 78.6%

SD: 10.8

IMPORTANT: Notice how SD and AVG are displayed to 1 decimal places.

Part B (20 marks)

The second part of your test is to develop a car purchase vs lease comparison tool. The program should ask the user to enter the following information regarding the purchase of a car:

- Purchase Price
- Loan Rate (%)
- Duration of the loan (in years)

After entering the above information, the monthly cost of purchase should be calculated using the below formula. The **principal** in this equation is the purchase price of the car INCLUDING taxes.

$$\text{Monthly Payment} = \frac{\left(\frac{\text{interest rate}}{\text{12 months}} \times \text{principal}\right)}{\left(1 - \left(1 + \frac{\text{interest rate}}{\text{12 months}}\right)^{(\text{-number of months})}\right)}$$

The program should also ask the user for the following lease details:

- Monthly lease price

Display to the user the monthly cost of leasing the car including taxes

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Lastly, the program should prompt the user for how long they expect to keep the vehicle (in years) and generate a comparison table as shown in the sample output below.

- Indicate to the user if it is cheaper to buy or lease the vehicle for that duration of time.

**********BUYING THE CAR**********

Please enter purchase price of the car: 40000

Taxes to be added (13%): 5200

Purchase price with taxes: 45200

Please enter loan rate (%): 1.75

Please enter duration of the loan (years): 4

Monthly cost of purchase: 975.70

*********LEASING THE CAR**********

Monthly Lease Price: 625

Taxes to be added: 81.25

Total Monthly lease cost: 706.25

*********COMPARISON**********

Please enter the duration you plan on keeping the car (years): 5

Year	Month	Lease Total	Purchase Total
1	1	706.25	975.70
1	2	1412.5	1951.40
1	3	2118.75	2927.10
…			
4	12	33900.00	46833.60
5	1	34606.25	
5	2	35312.50	
…			
5	12	42375.00	

Based on the information provided if you plan to keep your vehicle for 5 years it is cheaper to lease.