CSCI 1411: Fundamentals of Computing
Lab 10
Due Date: 8:30 AM October 27, 2020

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Goals:

- Use of decision structure
- Use of functions and modular programming
- Exception handling
- Testing

Development Environment: IDLE

Deliverables:

1. This lab handout with 6 screen shots (3 for part I and 3 for part II).
2. Your Python code for Part II of this lab. Name the file using the following format:
   YourlastnameFirstnameLab10b.py
   Example: If your name is Jamal Jones then you will name the file as follows:
   JonesJamalLab10b.py

How to take a **screen shot**:

- For a Windows 10: Use Snipping Tool to copy and CTRL + V to paste screen shot.
- For Mac: Shift + Command + 4 to copy and CTRL + V to paste screen shot.

Part I – Skill Practice (10 Points)

- Start IDLE
- Create a new file.
- Type the following code in the file. ….. **Do not cut and paste.** You will learn more by typing it in.
- Make sure that you read all comments to understand the code
- Remember to update the first 2 lines with your own name and the date of the lab.

```
#############################################################################
# Name:
# Date:
# This program will perform the following tasks:
#    1) It will ask user for three test scores
#    2) It will calculate the mean of the three test scores
#    3) It will convert the mean into a letter grade (See
#       find_letter_grade function for the mapping)
#    4) It will display the mean score and letter grade
# It will display an error message if the entered score is non-numerical
#############################################################################

#############################################################
# Function Name: calculate_mean
# Description: Calculate mean of three test scores
# Parameter: score1 - Score for test 1
#            score2 - Score for test 2
#            score3 - Score for test 3
# Returns mean of the three test scores
#############################################################
def calculate_mean (score1, score2, score3):
    mean = (score1 + score2 + score3) /3

    return mean
```

```
################################################################
# Function Name: find_letter_grade
# Description: Convert the mean into letter grade as follows:
#           Mean                      Letter Grade
#           90 to 100                     A
#           80 to 89                      B
#           70 to 79                      C
#           60 to 69                      D
#            0 to 59                      F
# If the score is above 100 or below 0 then it will return
# undefined
# Parameter: mean- mean of the test scores
# Returns letter grade
################################################################
def find_letter_grade (mean):

    if mean > 100:
      letter_grade = 'Undefined'
    elif mean >= 90:
        letter_grade = 'A'
    elif mean >= 80:
        letter_grade = 'B'
    elif mean >= 70:
        letter_grade = 'C'
    elif mean >= 60:
        letter_grade = 'D'
    elif mean >= 0:
        letter_grade = 'F'
    else:
        letter_grade = 'Undefined'

    return letter_grade
```

```
def main():

    print ('This program will calculate the mean of three test scores and')
    print ('convert the mean into a letter grade')
    print ('============================================================')

    # Use try/except block to catch errors
    try:
        score1 = int (input ('Enter score 1: '))
        score2 = int (input ('Enter score 2: '))
        score3 = int (input ('Enter score 3: '))

        mean = calculate_mean (score1, score2, score3)

        letter_grade = find_letter_grade (mean)

        print ('Your mean score is {0:.3f}'.format (mean))

        print ('Your letter grade is:', letter_grade)

    # If the input is a non-numerical string then display an error message
    except ValueError as err:
        print ('One of your score is non-numerical')
        print ('Please try again with correct scores')
    # Catch unexpected errors
    except:
        print ('Unknown error')
```

- Save the file as "YourLastNameYourFirstNameLab10a.py"
- Click Run -> Run Module
- Type `main()` to run your program
- If there are any syntax errors then fix those errors and run your program again.
- Use the test scores given in the following table to test your program for different possible outcomes.
- If you get the correct result (shown in the last two column) then your program is working as expected.

Run Number	Test Score 1	Test Score 2	Test Score 3	Output	
				Mean	Letter Grade
1	100	90	80	90.000	A
2	66	33	88	62.333	D
3	ABC			Display Error Message	
4	-100	-90	-80	-90.000	Undefined
5	101	102	103	102.000	Undefined

- **Once you are satisfied with your results then take a screen shot of run number 1, 3 and 4 and past them below.**

Paste your screen shot below this line

Run 1:

```
>>> main()
This program will calculate mean of three scores and
convert the mean into a letter grade
Enter score 1: 100
Enter score 2: 90
Enter score 3: 80
Your average score is: 90.000
Your grade is:  A
```

Run 3:

```
>>> main()
This program will calculate mean of three scores and
convert the mean into a letter grade
Enter score 1: ABC
One of your scores is not a number
Please try again
```

Run 4:

```
>>> main()
This program will calculate mean of three scores and
convert the mean into a letter grade
Enter score 1: -100
Enter score 2: -90
Enter score 3: -80
Your average score is: -90.000
Your grade is:  Undefined
```

Part II – Cost Calculator (15 Points)

A software company sells a package that retails for $ 99. Quantity discounts are given according to the following table:

Quantity	Discount
10 to 19	20%
20 to 49	30%
50 to 99	40%
100 or more	50%

Write a program that asks the user to enter the number of packages purchased. The program should then display the discount percentage, amount of the discount (can be 0) and the total amount of the purchase after the discount. Format the output to two decimal places, include % sign after the discount percentage and $ before the discount amount & total amount. Your program should include the following functions:

1. discount_percentage – This function will receive number of packages purchased as a parameter and will return the discount percentage.
2. main – This function will perform the following tasks:
    a. Ask use for the quantity
    b. Display an error message if quantity is less than 0 (negative number)
    c. Use discount_percentage function to calculate the discount percentage
    d. Calculate amount (quantity * 99)
    e. Calculate discount amount (amount * discount percentage /100)
    f. Calculate total amount (amount – discount amount)
    g. Display discount percentage, amount of discount, and total amount
    h. Use try/except construct to catch any errors
3. Click Run -> Run Module
4. Type `main()` to run your program
5. If there are any syntax errors then fix those errors and run your program again.
6. Use the quantity given in the following table to test your program for different possible outcomes.
7. If you get the correct results (shown in the last three columns) then your program is working as expected.

Run Number	Quantity	Output		
		Discount Percentage	Discount Amount	Total Amount
1	abc	Display Error Message		
2	-5	Display Error Message		
3	5	0.00%	$0.00	$495.00
4	19	20.00%	$376.20	$1504.80
5	55	40.00%	$2178.00	$3267.00

6	105	50%	$5197.50	$5197.50

- **Once you are satisfied with your results then take a screen shot of run number 1, 3 and 6 and past them below.**

Paste your screen shot below this line

- Upload this lab handout with required screen shots and your code file to Canvas to submit the lab.

Run 1:

```
>>> main()
What is the quantity of items you bought?: abc
The quantity entered is not a real quantity
Please enter it again
```

Run 3:

```
>>> main()
What is the quantity of items you bought?: 5
Your discount is:  0 %
Your amount of discount is: $0.00
Your total amount is: $495.00
```

Run 6:

```
>>> main()
What is the quantity of items you bought?: 105
Your discount is:  50 %
Your amount of discount is: $5197.50
Your total amount is: $5197.50
```