PROGRAMMING FOR ALL – SPRING 2021 - WEEK #2 – LAB – 210407

GENERAL LAB RULES:

1. **Every student has to join lab sessions.**
2. A goal of lab assignments is to practice topics covered in class during each week. Each lab has two parts: Theory & Programming.
3. In the theory part, you are expected to read pieces of codes and to predict outputs of these codes. You should not use Python for these predictions; you should test your skills to understand codes. When everyone is ready, TA displays correct outputs.
4. In the programming part, you are expected to make programs for assigned problems. You are expected to make all programs during the lab time, however, only one specified program should be submitted to CANVAS.
5. TA has to check your lab work for the full lab credit.

THIS WEEK TOPICS:

MATH MODULE, DECISION STRUCTURE

PART I: THEORY – for this part take a piece of paper or open an empty file and write down expected outputs without using Python. AFTER this prediction verify your answer using Python or wait for TA to display the answer

#1:

```python
import math

value_x=11
value_y=4


print(math.ceil(value_x/value_y))


print(math.sqrt(value_y))


print(math.hypot(8,6))


print(math.floor(value_y/value_x))
```

#2

```python
number1=-3
number2=20
if number1>number2:
        print(number1)
else:
        print(number2)
```

#3:

```python
value_A=10
value_B=25

if value_A>=15 and value_B>=15:
        print('XX')
if value_A>=15 or value_B>=15:
        print('YY')
if not(value_A>=15) and value_B>=15:
        print('ZZ')
if not(value_A>=15 or value_B<15):
        print('WW')
```

#4
```
temp_1=66
temp_2=85
if temp_1>70:
    if temp_2>100:
        print('AA')
    else:
        print('BB')
else:
    if temp_2>100:
        print('CC')
    else:
        print('DD')
```

#5

```
print('CASE A')
ratio=0.9
if ratio>0.8:
    print('The result is excelent.')
if ratio>0.6:
    print('The result is good.')
else:
    print('The result is bad.')



print('CASE B')
ratio=0.8
if ratio>0.9:
    print('The result is excelent.')
if ratio>0.6:
    print('The result is good.')
else:
    print('The result is bad.')



print('CASE C')
ratio=0.9
if ratio>0.8:
    print('The result is excelent.')
elif ratio>0.7:
    print('The result is good.')
else:
    print('The result is bad.')
```

PART II. PROGRAMMING

Note:

In all programs you can use only methods and tools already introduced in the class.

PROGRAM #1: BMI

Write a program that calculates and displays a person's body mass index (BMI). The BMI is often used to determine whether a person is overweight or underweight for his or her height. A person's BMI is calculated with the following formula:

$$BMI = weight \times 703 / height^2$$

where *weight* is measured in pounds and *height* is measured in inches.

The program should ask the user to enter his or her weight (in lb) and height (in inches) and then to display the user's BMI.

The program should also display a message indicating whether the person has optimal weight, is underweight, or is overweight.

A person's weight is considered to be optimal if his or her BMI is between 18.5 and 25. If the BMI is less than 18.5, the person is considered to be underweight. If the BMI value is greater than 25, the person is considered to be overweight.

PROGRAM #2: LARGEST - must be submitted to CANVAS as lab2.py.

Start the program with: # your name.

Write a program that prompts a user to enter three integers and then displays the largest integer.

Possible output of the program:

```
This program displays the largest of three integers.

Enter the first integer: 45
Enter the second integer: 202
Enter the third integer: 10

The largest integer is:  202
```

Program #3 – for fun: Roulette

On a roulette wheel, the pockets are numbered from 0 to 36. The colors of the pockets are as follows:

- Pocket 0 is green.
- For pockets 1 through 10, the odd-numbered pockets are red and the even-numbered pockets are black.
- For pockets 11 through 18, the odd-numbered pockets are black and the even-numbered pockets are red.
- For pockets 19 through 28, the odd-numbered pockets are red and the even-numbered pockets are black.
- For pockets 29 through 36, the odd-numbered pockets are black and the even-numbered pockets are red.

Write a program that asks the user to enter a pocket number and displays whether the pocket is green, red, or black. If the user enters an integer out of the possible range, the program displays the message "There is no color assigned to this number."