

BMGT 404 Lab 1

What to turn in

Turn in your codes through ELMS by **8:00AM on Monday, February 17th** (make sure readability of your code is good).

Please submit one Python source file, named as: YourFirstName_YourLastName_Lab1.py

Exercise 1.1 (10 points)

Write a Python code using only the **print** statement to print out a triangle below. Remember to save your program regularly, to keep from losing your work!

```
*  
***  
*****
```

Exercise 1.2 (10 points)

Compute and print both roots of the quadratic equation $x^2 - 40x + 391$.

Hint: recall that the roots of a quadratic equation $ax^2 + bx + c$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

To get a square root of a number (N) in Python, use `math.sqrt(N)`.

Note: To use all math functions, please add: `import math` at the beginning of your code.

For example, if I want to get the square root of 16, you can use the following code.

```
import math
```

```
print(math.sqrt(16)) # will print out 4.0
```

Exercise 1.3 (20 points)

Write a Python program using *input* function and arithmetic operators to do the following tasks.

1. Obtain two integer inputs from users: X and Y
2. Print out results for the equations $(X+Y)/(X-Y)$ and $(X-Y)^3$
3. Print out the last digit of $X+Y$

A sample run (when you run your codes; texts in blue are inputs from the keyboard):

Enter X: 15

Enter Y: 10

$(X+Y)/(X-Y) = 5$

$(X-Y)^3 = 125$

The last digit of $X+Y$ is: 5

Exercise 1.4 (30 points)

Write a Python program using conditional statements and user input function to generate the outcome of the rock, scissors, paper game. A sample run looks as follows: (texts in blue are inputs from the keyboard). The only valid inputs are rock, paper, and scissors. If you enter anything else, your program should output “invalid input”.

Player 1: rock

Player 2: paper

Player 2 wins

Exercise 1.5 (30 points)

Write a program using conditional statements and user input function to convert temperatures to and from Celsius, Fahrenheit. (Texts in blue are inputs from the keyboard)

[Formula: Celsius/5 = (Fahrenheit – 32)/9]

A sample run:

Please enter the temperature: 60

Is this Celsius or Fahrenheit? C

60C is 140 in Fahrenheit

Another sample run:

Please enter the temperature: 45

Is this Celsius or Fahrenheit? F

45F is 7 in Celsius

Optional Question (Hard)

Give an unsorted integer list (might be huge with millions of integers), find the smallest missing POSITIVE integer.

Requirement: your Python code should run in $O(n)$ time and uses constant extra space.