

**BENG215 – BSB501 – MBG624 - Homework 1 – 30/10/2023 – Due: 06/11/2020 23:59**

SUBMIT EACH QUESTION AS A SEPARATE \*.py file such as: **groupX\_HW1\_Q1.py** then zip all & upload!

WORK INDEPENDENTLY! IF YOUR HOMEWORK IS SIMILAR TO OTHERS, BOTH WILL GET **ZERO POINTS!**

1. (20 points) Write a Python script that calculates and prints the sum and average of the digits in the given string, my\_str. (Hint: You can use isdigit() function to check each character of the string.)

my\_str = 'TR29abcdqxw10Casd1923yhdf23askdj104ajdfguj19akflk05ssfij30lkhu08akdf'

2. (30 points) 7 students took 2 exams, the top three students will get AA. You were provided with the list of exam marks, use Python string operations, mathematical operations and loops to find average of two exam marks for each student and choose top 3 students programmatically. Announce the top 3 students to the audience:  
List = ['Ayşe: 75-78', 'Berk: 80-60', 'Can: 58-61', 'Didem: 34-45', 'Erdem: 32-37', 'Fatih: 69-75', 'Gül: 54-63']

3. (50 points) A scientist is growing two types of bacteria in a flask. Each type of bacteria produces a chemical that is toxic to the other one. Their features are as follows:  
One mole of Bacteria X produces 0.41 mole of Bacteria X and 0.5 mole of Toxin X every hour.  
One mole of Bacteria Y produces 0.55 mole of Bacteria Y and one mole of Toxin Y every hour.  
One mole of Toxin X kills 0.5% of Bacteria Y every hour.  
One mole of Toxin Y kills 1% of Bacteria X every hour.  
5% of Toxin Y degrades every hour.

**Initial conditions: @ Time = 0 hours : Bacteria X = Bacteria Y = 10 moles, Toxin X = Toxin Y = 0 moles.**

Write a Python script that calculates concentrations of Bacteria X, Bacteria Y, Toxin X and Toxin Y in the flask every hour and report it as:

(e.g. Hour 5: x moles of Bacteria X, y moles of Bacteria Y, z moles of Toxin X, w moles of Toxin Y.)

The simulation should stop when the change in concentrations are less than 0.1% (steady state conditions) in an hour or when a maximum of 1000 iterations are done.