ENG 2079/5322: Computer programming class test

12th March 2021

Instructions:

- You are given 90mins to complete all questions.
- The test comprises of 3 questions each with 20 marks available for each (60 total).
- When finished, you must submit your complete Python notebook (.ipynb file) through the test submission page on Moodle, along with pasted solution in a word document.
- This is an **open book test** and therefore you are free to use lecture and lab notes.
- You **must not confer** with other students during the test. All exams will be thoroughly checked for plagiarism/cheating.

Good luck!

Question 1 (20 marks)
An engineer has performed various measurements on different materials with the values given as follows:

matA	[194.7, 215.2, 200.5, 197.3, 205.3]
matB	[65.5, 73.4, 71.2, 68.5, 75.8, 66.9]
matC	[23.4,34.5,45.6,27.5,56.5,45.5,47.9]
matD	[110.4, 103.5, 129.4, 115.4, 123.2, 110.2]

Create a dictionary from the above data which uses the material name as the key and the experimental data as the corresponding list. Write some code which loops over this dictionary and outputs the maximum this list in the format where XX below are the respective values

```
Specimen: matA
Max: XX

Specimen: matB
Max: XX

Specimen: matC
Max: XX
….
```

[5 marks]

Write some code which gives overall minimum for all the data

```
Specimen: all_specimens
Min: XX
```

[5 marks]

Write some code which creates a second dictionary that comprises of the same materials but has an additional specimen, for example, “matE”. You should write the logic to populate the values for this material in a loop until the user types the word “stop”.

[5 marks]

Finally, produce a bar chart of each material type and its mean reading. Label your axes accordingly.

[5 marks]

Question 2 (20 marks)
The following program contains errors, fix them:

```
x=int(input("Enter value for x"))
print("The square of x is" x*x)
y=input("Enter value for y")
print("The product of x and y is",x*y)
if x>y
      print("The difference is",x-y)
      else:
      print("The difference is",y-x)
```

[6 marks]

Using loops, write a program that takes as an input "n" from the user and draws the 'asteriks' pattern:

Those with the numeric digits of the student IDs add up to an even number will attempt:

For example, if n=4:

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

Those with the numeric digits of the student IDs add up to an odd number will attempt:

For example, if n=4:

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

[10 marks]

Write a function called `isHexaDecimalDigit`, which takes a string as an argument and returns `True` if its argument is a single-character string with a value that is used in hexadecimal numerals (i.e., in the range `'0'` to `'9'` or `'a'` to `'f'`) but returns `False` otherwise

[4 marks]

Question 3 (20 marks)

A file containing data about a collection of lecturers has the following content (data.csv).

```
Rob,23000,ENGG
Liz,36000,MVLS
Sven,45000,ENGG
Fred,11000,SOCIO
Anna,10000,SOCIO
```

Each line contains a first name, salary, and a department

Write a complete Python program that will input the contents of the file into a dictionary (name:[list])

```
{'Rob':[23000,'ENGG']; 'Liz':[36000,'MVLS']; 'Fred':[11000,'SOCIO'];
'Anna':[10000,'SOCIO'],'Sven':[45000,'ENGG']}
```

Hint: When reading a line from the file, you can use

```
for line in file:
     record=line.split(",")#i.e., splitting line into a list
     # record[0] contains name
     # record[1] contains salary
     # record[2] contains department
```

[7 marks]

Print the output of the dictionary on the screen such that the lecturers are **sorted** by salary (smallest first) in a neatly formatted (`.format()`) manner, i.e.,

```
Anna,10000,SOCIO
Fred,11000,SOCIO
Rob,23000,ENGG
Liz,36000,MVLS
Sven,45000,ENGG
```

[7 marks]

Print the total salary of each department. You should demonstrate this by having a mechanism to populate a list of all the departments, iterate through the list, have a variable to add the values, with the final output as (department names can be given in any order):

```
SOCIO,21000
ENGG,68000
MVLS,36000
```

[6 marks]