Introduction to Programming with Python

Weekly Programming Assignment – Week 12

All solution files must be submitted at CodeGrade/Assignment enabled Link for grading.
All solutions must be uploaded on or before 8th of December 2021 at 11:59 PM

Exercise 1

The three sets given below in the main program contain Ids of people that got covid-19 vaccines shot1, shot2, and influenza vaccines respectively. Write a procedure **excuteOption()** : which receives user option via main program as input and execute (i) to (iii) based on user input passed to it and terminates.

(i) Display Ids in decreasing order in list form that received all three vaccines [for option 1].

(ii) Display Ids that received shot1 of covid-19 but not shot2 of covid-19 and influenza and vice versa as list values in ascending order [for option 2].

(iii) Any other number then display message "**Bye**".

The main program with sample run is given below. Submit your subprogram with main program.

```
#main program
shot1 ={"e101","e112","e132","e104","e105","e116","e227","e128","e109"}
shot2 = {"e112","e132","e105","e116","e227","e109"}
influshot = {"e101","e132","e104","e126","e227","e148","e109","e345","e156"}
x = int(input("Enter the option:"))
excuteOption(x)

```

```
Shell
Python 3.7.9 (bundled)
>>> %Run Q4r.py
  Enter the option:1
  ['e227', 'e132', 'e109']
>>> %Run Q4r.py
  Enter the option:2
  ['e126', 'e128', 'e148', 'e156', 'e345']
>>> %Run Q4r.py
  Enter the option:3
  Bye
>>> %Run Q4r.py
  Enter the option:123
  Bye
>>>
```

Exercise 2

The new monitor measure levels of airborne fine Particulate Matter ($PM_{2.5}$) are shown as follows:

Air quality grade	24-hour PM2.5 average value (μ g/㎥)
Excellent	0<=PM2.5<=35
Good	35<PM2.5<=75
Light pollution	75<PM2.5<=115
Moderate pollution	115<PM2.5<=150
Severe pollution	150<PM2.5<=250
Most-severe pollution	250<PM2.5
Non numeric characters	"Input error."

Write a procedure **airQuality ()** that prompts the user to get 24-hour $PM_{2.5}$ average value, to print the air quality grade based on details given in the table above. If the user input nonnumeric characters, then use exception and print "**Input error"** The sample run with main program is here.

```
22 #mainprogram
23 airQuality()
```

```
Shell
Python 3.7.9 (bundled)
>>> %cd 'Z:\Python 2021_Fall\Fall 2021_CT60
>>> %Run Q2_W12.py

  Please input PM2.5 value:sdsdf
  Input error.

>>> %Run Q2_W12.py

  Please input PM2.5 value:120
  Air quality is: Moderate pollution.

>>> %Run Q2_W12.py

  Please input PM2.5 value:256
  Air quality is: Most-severe pollution.

>>> %Run Q2_W12.py

  Please input PM2.5 value:115
  Air quality is: Light pollution.
```

Exercise 3

Write a program that accepts candidate name, age, and height. Then write that information into a file "**candidate.txt**" until user wants to. However, custom exceptions must be used to display appropriate messages, if

i. Any of the user inputs is not correct (data type) – use Python's exception

ii. Height input should not be in between 0.00 and 168.00 cms – define custom exception (user defined)

iii. Should be in between 18 - 25 years old – define custom exception (user defined)

if any of the inputs is wrong then the user must prompt to enter all information again (may give different input as well). Finally, the contents of the file must be displayed. The sample run is here.

```
Your name:Ashok
Your height:166
Height must be at least 168.00:166.0
Your name:Kumar
Your height:170
Your age:17
Age must be between 18 and 25:17
Your name:Welcome
Your height:172
Your age:26
Age must be between 18 and 25:26
Your name:Wali
Your height:wer
could not convert string to float: 'wer'
Your name:Wali
Your height:169
Your age:erew123
invalid literal for int() with base 10: 'erew123'
Your name:Chen
Your height:180
Your age:24
do you want to continue y or n:y
Your name:Kris
Your height:173.0
Your age:20
do you want to continue y or n:n
Chen,180.0,24
Kris,173.0,20
```

Exercise 4 (Application)

Black Friday is on the way. It is time to send gifts to customers of the XYZ company. The table given below contains gift voucher based on customer purchase history.

Amount	Gift voucher
a. Above 2500	50% discount coupon for any item on Black Friday
b. 1500 – 2500	30% discount coupon for any item on Black Friday
c. less than 1500	15% discount coupon any item on Black Friday
d. Best customer of the year	The customer who spent money for purchase at XYZ gets 70% discount coupon for any item purchase + free souvenir pouch on Black Friday

The "**Customer.txt**" file contains customer details that includes customer id, name, no. of items bought so far, amount of purchase. Write the functions that execute the following when they are called.

(i) Write a function that find the best customer of the year [customer that with highest amount of total purchase] of XYZ and return with message described in the table.

(ii) Write a procedure that display customer details and Gift voucher info based on criteria listed in the table. But it should be noted, the best customer details must be derived from function (i).

Submit your code with main program. The sample run is here

```
28 #main program
29 print("The best customer of the year:",bestCustomer("Customer.txt"))
30 giftVoucher("Customer.txt")
```

```
Shell
Python 3.7.9 (bundled)
>>> %Run Q4_W12.py
 The best customer of the year: c143,Wali,24,4500.0

 ['c172', 'Chen', '7', '500.0\n'] 15%
 ['c145', 'Peter', '12', '2500.0\n'] 30%
 ['c106', 'Mikko', '3', '4300.0\n'] 50%
 ['c104', 'Xiang', '2', '50.0\n'] 15%
 ['c101', 'Eduward', '4', '745.0\n'] 15%
 ['c134', 'Anita', '16', '1830.0\n'] 30%
 ['c108', 'Meng', '6', '1450.0\n'] 15%
 ['c143', 'Wali', '24', '4500.0\n'] 70%  Souvenir pouch
 ['c112', 'Rahman', '11', '3250.0'] 50%
```

Exercise / task Number	Codegrade link_Moodle for file solution files upload	Points / Marks
1	Exercise1_Week 12	15
2	Exercise2_ Week 12	15
3	Exercise3_Week 12	20
4	Exercise 4_Week 12	20