Programming Exam 1

Date/Time: 2018.10.30 10:10 – 12:00

(程式檔**學號_quiz1.py**，程式碼複製到**學號_quiz1.docx** [寫上姓名系級學號]，上傳此 2 個檔案至 Moodle)

Please write a program that provides the following input and outputs:

(1) Allow the user to input a **integer** number x. (10%)
(2) Obtain the **reversed** string of x, whose integer value is denoted by y. (15%)
(3) Compute $\sqrt{(x+y)^2+(x-y)^2}$ to the 4th decimal places (小數點以下第 4 位) (15%)
(4) Compute the **product of all digits** in x. (15%)
(5) Sum up all **digits in** x (每位數字相加) with a particular printing. (15%)
(6) Generate the result of **odd digits minus even digits** in x, with a particular printing. (15%)
(7) Find the **most frequent digit** among all of the digits in x^{10}. (15%)

[B1] Do the **Prime Factorization** for x (質因數分解). (Bonus: 10%)
[B2] **Sort all digits in x in the descending order** (由大到小排序每個數字). (Bonus: 10%)
You **CAN NOT use** `list` and any sorting functions or packages for [B2].
Only things we teach in Lecture 1~4 (strings, if-elif-else, while loops) can be used for [B2].

Note: You are required to write comments (註解) for each part in your code.

Sample Input and Output (your code needs to generate the results **exactly the same** as below.

```
c:\Python37\workspace>python quiz1.py
Enter an integer number x: 36
Reversed: 63
Expression: 102.6158
Product: 18
Digit_Sum: 3 + 6 = 9
Odd-Even: 3 - 6 = -3
Frequent digit of x**10: 6
Factorization: 36 = 2 * 2 * 3 * 3
Sorted: 63
```

```
c:\Python37\workspace>python quiz1.py
Enter an integer number x: 9
Reversed: 9
Expression: 18.0000
Product: 9
Digit_Sum: 9 = 9
Odd-Even: 9
Frequent digit of x**10: 4
Factorization: 9 = 3 * 3
Sorted: 9
```

```
c:\Python37\workspace>python quiz1.py
Enter an integer number x: 192837465
Reversed: 564738291
Expression: 843937942.3029
Product: 362880
Digit_Sum: 1 + 9 + 2 + 8 + 3 + 7 + 4 + 6 + 5 = 45
Odd-Even: 12345 - 9876 = 2469
Frequent digit of x**10: 1
Factorization: 192837465 = 3 * 3 * 5 * 229 * 18713
Sorted: 987654321
```

```
c:\Python37\workspace>python quiz1.py
Enter an integer number x: 30991
Reversed: 19903
Expression: 52087.8391
Product: 0
Digit_Sum: 3 + 0 + 9 + 9 + 1 = 22
Odd-Even: 391 - 9 = 382
Frequent digit of x**10: 7
Factorization: 30991 = 17 * 1823
Sorted: 99310
```