Advanced Programming Homework 1

Basic FastAPI

Deadline: 1403/11/30

Notes:
- Please **upload (push)** your **source codes** and **reports** to your **GitHub** Account as a **repository** and share it **publicly**.
- Any submission after the deadline is not considered and you will not get any credit.

۱-برای هر کدام از تمرینات زیر، با استفاده از FastAPI **یک** API **ایجاد کنید**. برای هر تمرین **یک یا چند ورودی انتخاب کنید** و **از ۳ روش** query parameter و path parameter و body ورودی را برای API **ارسال کرده و پاسخ** API **را نمایش دهید.**

Good Luck
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My_WebPage

1- Write a program to get a number and print all its **even digits** separated by *.
Input: 822145635
Output: 6*4*2*2*8

2- Write a program to compute the following expression for **500 sentences**:
$$\frac{3!}{2+9} - \frac{5!}{3+7} + \frac{7!}{4+5} - \frac{9!}{5+3} + \frac{11!}{6+1} - \frac{13!}{7-1} \dots$$

3- Write a program to **print all 4 digits numbers** (between 1000 and 9999) that the **sum** of the **first** and **second** digits is equal with the **product** of the **third** and **forth** digits.
3466: $6 + 6 = 3 \times 4$
Output: 1110, 1101, …, 2999 , … , 3466 , ….

4- Write a program to print **all 3 digits numbers** (between a 100 and 999) that does **not** have **odd** digits. Consider 0 as even digit.
Output: 200, 202,204, 206,208,**220**,222,…

5- Write a program to get **n** from user and print the following pattern:
Input: n=8
Output:

```
1
2  4
3  6  9
4  8  12  16
5  10  15  20  25
6  12  18  24  30  36
7  14  21  28  35  42  49
8  16  24  32  40  48  56  64
```

6- Write a program to get **n** and then **n numbers** from user and compute **maximum**, **minimum**, **average** and **standard deviation**. Test your program for **5 different inputs**.

Input	Enter the n: 5 Enter number 1: 12 Enter number 2: 15 Enter number 3: 9 Enter number 4: 11 Enter number 5: 84
Output	Maximum is: 84 Minimum is: 9 Average is: 26.2 Standard Deviation is : 29.06

7- Write 4 functions for question 6. Get **5 numbers** from user in main. Send numbers for Max1, Min1, Ave1 and STD1 functions. Max1 gives n numbers and return maximum. Min1 gives n number and return minimum. Ave1 and STD1 give n number and print average and standard deviation in their own body and do not return any value. Test your program for 5 different inputs.
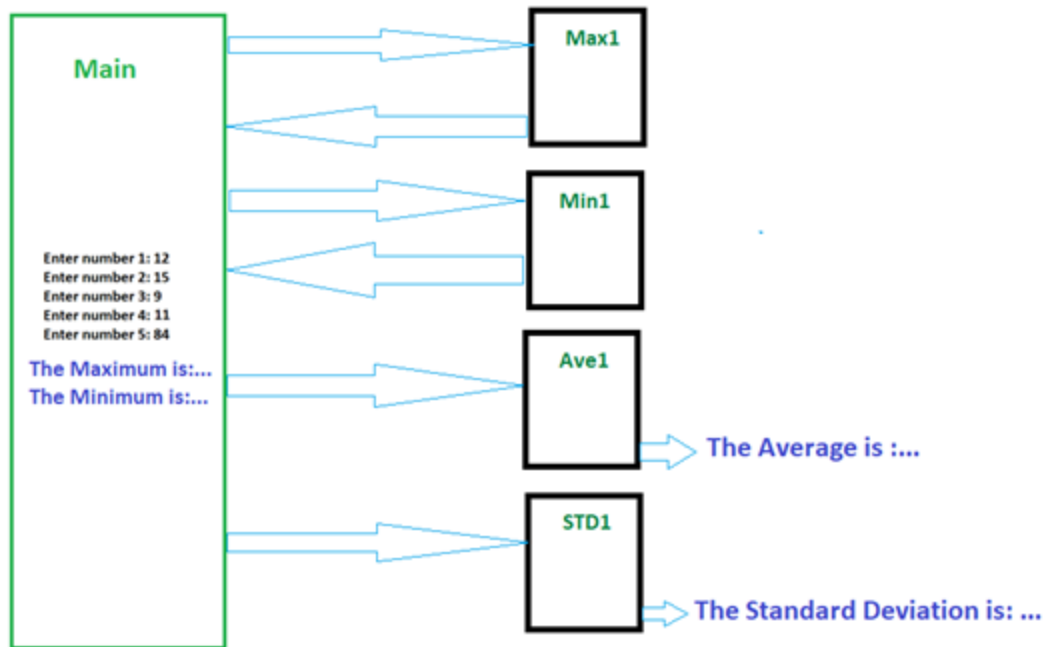
8- Give a number with 5 digits in main. If the number is not a 5 digits number, ask **repeatedly** from user to enter a valid number. Send the number for F1 function to find and return the maximum digit of the number. In the next step, send the maximum digit and the input number for F2 function to delete the maximum digit from number and return it. Finally, print the final output in main as shown in figure below.
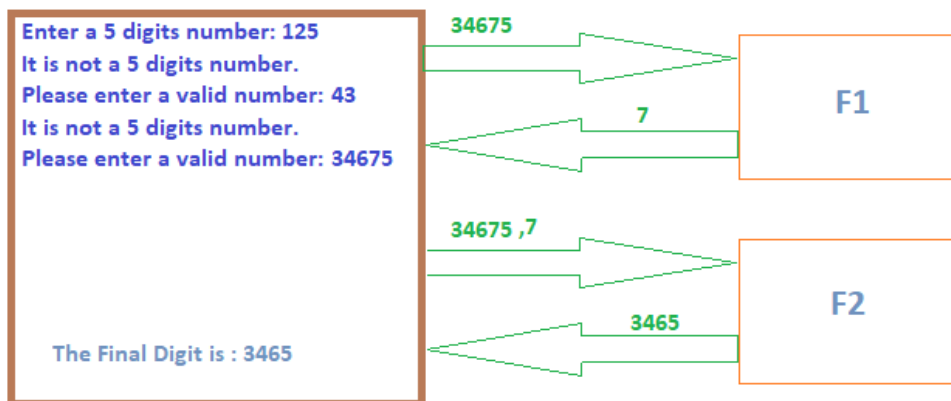
9-**Global** and **Local** variables: Run codes P1, P2, P3 and P4 and report outputs. Explain reasons for their outputs in details.

P1

```python
def f():
    # local variable
    s = "I live in Khorramabad"
    print(s)

# Main
f()
```

P2

```python
def f():

    # local variable
    s = "I live in Khorramabad"
    print("Inside Function:", s)

# Main
f()
print(s)
```

P3

```python
def f():
    global s
    s ='I live in Khorramabad.'
    print(s)

# Main: Global Scope
s = 'I live in Iran.'
f()
print(s)
```

P4

```python
# This function uses global variable s
def f():
    s="I live in Khorramabad"
    print(s)

# Main
s = "I live in Iran"
f()
print(s)
```

10-Study about **Recursive Functions** in python. Explain in details that how does the following recursive function work?

```python
def factorial(x):
    if x == 1: # This is the base case
        return 1

    else: # This is the recursive case
        return(x * factorial(x-1))

print(factorial(4))
```

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