**第六周任务**

**基本语法练习: 数据结构、递归函数**

1. 熟练掌握Python基础数据结构
2. 熟练掌握List、Tuple、Dict、String、Set的内置函数
3. 熟练掌握阅读python官方文档
4. 使用以上数据结构编写程序
5. 给定一个数组，含有若干个数字，这些数字可能有重复的。请设计一个函数能够删除数组中的重复数字，并且降序输出剩下的不重复数字。例如，一个数组 l = [3, 2, 1, 4, 2, 3, 5]，输出结果，[5, 4, 3, 2, 1]

Hint: set()? list()?

1. 请用两种方法逆序一个字符串。例如，s = 'hello, world', result: 'dlrow ,olleh'。

查看：reversed()

1. 给定一个 正整数，将整数中的数字进行反转；

给定一个 负整数，将整数中的数字进行反转。

示例 1:

输入: 123

输出: 321

示例 2:

输入: -123

输出: -321

示例 3:

输入: 120

输出: 21

1. 请实现以下功能：

（1） 从键盘读入两个lists

（2） 写出一个函数，该函数的返回值为两个lists的交集，如果没有交集，则返回False并打印出“no intersection”

提示：split() 与 set

1. Write a program that accepts sequence of lines as input and prints the lines after making all characters in the sentence capitalized.

Suppose the following input is supplied to the program:

Hello world

Practice makes perfect

Then, the output should be:

HELLO WORLD

PRACTICE MAKES PERFECT

Hints:

In case of input data being supplied to the question, it should be assumed to be a console input.

1. Please write a function which accepts a string from console and print it in reverse order.

Example:

If the following string is given as input to the program:

rise to vote sir

Then, the output of the program should be:

ris etov ot esir

Hints:

Use list[::-1] to iterate a list in a reverse order.

1. Define a function that can accept two strings as input and print the string with maximum length in console. If two strings have the same length, then the function should print all strings line by line.
2. Inverse a string
3. Given two sored list a, b, merge them into a new sorted list c.
4. Write a Python program to guess a number between 1 to n.
5. Write a Python program to construct the following pattern, using a nested for loop.

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\* \*   
\* \* \*   
\* \* \* \*   
\* \* \* \* \*   
\* \* \* \*   
\* \* \*   
\* \*   
\*

1. Write a Python program to count the number of even and odd numbers from a series of numbers.
2. Print the following pattern

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

1. Print the following pattern using for loop

5 4 3 2 1

4 3 2 1

3 2 1

2 1

1

1. Reverse a given integer number
2. Given a number count the total number of digits in a number
3. Find the sum of the series 2 +22 + 222 + 2222 + .. n terms
4. Write a Python program to check the validity of password input by users.

Validation :

1. At least 1 letter between [a-z] and 1 letter between [A-Z].
2. At least 1 number between [0-9].
3. At least 1 character from [$#@].
4. Minimum length 6 characters.
5. Maximum length 16 characters.
6. Write a Python program to find numbers between 100 and 400 (both included) where each digit of a number is an even number.
7. Write a Python program to check whether an alphabet is a vowel or consonant.
8. Write a Python program to convert month name to a number of days.
9. Write a Python program to check a string represent an integer or not.
10. Write a Python program to check a triangle is equilateral, isosceles or scalene.
11. Write a Python program that reads two integers representing a month and day and prints the season for that month and day.
12. Write a Python program to display astrological sign for given date of birth.
13. Write a Python program to display the sign of the Chinese Zodiac for given year in which you were born.
14. Write a Python program to get next day of a given date.

Input a year: 2016

Input a month [1-12]: 08

Input a day [1-31]: 23

The next date is [yyyy-mm-dd] 2016-8-24

1. Write a Python program to create the multiplication table (from 1 to 10) of a number.

**Do not use recursion**

递归虽然用起来很方便，但是效率一般会比循环低。

1. Write a Python program to calculate the sum of a list of numbers
2. Write a Python program to converting an integer to a string in any base (进制).
3. Write a Python program of recursion list sum.

Test Data: [1, 2, [3,4], [5,6]]

Expected Result: 21

1. Write a Python program to get the factorial of a non-negative integer.
2. Write a Python program to get the sum of digitals of a non-negative integer.

Test Data:

sumDigits(345) -> 12

sumDigits(45) -> 9

1. Write a Python program to calculate the geometric sum of n items.   
    Example :
2. Write a Python program to calculate the value of 'a' to the power 'b’.

Test Data :  power(3,4) -> 81

1. Fibonacci sequence Fib(n)
2. Greatest common divisor gcd(a, b)
3. Binary search: Given a sorted list lst, find whether x in list?

Links:

各个语法特性的练习题，根据需要自己练习

1. **https://www.w3resource.com/python-exercises/**python-conditional-statements-and-loop-exercises.php
2. https://pynative.com/python-if-else-and-for-loop-exercise-with-solutions/
3. https://erlerobotics.gitbooks.io/erle-robotics-learning-python-gitbook-free/content/loops/exercises\_loops.html
4. https://holypython.com/intermediate-python-exercises/exercise-8-python-for-loop/