HW5

36-650 – Statistical Computing

Deadline: October 24th, 11:59PM EST

- You must submit your HW solution as series of python files and screenshots showing the results for running your code.
- Your GitHub repository should contain a folder named HW-5. Inside this folder, there should be a folder for each question.
- On GitHub, check-in the answer for each question in a separate python file in the corresponding folder.
- Each python file may include one or more python functions. Each function SHOULD NOT exceed 15 lines of code (excluding comments).
- For each question, submit a screenshot for the result of running your code.
- Make sure your GitHub repository is publicly viewable.
- On Canvas, only submit a URL to your GitHub repository.
- Plan to get the needed assistance from instructor or TA by Friday. Expect no assistance over the weekend.
- Not following the submission guidelines may result in grading penalties.

Question 1 (10 points)

Write a python function to transpose a matrix. Your function should accept the matrix as input and output the transposed matrix.

Example Input:

```
X = [[10,8],
    [2 ,4],
    [1 ,7]]
```

Output

```
[10, 2, 1]
[8, 4, 7]
```

Question 2 (10 points)

Write a python function to remove punctations from string attributes. Use for loop only and don't use out-of-the box functions to remove the punctations. Your function should accept an input string and output another string without punctations. Use the following variable to define all possible punctations:

```
punctuations = '''!()-[]{};:'"\,<>./?@#$%^&*_~'''
```

Example:

Input: Hello in 36-650**, &** other MSP courses**.**

Output: Hello in 36650 other MSP courses

Question 3 (10 points)

One Away: There are three types of edits that can be performed on strings: insert a character, remove a character, or replace a character. Given two strings, write a function to check if they are one edit (or zero edits) away.

Examples:

Input: pale, ple **Output:** true

Input: pales, pale **Output:** true

Input: pale, bale **Output:** true

Input: pale, bake **Output:** false

Question 4 (10 points)

Write python function that prints triangles in the following form on the screen. Your function should accept the number of rows to be printed from the triangle on the screen. Hint: you may find “while” loops useful in solving this problem.

Example Input: 3

Example Output:

```
1
2  3
4  5  6
```

Example Input: 6

Example Output:

```
1
2  3
4  5  6
7  8  9  10
11  12  13  14  15
16  17  18  19  20  21
```

Your function should print “Invalid Input” if you input negative numbers or decimal numbers.

Question 5 (10 points)

Write python function to print the following pyramid. Your python function should accept the number of rows that will be printed on the screen. Below is an example for the function with input as 5.

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

Question 6 (10 points)

Develop Python function that creates employees table in your Postgres database.

Your employee table should have three columns (id: serial, fname: varchar(10), lname: varchar (10))

Question 7 (10 points)

Develop Python function that populates the employees table in your Postgres database with 500 dummy records. Your code/script should create the dummy data and not import them from external files.

Question 8 (10 points)

Develop Python function that displays 10 records from your employees table. You don't need to specify an order for displaying the data.

Question 9 (10 points)

A string is said to be palindrome if it reads the same backward as forward. For e.g. "Kayak" is a palindrome because if we try to read it from backward, it is same as forward. One approach to check if a string is palindrome is to iterate through the string till middle of string and compare a character from back and forth.

Use **recursion** to develop a python function (or functions) that checks if a string is palindrome. The main function should accept a string and returns true/false. You may assume all strings have lower-case letters.

Example Input: kayak Output: true

Example Input: hello Output: false

Common Penalties:

- Your GitHub repository is not public: 100% reduction (won't be graded)
- Late submissions on Canvas or GitHub: 100% reduction (won't be graded)