Python Assignment

Assignment 1

1. Write a program to swap two variables. Example: x = 3, y = 5 ==> y = 3 , x = 5.
2. Write a program to check if a number is odd or even.
3. Write a program to find the square root of a number.
4. Write a program to print all the natural numbers from 1 to n (user input). Then print the same in reverse order.
5. Write a program which prints volume of a sphere, given the radius. (use pi = 3.14).
6. Print all odd numbers and even numbers between 1 to 100.
7. Write a program to compute roots of a quadratic equation when coefficients a, b and c are known (entered by the user).
8. Count the number of digits in a number. Example: 5342 has 4 digits.
9. Write a program to check if a number is prime or not. Example: 7 ==> True, 6 ==> False
10. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n such that only multiples of three or five are considered in the sum, e.g. 3, 5, 6, 9, 10, 12, 15 for n=17.
11. Write a program that asks the user for a number n and gives them the possibility to choose between computing the sum and computing the product of 1,...,n.
12. Find the sum of all the multiples of 3 or 5 below 1000.
13. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included).
14. Find the difference between the sum of the squares of the first one hundred natural numbers and the square of the sum.
15. Write a program which repeatedly reads numbers until the user enters "stop". Once "stop" is entered, print out the total, count, and average of the numbers. If the user enters anything other than a number then also stop.
16. Write a program that prints *all* prime numbers till n. (n is the user input).
17. Write a program which can compute the factorial of a given number.
18. Write a program for printing fibonacci series till n.
19. Write a program to find the LCM of two numbers.
20. Write a program to find factors of a number.
21. Write a program to print the following pattern.

```
1)
```

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

2)
*******
******
*****
****
***
**
*

3)

1
2 2
3 3 3
4 4 4 4
5 5 5 5 5

4)
    *
   * *
  * * *
* * * *

5)
```

```
1
2 3
4 5 6
7 8 9 10

6)

A
B C
D E F
G H I J K
```

22. Write a program that computes the value of a+aa+aaa+aaaa with a given digit as the value of a. Suppose the following input is supplied to the program: 9, Then, the output should be: 9 + 99 + 999 + 9999 = 11106.

Assignment 2

1. Find the length of a string using loops (not len()).
2. Write a program that accepts two strings and outputs the concatenation of them. Example: ‘hello’ , ‘world’ ==> ‘helloworld’
3. Write a program that accepts a sentence (string) and calculate the number of letters and digits. Example: ‘this is a test sentence number 389’ ==> letters = 25 and digits = 3.
4. Write a program that accepts a string and outputs the string with all capital letters.
   Example: ‘hello’ ==> ‘HELLO’
5. Write a program that accepts a sentence and calculate the number of upper case letters and lower case letters.
6. Swap cases in a string using loops.
7. Write a program that counts the occurrence of a character in a string. Example: ‘This is a test string.’ count of i = 3.
8. Write a program to find if a given string is a pallindrome or not.
9. Write a program to that accepts a string s, an index number n and a character ‘c’. And outputs the string replaced with the character at the index number n.

Example- ‘hello’ , 0 , ‘j’ ==> ‘jello’

10. Output the integer number indicating the total number of occurrences of the substring in the original string.
11. Check if there are K consecutive 1’s in a binary number. Example: ’10010011101111001011 1’

```
k = 3 output: True
k = 5 output: False
```

12. Reverse a string.
13. Find the only one non repeated number in a string (rest all have pairs). Example: ‘abcccdbfhdifih’ => has only 1 non pair c.
14. Write a program which accepts two strings s1 and s2 and checks if s2 is a substring of s1.
15. Make a password validator with the following checks. A website requires the users to input username and password to register. Write a program to check the validity of password input by users.
    Following are the criteria for checking the password:
    1. At least 1 letter between [a-z]
    2. At least 1 number between [0-9]
    3. At least 1 letter between [A-Z]
    4. At least 1 character from [$#@]
    5. Minimum length of transaction password: 6
    6. Maximum length of transaction password: 12

    Your program should accept a sequence of comma separated passwords and will check them according to the above criteria. Passwords that match the criteria are to be printed, each separated by a comma.
    Example
    If the following passwords are given as input to the program:
    ABd1234@1,a F1#,2w3E*,2We3345
    Then, the output of the program should be:
    ABd1234@1

Assignment 3

1. Write a function that accepts two positional arguments (x and y) and returns x raised to power y.
2. Write a function that accepts two strings and returns the concatenation of the two. Also if no argument is there in the call, return the concatenation of ‘Hello’ and ‘world’.

3. Write a function which returns a bool, indicating if the input number is even or not.
4. Write function which returns a bool, indicating if the input number is a prime or not.
5. Write function which returns a bool, indicating if the input is a pallindrome or not. Example: ‘abba’ ==> True , ‘fkdjskj’ ==> False , 12345 ==> False , 1221 ==> True.
6. Write a program that takes input a string and find the number of words in the string.
7. Write a program to find the largest of the three given numbers n,m,l. Example - input 4,9,2 →9.
8. Write a program which prints first N1 terms of the series 3n + 2 which are not multiples of N2. The program takes input N1 and N2. Example: if N1 = 10 and N2 = 4 ==>

```
output:
5
11
14
17
23
26
29
35
38
41
```

9. Write a program that reverses a number n (take n as input from user).
10. Write a program to find largest number of three. Example 1 , 45, 9 ==> 45.
11. Write a program to replace all the zeros in the number by 5. Example: input = 102920083, output ==> 152925583.
12. Write a program to generate multiplication table for a number.
13. Write a program to find sum of all the digits of a number. (take input from user). Example: n = 1845 ==> 18 , 1000 ==> 1. sum(map(lambda x: int(x) , list(map(lambda x: x+ ' ' , '1856'))))
14. Write a program to remove all the puctuations ('!()-[]{};:'"\,<>./?@#$%^&*_~') from the input sentence.

15. Write a program to reverse the input number n. Example - input → 4321 → 1234. int(''.join(list(reversed('1234'))))
16. Write a program to print the following pattern.

```
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
|         |         |
+ - - - - + - - - - +
|         |         |
|         |         |
|         |         |
|         |         |
+ - - - - + - - - - +
```

Assignment 4

1. Write a program to print a list in reverse order without creating a new list.
2. Write a program that takes input n and searches the number from the list. print the index of the input number n.
3. Write a program that takes input n and another number k (input from user) and insert it at a particular index k(input from user.).
4. Write a program that input n numbers and reverse the set of numbers.
5. 2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder. What is the smallest positive number that is evenly divisible by all of the numbers from 1 to 20?
6. Given the participants' score sheet for your University Sports Day, you are required to find the runner-up score. You are given n scores. Store them in a list and find the score of the runner-up.
7. Given a list of numbers containing pairs of numbers only one number does not form a pair. Find that number. Example: [1,1,2,2,4,5,4,7,7] => 5.
8. Given a list of integers, find and print the maximum number of integers you can select from the list such that the absolute difference between any two of the chosen integers is less than or equal to 1.

Example => if your list is [1,1,2,2,4,4,5,5,5] , you can create two sublists meeting the criterion: [1,1,2,2] and [4,4,5,5,5] . The maximum length sublist has 5 elements.

9. Write a program that inputs a list of numbers and returns square of each of the element.
10. Write a program that inputs a list of numbers and returns a list which has all the elements greater than the square of the smallest number in the list.
11. Write a program that takes input a list and finds the max and min numbers in the list.
12. Write a program which can returns even numbers in a list. (use filter function).
13. Write a program which can returns in a list all the elements which are square of an even number.
14. Write a program which returns a list where the values are square of numbers between 1 and 20 (both included). And prints all values except the first 5 elements in the list.

Assignment 5:

1. Implement your own coordinate system. Support methods like distance between two coordinates , distance from origin.
2. Make a class named shape which has a method area, implement different shapes like circle, square with a method area.
3. Implement a class stack and support the methods pop, push and top.
4. Implement a class Queue and support the methods enque , deque and show.
5. Write a program to generate a random string of input length n.
6. Write a program to make a dictionary where the keys are numbers between 1 and 10 (both included) and the values are square of keys. Example: {1:1 , 2:4 , 3:9}
7. Write a program which can filter even numbers in a list by using filter function.
8. Write a program which can find in a list all the elements which are square of an even number.
9. Write up a module of area of different 2d, 3d surfaces like circle, square, rectangle, cube, cuboid, cylinder, sphere. Make it commandline executable.
10. Write a program that generates a random alphanumeric string of given input length n.
11. Make a command line interface program for an unbiased coin simulator.
12. Make a biased coin simulator with 60% head and 40% tails. (Use random module)
13. Write a python script that counts the number of image files in a directory. Take directory name as an input and print the count.

14. Write a program that takes text file as an input and count the number of words in the file.
15. Write a program that truncates a file and then writes a custom message entered by a user to a text file.
16. Write a program to make a class for the real world entitity car. Assume some data attributes and methods to model a car.
17. Construct a class Student with attributes name, age, rollnumber and methods getters and setters for all the attributes. Create a list of 10 students and then compute the average age of students in the batch.
18. Implement a class called Animal with some data attributes and method . Make a class of dog and a class of cat which inherits from the class animal.
19. Implement multi-level inheritance.
20. Implement method overloading.
21. Implement inheritance and use super to access parent class's methods which are overloaded.
22. Implement operator overloading of operator (-) on the coordinate class.
23. Write a regex for a ten digit mobile number starting with 7,8,9.
24. Write a program to make a password validator as in question 11. (use regex)
25. Write a program that checks if the input is a valid email id or not. Example: A valid email will be of the form **(x@y.com)** where x and y are any alpha numeric.

Input : abc@gmail.com → True
343fsd@hfjdsh.com → True
284738@hfdhfl.com → True
438749@34729.com → True
jdksj@jksdfj.jfsk → False
kfjdsk@nfjsdn → False