**Python Practice**

**Basics**

1. What is an expression?
2. What is a syntax error?
3. What is PEP8?
4. What does a linter do?
5. What is the result of this expression: “\*” \* 10

**Primitive Types**

1. What is a variable?
2. What are the primitive built-in types in Python?
3. When should we use “”” (tripe quotes) to define strings?
4. Assuming (name = “John Smith”), what does name[1] return?
5. What about name[-2]?
6. What about name[1:-1]?
7. How to get the length of name?
8. What are the escape sequences in Python?
9. What is the result of f**“{2+2}+{10%3}”**?
10. Given (name = “john smith”), what will **name.title()** return?
11. What does name.**strip()** do?
12. What will **name.find(“Smith”)**return?
13. What will be the value of **name** after we call name.**replace(“j”, “k”)**?
14. How can we check to see if **name** contains **“John”**?
15. What are the 3 types of numbers in Python?

**Control Flow**

1. What is the difference between **10 / 4** and **10 // 4**?
2. What is the result of 10 \*\* 4?
3. Given (**x = 2**), what will be the value of after we run (**x += 2**)?
4. How can we round a number?
5. What is the result of **float(2)**?
6. What is the result of **bool(“False”)**?
7. What are the falsy values in Python?
8. What is the result of **10 == “10”**?
9. What is the result of **“bag” > “apple”**?
10. What is the result of **not(True or False)**?
11. Under what circumstances does the expression **19 <= age < 75**evaluate to True**?**
12. What does **range(1, 20, 2)** return?
13. Name 3 iterable objects in Python.

**Functions**

1. What is the difference between a parameter and an argument?
2. All functions in Python by default return …?
3. What are keyword arguments and when should we use them?
4. How can we make a parameter of a function optional?
5. What happens when we prefix a parameter with an asterisk (\*)?
6. What about two asterisks (\*\*)?
7. What is scope?
8. What is the difference between local and global variables?
9. Why is using the **global** statement a bad practice?

**Coding Exercises**

1. Write a function that returns the maximum of two numbers.
2. Write a python program to add ‘ing’ at the end of a given string (length should be at least 3). If the given string already ends with ‘ing’ then add ‘ly’ instead. If the string length of given string is less than 3, leave it unchanged.
3. A card printing industry was not able to meet the time constraints of printing the cards as the users do not clearly mention the case of alphabets in the content to be printed on the card. To meet this constraint write a python script that takes input from the user, and appropriately use upper and lower case alphabets and display the content to facilitate the printing.
4. Write a python program that accepts students names separated with comma as an input and prints the names in sorted form (alphanumerically).
5. Write a python program to convert list to list of dictionaries.
6. Read a data from the file and save it in array A. Compute the mean M1 of first A[0]- A[4] elements. M2 is the mean of A[1]- A[5], M3 is the mean of A[2]- A[6] and so on. Find max(M1, M2, M3……Mn). If the number of elements in the input file is less than 5, calculate the mean of all elements. Write a Python program to find the mean of .
7. Write a function called **fizz\_buzz**that takes a number.
   1. If the number is divisible by 7, it should return “Fizz”.
   2. If it is divisible by 9, it should return “Buzz”.
   3. If it is divisible by both 7 and 9, it should return “FizzBuzz”.
   4. Otherwise, it should return the same number.
8. Write a function for checking the speed of drivers. This function should have one parameter: speed.
   1. If speed is less than 60, it should print “Ok”.
   2. Otherwise, for every 5km above the speed limit (60), it should give the driver one demerit point and print the total number of demerit points. For example, if the speed is 80, it should print: “Points: 4”.
   3. If the driver gets more than 12 points, the function should print: “License suspended”
9. Write a function called **showNumbers**that takes a parameter called **limit.**It should print all the numbers between 0 and limit (limit should be greater than 6 with a label to identify the square numbers. For example, if the limit is 7, it should print:
   1. 0 NA
   2. 1 Sq No
   3. 2 NOT a Sq No
   4. 3 NOT a Sq No
   5. 4 Sq No
   6. 5 NOT a Sq No
   7. 6 NOT a Sq No
   8. 7 NOT a Sq No
10. Write a function that returns the sum of multiples of 3 and 5 between 0 and **limit** (parameter). For example, if limit is 20, it should return the sum of 3, 5, 6, 9, 10, 12, 15, 18, 20.
11. Write a function called **show\_stars(rows).**If **rows** is 5, it should print the following:
    1. \*
    2. \*\*
    3. \*\*\*
    4. \*\*\*\*
    5. \*\*\*\*\*
12. Write a function that prints all the prime numbers between 0 and **limit**where limit is a parameter
13. What is the output of the following code?

age = 38

if (age >= 11):

print ("You are eligible to see the Football match.")

if (age <= 20 or age >= 60):

print("Ticket price is $12")

else:

print("Tic kit price is $20")

else:

print ("You're not eligible to buy a ticket.")

1. What is the output of the following piece of code?

n =150

print(n)

#if n is greater than 500, n is multiplied by 7, otherwise n is divided by 7

result= n \*7if n >500else n /7

print(result)

1. Write program to read 2X2 matrix and find its covariance matrix. Eigen values and Eigen vectors of covariance matrix. Discuss what do you mean by eigen values and covariance matrix
2. Design a simple calculator to perform addition, subtraction, multiplication and division.
3. Perform following matrix operations:
   1. Writing a data into given size matrix
   2. Reading a matrix to either row vector or column vector
   3. Addition, subtraction, multiplication of matrices
   4. Find the rank of a given matrix
4. Perform data Analysis which includes:
   1. Read a data from a .xls file
   2. Write a date into a .xls file
   3. Plot a data from the file using different styles
   4. Compute Mean, median, standard deviation of a row and column separately
5. Use Bisection Method to find roots of a given function f(x)
6. The Bisection Method is a successive approximation method that narrows down an interval that contains a root of the function f(x).
7. Use Cramer’s rule to solve minimum 3 linear equations
8. Cramer's rule is an explicit formula for the solution of a system of linear equations with as many equations as unknowns, valid whenever the system has a unique solution.
9. Write a code to check whether a given number is prime or not,

If not prime, whether it is divisible by 3,7,9,11?

24. Write a [Python program to check if a number is positive or negative](https://beginnersbook.com/2018/01/python-program-check-positive-negative-zero/)

25. Write a python program to check leap year

26. Write a Python Program to Read a Number n And Print the Series "1+2+…..+n= "

# 27. Write a Program to Compute a Polynomial Equation given that the Coefficients of the Polynomial are stored in a List

28. Write a Python Program to Compute the Value of Euler's Number e. Use the Formula:

e = 1 + 1/1! + 1/2! + …… 1/n!

29. Write a Python Program to Convert Binary to Gray Code

30. Write a Python Program to Read a List of Words and Return the Length of the Longest One

31. Write a Python Program to detect if Two Strings are Anagrams

32. Write a Python Program to Generate a Dictionary that Contains Numbers (between 1 and n) in the Form (x,x\*x).

33. Write a Python Program to Count the Frequency of Words Appearing in a String Using a Dictionary

34. Write a Python Program to Count the Number of Words in a Text File

35. Write a Python Program that Reads a Text File and Counts the Number of Times a Certain Letter Appears in the Text File

36. Write a Python Program to Implement Stack using One Queue

37. Write a Python Program to Check String is Palindrome using Stack

38. Write Notes on the following points

* What Is a Python NumPy Array?
* NumPy Arrays v/s List
* NumPy Operations
* NumPy Special Functions

39. Write a python program for Matrix Multiplication Using Nested List Comprehension and using Using Nested Loop

40. Write a python program to find the H.C.F of two input number using loops

41. Answer the following

* What is SCipy?
* Difference between Scipy and Numpy?
* Why use SciPy

42. Write a python program to read a image and flip it using scipy library

43. Perform single integration using Scipy library