Programming Exercises:

1. Write a program to swap two numbers using bitwise operators.
2. Write a program to reverse a given number.
3. Write a program to print odd numbers within a given range.
4. Write a program to compute the prime factors of an integer.
5. Write a program to find the smallest divisor of a given number.
6. Write a program to count the number of digits in a number.
7. Write a program to calculate the sum and product of the digits in an integer.
8. Write a program to calculate the sum of the digits of a random four-digit number.
9. Write a program to check whether the given number is a palindrome number.
10. Write a program to find factorial of the given number.
11. Write a program to generate the Fibonacci series up to a given terms.
12. Write a program to randomly print an integer number between 7 and 15 inclusive.
13. Write a program to check whether a given year is a leap year.
14. Write a program to check whether a given number is an Armstrong number.
15. Write a program to find the sum of the series 1,1/2, 1/3, 1/4, . .., 1/n.
16. Write a program to print the Pascal's triangle for n number of rows given by user.
17. Write a program to find out identity and type of a variables a and b where a=10.5 and b=a.
18. Write a program to print the following pattern

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

19. Write a program to print the following pattern

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

20. Write a program to print the following pattern

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

21. Write a program to print the following pattern

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

22. Write a program to print the following pattern

```
      1
    1 2 1
  1 2 3 2 1
1 2 3 4 3 2 1
```

23. Write a program which accepts the radius of a circle from the user and compute the area.
24. Write a program that will accept the base and height of a triangle and compute the area.
25. Write a program to find the volume of a sphere.
26. Write a program to print prime numbers within a given range.
27. Write a program to sum of the first n positive integers.
28. Write a program to sort three integers without using conditional statements and loops.
29. Write a program to add two numbers using anonymous function.
30. Write a program to display power of 2 using anonymous function.
31. Write a program to find the biggest number from two numbers using anonymous function.
32. Write a program to divide a number by another number using anonymous function with ZeroDivisionError exception appropriately.
33. Write a program to input three integer numbers (>0) from keyboard separated by comma in a single input statement. Then find the sum, average of these

three numbers. Program should have proper exceptions handlers like ValueError.

34. Write a program to find out length of a string without using built-in function.
35. Write a program which accepts the user's first and last name and print them in reverse order with a space between them.
36. Write a program which accepts a sequence of comma-separated numbers from user and generate a list and a tuple with those numbers.
37. Write a program to get a new string from a given string where "Is" has been added to the front. If the given string already begins with "Is" then return the string unchanged.
38. Write a program to concatenate all elements in a list into a string and return it.
39. Write a program to get the command-line arguments (name of the script, the number of arguments, arguments) passed to a script.
40. Write a program to test whether all numbers of a list is greater than a certain number.
41. Write a program to remove the first and last item from a specified list.
42. Write a program to input a number, if it is not a number generate an error message.
43. Write a program to find intersection of two lists.
44. Write a program to find union of two lists.
45. Write a program to convert an integer to binary keep leading zeros.
46. Write a program to convert decimal to hexadecimal.
47. Write a program to find the maximum and minimum numbers from a sequence of numbers.
48. Write a program to find a distinct pair of numbers whose product is odd from a sequence of integer values.
49. Write a program to define a function that takes a positive integer and returns the sum of the cube of all the positive integers smaller than the specified number.
50. Write a program to sort a list of numbers in ascending order using insertion sort.
51. Write a program to sort a list of numbers in ascending order using selection sort.
52. Write a program to sort a list of numbers in ascending order using bubble sort.
53. Write a program to sort a list of numbers in ascending order using merge sort.

54. Write a program to sort a list of numbers in ascending order using quick sort.
55. Write a program to sort a list of numbers in ascending order using randomized quick sort.
56. Write a program to display Fibonacci sequence using recursion.
57. Write a program to find sum of natural numbers using recursion.
58. Write a program to reverse a string using recursion.
59. Write a program to find factorial of number using recursion.
60. Write a program to convert Decimal to Binary using recursion.
61. Write a program to create and print an identity matrix.
62. Write a program to add diagonal elements of a given matrix.
63. Write a program to print upper diagonal of a given matrix.
64. Write a program to print lower diagonal of a given matrix.
65. Write a program to transpose a given matrix.
66. Write a program to count the number of each vowel in a sentence.
67. 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). The numbers obtained should be printed in a comma-separated sequence on a single line.
68. Write a program to generate and print a dictionary that contains (i, i*i) such that i is an integral number between 1 and n (both included) with a given integral number n.
69. Write a program which accepts a sequence of comma separated 4 digit binary numbers as its input and then check whether they are divisible by 5 or not. The numbers that are divisible by 5 are to be printed in a comma separated sequence.
70. Write a program that accepts a comma separated sequence of words as input and prints the words in a comma-separated sequence after sorting them alphabetically.
71. Write a program, which will find all such numbers between 1000 and 3000 (both included) such that each digit of the number is an even number.
72. Write a program to solve a classic ancient Chinese puzzle: We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?
73. Write a program to define a class Person and its two child classes: Male and Female. All classes have a method "getGender" which can print "Male" for Male class and "Female" for Female class.

74. With a given list [12,24,35,24,88,120,155,88,120,155], write a program to print this list after removing all duplicate values with original order reserved.
75. Write a program generate a 3*5*8 3D array whose each element is 0 by using list comprehension.
76. Write a program to output a random number, which is divisible by 5 and 7, between 0 and 10 inclusive using random module and list comprehension.
77. Write a sequential search function which searches an item in a list. The function should return the index of element to be searched in the list.
78. Write a binary search function which searches an item in a sorted list. The function should return the index of element to be searched in the list.
79. Write a program to define a custom exception class which takes a string message as attribute.
80. Write a function to compute 5/0 and use try/except to catch the exceptions.
81. Write a program to define a class named Shape and its subclass Square. The Square class has an init function which takes a length as argument. Both classes have a area function which can print the area of the shape where Shape's area is 0 by default.
82. Write a program to define a class named Circle which can be constructed by a radius. The Circle class has a method which can compute the area.
83. Write a program to generate and print another tuple whose values are even numbers in the given tuple (1,2,3,4,5,6,7,8,9,10).
84. Write a program to generate and print a tuple where the value are square of numbers between 1 and 20 (both included).
85. Write a program to define a function which can generate a dictionary where the keys are numbers between 1 and 20 (both included) and the values are square of keys.
86. Write a program to replace a specified line in a text file.
87. Write a program to find the number of lines in a text file.
88. Write a program which asks the user for a number between 1- 9 and shows the number. If the user inputs a number out of the specified range, the program should show an error and prompt the user for a valid input.
89. Write a program to define a function that takes a list and returns a new list with unique elements of the first list. Import the module and input a list to find the unique elements in a list.

90. Write a program that counts the number of tabs, spaces and newline character in a file.
91. Write a program to counts the number of lowercase character in a string.
92. Write a program to check if a substring is present in a given string.
93. Write a program to replace every blank space of a string with hyphen.
94. Write a program which would input three items – empno(int), name(str), salary(float) from keyboard and then put them in a tuple called 'emptup' . Print the tuple using for loop.
95. Write a program to input elements separated by comma and store them in a string. Convert this string to tuple using 'tuple' method. Print the tuple created.
96. Write a program to create a third list 'lst3' from two given lists 'lst1' and 'lst2' of numbers such that it contains numbers which are present in 'lst1' but not in 'lst2'.
97. Consider the given series: 1, 2, 1, 3, 2, 5, 3, 7, 5, 11, 8, 13, 13, 17, …,This series is a mixture of 2 series – all the odd terms in this series form a Fibonacci series and all the even terms are the prime numbers in ascending order.
    Write a program to find the nth term in this series.
98. Consider the following series:
    1,1,2,3,4,9,8,27,16,81,32,243,64,729,128,2187…This series is a mixture of 2 series – all the odd terms in this series form a geometric series and all the even terms form yet another geometric series.
    Write a program to find the nth term in the series. The value n is a positive integer that should be read from user. The nth term that is calculated by the program should be printed on screen. Other than the value of the nth term, no other character/string or message should be printed. For example, if N=16, the 16th term in the series is 2187, so only value 2187 should be printed.