Python – I

Assignments

**Variables, Operators and Expressions**

**1.**Write a program that asks the user for his name and then welcomes him. The output should look like this :

Enter your name : Saksham

Hello Saksham

**2.**Write a program that prompts the user to enter two integers and display the total on the screen.

**3.**Write a program that prompts the user to input a Celsius temperature and outputs the equivalent temperature in Fahrenheit. The formula to convert the temperature is: F = 9/5 C + 32 where F is the Fahrenheit temperature and C is the Celsius temperature.

**4.**Write a program which accept principle, rate and time from user and print the simple interest. The formula to calculate simple interest is: simple interest = principle x rate x time / 100

**5.**Write a program that accepts seconds from keyboard as integer. Your program should converts seconds in hours, minutes and seconds. Your output should like this :

Enter seconds: 13400

Hours: 3

Minutes: 43

Seconds: 20

**6.**Write a program that prompts the user to enter number in two variables and swap the contents of the variables.

**7.**Write a program that prompts the user to enter number in two variables and swap the contents of the variables.(Do not declare extra variable.)

**8.**Write a program that prompts the user to input the radius of a circle and outputs the area and circumference of the circle. The formula is  
Area = pi x radius2  
Circumference = 2 x pi x radius

**9.**Write a program that prompts the user to input the length and the width of a rectangle and outputs the area and circumference of the rectangle. The formula is  
Area = Length x Width  
Circumference = 2 x ( Length + Width)

**10.**Suppose a, b, and c denote the lengths of the sides of a triangle. Then the area of the triangle can be calculated using the formula:  
  
where   
Write a program that asks the user to input the length of sides of the triangle and print the area.

**11.**Write a program which prompts the user to input principle, rate and time and calculate compound interest. The formula is :  
CI = P(1+R/100)^T - P

## Conditional Structures

**1.**Write a program that prompts the user to input a number and display if the number is even or odd.

**2.**Write a program that prompts the user to input two integers and outputs the largest.

**3.**Write a program that prompts the user to input three integers and outputs the largest.

**4.**Write a program that prompts the user to input a year and determine whether the year is a leap year or not.  
Leap Years are any year that can be evenly divided by 4. A year that is evenly divisible by 100 is a leap year only if it is also evenly divisible by 400. Example :

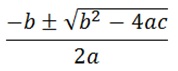
1992 Leap Year

2000 Leap Year

1900 NOT a Leap Year

1995 NOT a Leap Year

**5.**Write a program that prompts the user to input number of calls and calculate the monthly telephone bills as per the following rule:  
Minimum Rs. 200 for up to 100 calls.  
Plus Rs. 0.60 per call for next 50 calls.  
Plus Rs. 0.50 per call for next 50 calls.  
Plus Rs. 0.40 per call for any call beyond 200 calls.

**6.**The roots of the quadratic equation ax2 + bx + c = 0, a ≠ 0 are given by the following formula:  
  
In this formula, the term b2 - 4ac is called the discriminant. If b2 - 4ac = 0, then the equation has two equal roots.  
If b2 - 4ac > 0, the equation has two real roots. If b2 - 4ac < 0, the equation has two complex roots.

Write a program that prompts the user to input the value of a (the coefficient of x2), b (the coefficient of x), and c (the constant term) and outputs the roots of the quadratic equation.

**7.**The marks obtained by a student in 3 different subjects are input by the user. Your program should calculate the average of subjects and display the grade. The student gets a grade as per the following rules:

Average Grade

90-100 A

80-89 B

70-79 C

60-69 D

0-59 F

**8.**Write a program that prompts the user to input a number. Program should display the corresponding days to the number. For example if user type 1 the output should be sunday. If user type 7 the output should be saturday.

**9.**Write a program that prompts the user to input a character and determine the character is vowel or consonant.

## Looping Structures

### [Set – 1]

**1.**Write a Python program to print the numbers from 1 to 10 using a for loop.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**2.**Write a Python program to print the numbers from 20 to 1 using a while loop.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**3.**Write a program to print even numbers from 1 to 10.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**4.**Write a program that prompts the user to enter a number n and prints all the numbers from 1 to n.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**5.**Write a program that prompts the user to enter a number n, and then prints all the odd numbers between 1 and n.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**6.**Write a program that prints 'Happy Birthday!' five times on screen.[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**7.**Write a program that takes a number n as input from the user and generates the first n terms of the series formed by squaring the natural numbers.

Sample output  
Enter a number: 6  
The first 6 terms of the series are:  
1 4 9 16 25 36[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**8.**Write a program that prompts the user to input a number and prints its multiplication table. [Solution](https://www.pyforschool.com/assignment/loops/multiplication-table.html)

**9.**Write a Python program to print the first 8 terms of an arithmetic progression starting with 3 and having a common difference of 4.  
The program should output the following sequence:  
3 7 11 15 19 23 27 31[Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**10.**Write a Python program to print the first 6 terms of a geometric sequence starting with 2 and having a common ratio of 3.  
The program should output the following sequence:  
2 6 18 54 162 486 [Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**11.** Write a program that asks the user for a positive integer value. The program should calculate the sum of all the integers from 1 up to the number entered. For example, if the user enters 20, the loop will find the sum of 1, 2, 3, 4, ... 20. [Solution](https://www.pyforschool.com/assignment/loops/sum-natural-numbers.html)

**12.** write a program that takes a positive integer N as input and calculates the sum of the reciprocals of all numbers from 1 up to N. The program should display the final sum. Output of the program should be like:  
Enter a positive integer: 5  
The sum of reciprocals from 1 to 5 is: 2.28 [Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**13.** Write a program that prompts the user to enter a number and repeats this process 5 times. The program should accumulate the numbers entered and then display the final running total.

Sample Output:  
Enter a number: 10  
Enter a number: 15  
Enter a number: 35  
Enter a number: 40  
Enter a number: 50  
The final running total is: 150 [Solution](https://www.pyforschool.com/assignment/loops-set-1.html)

**14.**Write a program that prompts the user to enter a positive integer and calculates its factorial. The factorial of a positive integer 'n' is denoted as 'n!' and is calculated by multiplying all the integers from 1 to 'n' together. For example, the factorial of 5 (denoted as 5!) is calculated as 1 x 2 x 3 x 4 x 5.

The program should display the factorial value if the input is a positive number, or display a message stating that the factorial does not exist for negative numbers. Additionally, for an input of zero, the program should output that the factorial of 0 is 1. [Solution](https://www.pyforschool.com/assignment/loops/factorial.html)

**15.**Write a Python program that prompts the user to enter a base number and an exponent, and then calculates the power of the base to the exponent. The program should not use the exponentiation operator (\*\*) or the math.pow() function. The program should handle both positive and negative exponents. [Solution](https://www.pyforschool.com/assignment/loops/power.html)

## SET-2

**1.**Write a program to print numbers from 1 to 10.

**2.**Write a program that asks the user for a positive integer value. The program should calculate the sum of all the integers from 1 up to the number entered. For example, if the user enters 20, the loop will find the sum of 1, 2, 3, 4, ... 20.

**3.**Write a program that prompts the user to input a number and prints its mulitiplication table.

**4.**Write a program that prompts the user to input a number and prints its factorial. The factorial of an integer n is defined as n! = 1 x 2 x 3 x ... x n; if n > 0 = 1; if n = 0 For instance, 6! can be calculated as 1 x 2 x 3 x 4 x 5 x 6.

**5.**Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.

**6.**Write a program that prompts the user to input a number and reverse its digits. For example, the reverse of 12345 is 54321; reverse of 5600 is 65.

**7.**Write a program that asks the user to input a positive integer. Your program should find and display the sum of digits of number. For example, sum of digits of number 32518 is 3+2+5+1+8 = 19.

**8.**A palindromic number is a number that remains the same when its digits are reversed. For example, 16461. Write a program that prompts the user to input a number and determine whether the number is palindrome or not.

**9.**Write a program that prompts the user to input a decimal integer and display its binary equivalent.

**10.**Write a program that prompts the user to input a binary number and display its decimal equivalent.

**11.**Write a program that prompts the user to input a positive integer. It should then output a message indicating whether the number is a prime number. A prime number is a number that is evenly divisible only by itself and 1. For example, the number 5 is prime because it can be evenly divided only by 1 and 5. The number 6, however, is not prime because it can be divided evenly by I, 2, 3, and 6.

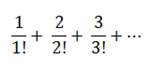
**12.**Write a program that prompts the user to input two numbers and display its HCF. The Highest Common Factor (HCF) also called the Greatest Common Divisor (GCD) of two whole numbers, is the largest whole number that's a factor of both of them.

**13.**Write a program to enter the numbers till the user wants and at the end it should display the count of positive, negative and zeros entered.

**14.**Write a program to enter the numbers till the user wants and at the end the program should display the largest and smallest numbers entered.

**15.**An Armstrong number of three digits is an integer such that the sum of the cubes of its digits is equal to the number itself. For example, 371 is an Armstrong number since 33 + 73 + 13 = 371. Write a program to find all Armstrong number in the range of 0 and 999

**16.**Write a program to obtain the first 25 numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term. Following are the first few terms of the Fibonacci sequence:  
0 1 1 2 3 5 8 13 21 34 55 89...

**17.**Write a program to add first seven terms of the following series using a for loop:  


**18.**Compute the sum up to n terms in the series  
1 - 1/2 + 1/3 - 1/4 + 1/5 -... 1/n  
where n is a positive integer and input by user.

**19.**Write programs to print following patterns :

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##### 2.

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##### 3.

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##### 4.

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##### 5.

1

222

33333

4444444

555555555

##### 6.

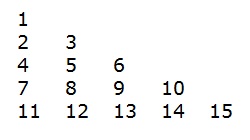
1

212

32123

4321234

543212345

**20.**Floyd's triangle is a right-angled triangular array of natural numbers as shown below:  


Write a program to print the Floy'd triangle.

**21.**Write a program to compute sin x for given x. The user should supply x and a positive integer n. We compute the sine of x using the series and the computation should use all terms in the series up through the term involving xn  
sin x = x - x3/3! + x5/5! - x7/7! + x9/9! ........

**22.**Write a program to compute cosine of x. The user should supply x and a positive integer n. We compute the cosine of x using the series and the computation should use all terms in the series up through the term involving xn  
cos x = 1 - x2/2! + x4/4! - x6/6! .....

**23.**Write a program that generates a random number and asks the user to guess what the number is. If the user's guess is higher than the random number, the program should display "Too high, try again." If the user's guess is lower than the random number, the program should display "Too low, try again." The program should use a loop that repeats until the user correctly guesses the random number. Program should count and display number of tries to win the game.

## Strings

**1.**Write a program that accepts a string from user. Your program should count and display number of vowels in that string.

**2.**Write a program that reads a string from keyboard and display:  
\* The number of uppercase letters in the string  
\* The number of lowercase letters in the string  
\* The number of digits in the string  
\* The number of whitespace characters in the string

**3.**Write a Python program that accepts a string from user. Your program should create and display a new string where the first and last characters have been exchanged.

For example if the user enters the string 'HELLO' then new string would be 'OELLH'

**4.**Write a Python program that accepts a string from user. Your program should create a new string in reverse of first string and display it.

For example if the user enters the string 'EXAM' then new string would be 'MAXE'

**5.**Write a Python program that accepts a string from user. Your program should create a new string by shifting one position to left.

For example if the user enters the string 'examination 2021' then new string would be 'xamination 2021e'

**6.**Write a program that asks the user to input his name and print its initials. Assuming that the user always types first name, middle name and last name and does not include any unnecessary spaces.

For example, if the user enters Ajay Kumar Garg the program should display A. K. G.  
Note:Don't use split() method

**7.**A palindrome is a string that reads the same backward as forward. For example, the words dad, madam and radar are all palindromes. Write a programs that determines whether the string is a palindrome.

Note: do not use reverse() method

**8.**Write a program that display following output:  
SHIFT  
HIFTS  
IFTSH  
FTSHI  
TSHIF  
SHIFT

**9.**Write a program in python that accepts a string to setup a passwords. Your entered password must meet the following requirements:

* The password must be at least eight characters long.
* It must contain at least one uppercase letter.
* It must contain at least one lowercase letter.
* It must contain at least one numeric digit.

Your program should should perform this validation.

## Lists

**1.**Write a program that accepts a list from user and print the alternate element of list.

**2.**Write a program that accepts a list from user. Your program should reverse the content of list and display it. Do not use reverse() method.

**3.**Find and display the largest number of a list without using built-in function max(). Your program should ask the user to input values in list from keyboard.

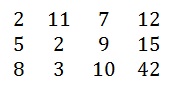
**4.**Write a program that rotates the element of a list so that the element at the first index moves to the second index, the element in the second index moves to the third index, etc., and the element in the last index moves to the first index.

**5.**Write a program that input a string and ask user to delete a given word from a string.

**6.**Write a program that reads a string from the user containing a date in the form mm/dd/yyyy. It should print the date in the form March 12, 2021.

**7.**Write a program with a function that accepts a string from keyboard and create a new string after converting character of each word capitalized. For instance, if the sentence is "stop and smell the roses." the output should be "Stop And Smell The Roses"

**8.**Find the sum of each row of matrix of size m x n. For example for the following matrix output will be like this :



Sum of row 1 = 32

Sum of row 2 = 31

Sum of row 3 = 63

**9.**Write a program to add two matrices of size n x m.

**10.**Write a program to multiply two matrices

## Dictionary

**1.**Write a program that reads a string from keyboard and prints the unique words. Your program should convert input string to lower case.

**2.**Write a program that reads a string from keyboard and prints the letters in decreasing order of frequency. Your program should convert all the input to lower case and only count the letters a-z. Your program should not count spaces, digits, punctuation or anything other than the letters a-z.

**3.**Write a program that accepts a string and change its lowercase vowels to special character as given below:

a #

e @

i $

o %

u !

**4.**Write a program that reads two strings from keyboard and prints the common words. Your program should convert input string to lower case.

**5.**Write a program that keeps student's name and his marks in a dictionary as key-value pairs. The program should store records of 10 students and display students name and marks of five students in decreasing order of marks obtained.

**6.**Write a program that keeps name and birthday in a dictionary as key-value pairs. The program should display a menu that lets the user search a person’s birthday, add a new name and birthday, change an existing birthday, and delete an existing name and birthday.

## Function

**1.**Write a function find\_max that accepts three numbers as arguments and returns the largest number among three. Write another function main, in main() function accept three numbers from user and call find\_max.

**2.**Write a function, is\_vowel that returns the value true if a given character is a vowel, and otherwise returns false. Write another function main, in main() function accept a string from user and count number of vowels in that string.

**3.**Write a function named is\_prime, which takes an integer as an argument and returns true if the argument is a prime number, or false otherwise. Also, write the main function that displays prime numbers between 1 to 500.

**4.**Write a function in python to find the sum of the cube of elements in a list. The list is received as an argument to the function, in turn, the function must return the sum. Write the main function which invokes the above function.

**5.**Write the definition of a function zero\_ending(scores) to add all those values in the list of scores, which are ending with zero and display the sum.

For example: If the scores contain [200, 456, 300, 100, 234, 678] The sum should be displayed as 600.

**6.**Write a definition of a method count\_now(places) to find and display those place names, in which there are more than 5 characters.

For example :  
If the list places contains  
["DELHI","LONDON","PARIS","NEW YORK","DUBAI"]  
The following should get displayed :  
LONDON  
NEW YORK

**7.**Write a method in python to display the elements of list thrice if it is a number and display the element terminated with ‘#’ if it is not a number.

For example, if the content of list is as follows :  
ThisList=[‘41’,‘DROND’,‘GIRIRAJ’, ‘13’,‘ZARA’]  
The output should be  
414141  
DROND#  
GIRIRAJ#  
131313  
ZARA#

**8.**For a given list of values in descending order, write a method in python to search for a value with the help of Binary Search method. The method should return position of the value and should return -1 if the value not present in the list.

**9.**Write a function half\_and\_half that takes in a list and change the list such that the elements of the second half are now in the first half.

For example, if the size of list is even and content of list is as follows :  
my\_liist = [10,20,30,40,50,60]  
The output should be  
[40,50,60,10,20,30]  
if the size of list is odd and content of list is as follows :  
my\_liist = [10,20,30,40,50,60,70]  
The output should be  
[50,60,70,40,10,20,30]

**10.**Write a function that accepts a dictionary as an argument. If the dictionary contains replicate values, return an empty dictionary, otherwise, return a new dictionary whose values are now the keys and whose keys are the values.

## Recursion

**1.**Write a recursive function that accepts an integer argument and returns the factorial.

**2.**Write a recursive function that accepts two numbers as its argument and returns its power.

**3.**Write a recursive function that accepts a number as its argument and returns the sum of digits.

**4.**Write a program that reads two integers from keyboard and calculate the greatest common divisor (gcd) using recursive function.

**5.**Write a recursive function that accepts an integer argument in n. This function returns the nth Fibonacci number. Call the function to print fibonacci sequences.

**6.**Write a recursive function that accepts a decimal integer and display its binary equivalent.

**7.**Write a recursive function that calculate sum of first n natural numbers.

**8.**Write a Recursive function in python BinarySearch(Arr, L, R, X) to search the given element X to be searched from the List Arr having R elements, where L represents lower bound and R represents the upper bound.

## File Handling

**1.**Write a function in python to read the content from a text file "poem.txt" line by line and display the same on screen.

**2.**Write a function in python to count the number of lines from a text file "story.txt" which is not starting with an alphabet "T".

Example: If the file "story.txt" contains the following lines: A boy is playing there.  
There is a playground.  
An aeroplane is in the sky.  
The sky is pink.  
Alphabets and numbers are allowed in the password.

The function should display the output as 3

**3.**Write a function in Python to count and display the total number of words in a text file.

**4.**Write a function in Python to read lines from a text file "notes.txt". Your function should find and display the occurrence of the word "the".

For example: If the content of the file is:  
"India is the fastest-growing economy. India is looking for more investments around the globe. The whole world is looking at India as a great market. Most of the Indians can foresee the heights that India is capable of reaching."

The output should be 5.

**5.**Write a function display\_words() in python to read lines from a text file "story.txt", and display those words, which are less than 4 characters.

**6.**Write a function in Python to count the words "this" and "these" present in a text file "article.txt". [Note that the words "this" and "these" are complete words]

**7.**Write a function in Python to count words in a text file those are ending with alphabet "e".

**8.**Write a function in Python to count uppercase character in a text file.

**9.**A text file named "matter.txt" contains some text, which needs to be displayed such that every next character is separated by a symbol "#". Write a function definition for hash\_display() in Python that would display the entire content of the file matter.txt in the desired format.

Example :  
If the file matter.txt has the following content stored in it :  
THE WORLD IS ROUND  
  
The function hash\_display() should display the following content :  
T#H#E# #W#O#R#L#D# #I#S# #R#O#U#N#D#

**10.**Aditi has used a text editing software to type some text. After saving the article as WORDS.TXT, she realised that she has wrongly typed alphabet J in place of alphabet I everywhere in the article.

Write a function definition for JTOI() in Python that would display the corrected version of entire content of the file WORDS.TXT with all the alphabets "J" to be displayed as an alphabet "I" on screen.

Note: Assuming that WORD.TXT does not contain any J alphabet otherwise.

Example:  
If Aditi has stored the following content in the file WORDS.TXT:  
WELL, THJS JS A WORD BY JTSELF. YOU COULD STRETCH THJS TO BE A SENTENCE  
The function JTOI() should display the following content:  
WELL, THIS IS A WORD BY ITSELF. YOU COULD STRETCH THIS TO BE A SENTENCE

**11.**Write a function AMCount() in Python, which should read each character of a text file STORY.TXT, should count and display the occurance of alphabets A and M (including small cases a and m too).  
For Example:  
If the file content is as follows:  
Updated information  
As simplified by official websites.  
The EUCount() function should display the output as:  
A or a:4  
M or m :2

**12.**A binary file "Book.dat" has structure [BookNo, Book\_Name, Author, Price].  
i. Write a user defined function createFile() to input data for a record and add to Book.dat.  
ii. Write a function countRec(Author) in Python which accepts the Author name as parameter and count and return number of books by the given Author are stored in the binary file "Book.dat"

**13.**A binary file "STUDENT.DAT" has structure (admission\_number, Name, Percentage). Write a function count\_rec() in Python that would read contents of the file "STUDENT.DAT" and display the details of those students whose percentage is above 75. Also display number of students scoring above 75%

**14.**Given a binary file employee.dat, created using dictionary object having keys: (empcode, name, and salary)

1. Write a python function that add one more record at the end of file.
2. Write a python function that display all employee records whose salary is more that 30000

**15.**Write a function to search and display details of student whose rollno is '1005' from the binary file student.dat having structure [rollno, name, class and fees].

**16.**A binary file school.dat has structure(rollno, name, class, fees)

Write a definition for function total\_fees( ) that reads each object of file and calculate the total fees of students and display the same.

**17.**A binary file players.dat, containing records of following list format: [code, name, country and total runs]

1. Write a python function that display all records where player name starts from 'A'
2. Write a python function that accept country as an argument and count and display the number of players of that country.
3. Write a python function that add one record at the end of file.

**18.**Given a binary file game.dat, containing records of following list format: [game\_name, participants]

Write a function in Python that would read contents from the file game.dat and creates a file named basket.dat copying only those records from game.dat where the game name is "Basket Ball"