File Handling, Functions and Data Structures:

1. Write a function to create a text file containing following data:

> *Neither apple nor pine are in pineapple. Boxing rings are square.*
> *Writers write, but fingers don't fing. Overlook and oversee are opposites.*
> *A house can burn up as it burns down. An alarm goes off by going on.*

   a) Read back the entire file content using read() or readlines() and print it.
   b) Append more text of your choice in the file and display the content of file with line numbers prefixed to line.
   c) Display last line of file.
   d) Display first line from 10th character onwards.
   e) Read and display a line from the file. Ask user to provide the line no. to be read.
   f) Find the frequency of words beginning with every letter i.e. (For the above example)
   Words beginning with a: 5
   Words beginning with n: 2
   Words beginning with p: 2
   Words beginning with o: 5 and so on

2. Assume that a text file named file1.txt contains some text, write a function named isvowel( ) that reads the file file1.txt and creates a new file named file2.txt, which shall contain only those words from the file file1.txt which don't start with a vowel.
   For example, if the file1.txt contains:

   > Carry Umbrella and Overcoat When it Rains

   Then the file file2.txt shall contain

   > Carry When Rains

3. A file containing data about a collection of students has the following format. Each line contains a first name, a second name, a registration number, no of years and a department separated by tabs.

Rajat	Sen	12345	1	CSEE
Jagat	Narain	13467	3	CSEE
Anu	Sharma	11756	2	Biology
Sumita	Trikha	23451	4	Biology
Sumder	Kumra	11234	3	MME
Kanti	Bhushan	23211	3	CSEE

   a) Write a Python program that will copy the contents of the file into a list of tuples
   b) Display full details of the student sorted by registration number

i) The names of all students with no of year less than 3
ii) The number of people in each department

4. Write a program that reads myfile.txt, and builds a histogram (a dictionary having key value pair as word: occurrence) of the words in the file.
   a) Now use histogram to print :
      i) Total number of words
      ii) Number of different words
      iii) The most common words
   b) Using above text file, myfile.txt,
   i) Write a program that maps a list of words read from the file to an integer representing the length of the corresponding words (Use a dictionary having key value pair as length : list of word).
   Now using this dictionary,
   ii) Design a function find_longest_word() to display a list of longest words from file.
   iii) Define a function filter_long_words(n) that takes an integer n and returns the list of words that are longer than n from file.

5. A dictionary Customer contains the following keys: roomno, name, duration. A binary file 'hotel.dat' contains details of customer checked in the hotel. Write a program to perform the following using pickle module:
   a) Read n dictionary objects and load them into the file
   b) Read all the dictionary objects from the file and print them
   c) Counts the number of customers present in the hotel. (Counts the total number of customers present in the hotel.(Assume that file might have few record before adding n records in part (a))
   d) Display those customers from the file, who have stayed more than 2 days in the hotel.

6. Sun Microsystems held a recruitment test. The file, placement.csv, contains the below format of data: The marks are from 5 different tests conducted and each col is out of 5 marks:

SNO	NAME	MARKS1	MARKS2	MARKS3	MARKS4	MARKS5
1	JOHN	4	3	4	2	5
2	PETER	3	4	4	3	5

   a) Read the above file and print the data.
   b) Write the UDF to find total no. of people who came for the placement test.
   c) Write the UDF to find the top n Names on basis of total Marks.

7. Write a program to input a number and then call the functions
   a) count(n) which returns the number of digits
   b) reverse(n) which returns the reverse of a number

c) hasdigit(n) which returns True if the number has a digit else False
d) show(n) to show the number in its expanded form (sum of place values of the digits in n) (E.g. 124 = 100 + 20 + 4)

8. A Number is a perfect number if the sum of all the factors of the number (including 1) excluding itself is equal to number. (E.g. 6 = 1+2+3 and 28=1+2+4+7+14). Number is a prime number if its factors are 1 and itself. Write functions:
a) Generatefactors() to populate a list of factors
b) isPrimeNo() to check whether the number is prime number or not
c) isPerfectNo() to check whether the number is perfect number or not
Save the above as a module perfect.py and use in the program main.py as a menu driven program.

9. Roman numerals are represented by seven different symbols: I, V, X, L, C, D and M.

Roman Numeral	Number
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

For e.g., 2 is written as II in Roman numeral, just two one's added together. 12 is written as XII, which is simply X + II. The number 27 is written as XXVII, which is XX + V + II. Roman numerals are usually written largest to smallest from left to right.

However, the numeral for four is not IIII. Instead, the number four is written as IV. Because the one is before the five, we subtract it making four. The same principle applies to the number nine, which is written as IX.

There are six instances where subtraction is used:
- I can be placed before V (5) and X (10) to make 4 and 9.
- X can be placed before L (50) and C (100) to make 40 and 90.
- C can be placed before D (500) and M (1000) to make 400 and 900.

Write a UDF which takes a string (Roman Numeral) as an argument and returns the integer equivalent.

```
def romanToInt(s):
        return Ans
print(romanToInt('LVIII')) #Should print 58
print(romanToInt('MCMXCIV')) #Should print 1994
```

10. Data can be represented in memory in different ways Binary, Decimal, Octal, and Hexadecimal. Input number in decimal and desired type (Specify B for Binary, O for Octal, H for Hexadecimal) for output. Write a function to perform the conversions:

a)

```
SAMPLE INPUT: 12
DESIRED TYPE: B
RESULT:  1100
```

b)

```
SAMPLE INPUT: 25
DESIRED TYPE: O
RESULT: 31
```

Database Management (MySQL):

1. Given table, Tutor, is shown below.

ID	NAME	AGE	CITY	FEE	PHONE
P1	SAMEER	34	DELHI	45000	9811076656
P2	ARYAN	35	NAGARKOT	54000	9911343989
P4	RAM	34	CHENNAI	45000	9810593578
P6	PREMLATA	36	BHOPAL	60000	9910139987
P7	SHIKHA	36	RAJKOT	34000	9912139456
P8	RADHA	33	DELHI	23000	8110668888

Write commands to do the following:
a) Display the name of those students in descending order whose age doesn't lie between 35 and 40.
b) List cities with their average fee in it.
c) Decrease the fees of Shikha by 5%.
d) Display cities where fees are maximum and minimum respectively.
e) Display the name and city of tutor who lives in a city having 'O' but not 'P'.

2. Consider the following WATCHES and SALE table and Write the SQL commands for (i) to (v):
a) To display watch name and their quantity sold in first quarter.
b) To display the details of those watches whose name ends with 'Time'
c) To display total quantity in store of Unisex type watches.
d) To display watch's name and price of those watches which have price range in between 5000-15000.
e) To display Quantity sold of all watches WatchId wise.

WatchId	Watch_Name	Price	Type	Qty_Store
W001	High Time	10000	Unisex	100
W002	Life Time	15000	Ladies	150
W003	Wave	20000	Gents	200
W004	High Fashion	7000	Unisex	250
W005	Golden Time	2500	Gents	100

WATCHES

WatchId	Qty_Sold	Quarter
W001	10	1
W003	5	1
W002	20	2
W003	10	2
W001	15	3
W002	20	3
W005	10	3
W003	15	4

SALES