1. Write a single python program to do the following operations on a text file by writing different user defined functions.
   a. Remove all the special characters.
   b. Remove all single characters.
   c. Substitute multiple spaces with single space.
   d. Convert all the words into Lowercase.
   e. Convert the words into literal form from their contracted form (e.g., Couldn't → Could not)

2. Implement one multi-threaded server with socket programming in python.

3. Implement one hospital information system using Python and any of the databases among MySQL, PostgreSQL, SQLite, MongoDB with following information –

**Hospital**

Hospital_Id (P)
Hospital_Name
Bed_Count

**Doctor**

Doctor_Id (P)
Doctor_Name
Hospital_Id (F)
Joining_Date
Speciality
Salary
Experience
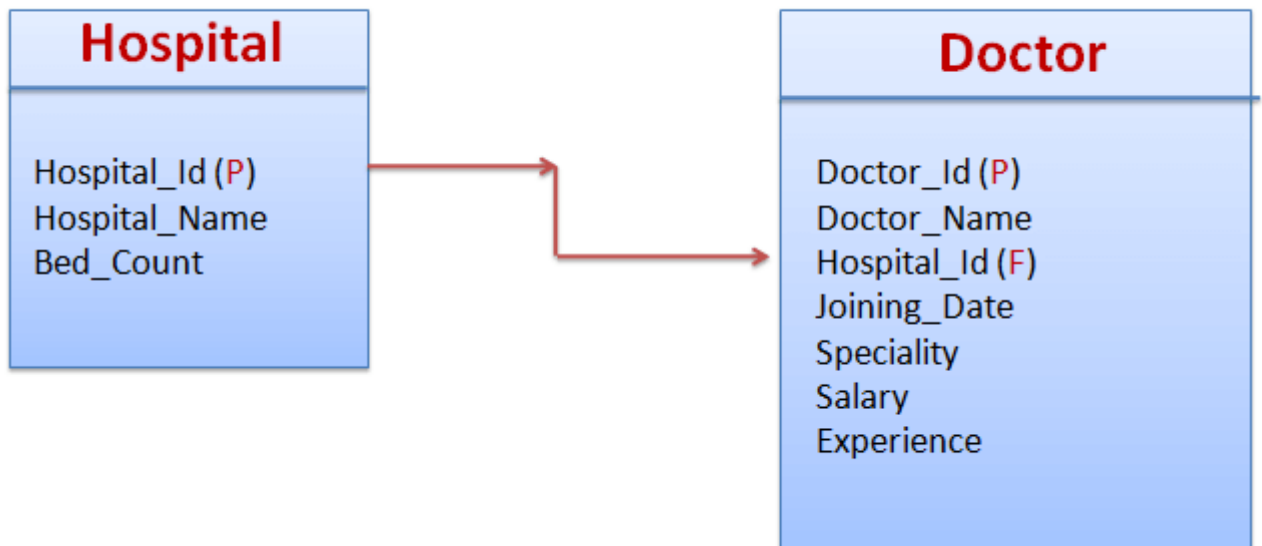
   i)   Connect to your database server and print its version.
   ii)  Fetch Hospital and Doctor Information using hospital Id and doctor Id.
   iii) Get the list Of doctors as per the given specialty and salary.
   iv)  Get a list of doctors from a given hospital.
   v)   Update doctor experience in years.

4. Write a python program to build a term-document matrix $M_{m \times n}$ (occurrence of terms in a document) from a set of *n* text documents (*n* will be user given). The output will be a .csv file containing rows that represent unique terms and columns that represent documents.

5. Write a python script for implementing matrix factorization that represents a matrix in the product of matrices. The outputs of each of the following matrices will be stored in .csv files

$$M = U \sum V^T$$

Where,
M is an m×n matrix,
U: is the matrix of the eigenvectors of $M^TM$ and size of m×m

$\Sigma$: is a diagonal matrix containing the singular values obtained as square roots of the eigenvalues of $M^TM$ and of size m×n | k×k where k will be user given. The values of the diagonal will be represented in decreasing order.

V: is the matrix of the eigenvectors of $MM^T$

$V^T$ is the transpose of V.