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INTRODUCTION TO PYTHON

Python is a popular programming language. It was created and released in 1991 by Guido Van Rossum.

Fields of working:

- web-development (server side)
- software development
- Mathematics
- system scripting.

Application:

1. GUI based desktop applications.
2. Graphic design, image processing applications, Games and scientific / computational applications".
3. Web frameworks and applications.
4. Operating systems.
5. Prototyping.

Advantages:

1. Presence of third-party modules.
2. Extensive support libraries.
3. Open source and community development.
4. Portable and interactive.

Organizations using Python:

- Google
- Yahoo (Maps)
- Mozilla
- Dropbox
- Microsoft
- Cisco
- Spotify
- Quora.

WHY PYTHON?

Every Programming language serves some purpose or use-case according to a domain. for e.g., JavaScript is the most popular language amongst web developers as it gives the developer the power to handle applications via different frameworks like react, Vue, angular which are used to build beautiful User Interfaces.

Similarly, they have pros and cons at the same time. so, if we consider python it is general-purpose which means it is widely used in every domain the reason is it's very simple to understand, scalable because of which the speed of development is so fast. Now you get the idea why besides learning python it doesn't require any programming background so that's why it's popular amongst developers as well. Python has simpler syntax similar to the English language and also the syntax allows developers to write programs with fewer lines of code. Since it is open-source there are many libraries available that make developers' jobs easy ultimately results in high productivity. They can easily focus on business logic and Its demanding skills in the digital era where information is available in large data sets.

Python Syntax compared to other programming languages:

- Python was designed for readability, and has some similarities to the English language with influence from mathematics.
- Python uses new lines to complete a command, as opposed to other programming languages which often use semicolons or parentheses.
- Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.

WHAT IS CSV?

CSV (Comma Separated Values) is a simple file format used to store tabular data, such as a spreadsheet or database. A CSV file stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. The use of the comma as a field separator is the source of the name for this file format. For working CSV files in python, there is an inbuilt module called csv.

To write data into a CSV file, you follow these steps:

- First, open the CSV file for writing (w mode) by using the open () function.
- Second, create a CSV writer object by calling the writer () function of the csv module.
- Third, write data to CSV file by calling the write row () or write rows () method of the CSV writer object.
- Finally, close the file once you complete writing data to it.

INTRODUCTION TO THE REFERENCE TOPIC

What is **LIBRARY MANAGEMENT**?

The library management system is basically a database-based project done with the help of python programming language. This project is very useful for librarians to keep a count on what project they have. This project is multifield project, so that it can be modified for various purposes.

Need for library management system?

It allows the librarian to maintain library resources in a more operative manner that will help to save their time. It is also convenient for librarian. manage the process of books allotting and making payment, Library management system is also useful for students as well as librarian to keep the constant track of the availability of all books in a store.

The system helps both students and library manager to keep a constant track of all the books available in the library. It allows both the admin and the student to search for the desired book. It becomes necessary for colleges to keep a continuous check on the books issued and returned and even calculate fine.

This task if carried out manually will be tedious and includes chances of mistakes.

These errors are avoided by allowing the system to keep track of information such as issue date, last date to return the book and even fine information and thus there is no need to keep manual track of this information which thereby avoids chances of mistakes. Thus, this system reduces manual work to a great extent allows smooth flow of library activities by removing chances of errors in the details.

Advantages:

- The system excludes the use of paper work by managing all the book information electronically.
- Admin can keep updating the system by providing the new books arrival in system and their availability thus students need not to go to library for issuing purpose.
- The system has books well organized and systematically arranged in different categories in the system so that user can easily search and find the book.
- Thus, it saves human efforts and resources.

Effective

The library system will streamline the library process which accelerates the effectiveness of the library.

Efficacious

The users are served in a reasonable time and are also able to search and select their required books.

Efficient

Members and Librarians are able to use the system quickly without any long procedures.

Elegant

Since the system is intuitive and comprehensive and is designed to be as effortless as possible

ABOUT THE PROJECT

This project is based on library analysis of our school. The objective of this project is to let the students apply the programming knowledge into a real-world situation / problem and expose the students how programming skills help in developing a good software. With this project, we are trying to:

- To learn the steps needed to be taken care of while preparing the data for analysis.
- To learn how to look at the data to find a good measure to establish the analysis based upon.
- To learn how to visualize the result of the analysis.

It will help streamline the collected data. It will better display the comparison of book numbers in past few months, in a manner which will be easier to see and read and compare with one another and thus, help to establish more control on what to do and where to do.

Using this comparison, the user can decide better on how they can achieve the goal of minimizing problems rising in future related to book numbers.

The data will be shown in a tabular as well as well as graphical /pictorial form, which will be easy to study and compare. All the work will be done using python programming language various libraries.

It deals with the complete processes on building and implementing it. It focuses in the technical aspects of the system starting with identifying the necessary components and building the relevant relationship between or among them as needed for the smooth and efficient operation of the system.

BACKGROUND OF THE PROJECT:

library is a collection resources especially books that a wide range of individuals can access and share them. Library has been in use since 15th century as has been gone through several stages of improvisation and it's been in the form as today. Library can be categorized into different types according to the organization that runs it as Academic library, public library, School library etc. Furthermore, it can be classified according to the subject matter of the documents it contains as Medical library, Law library, Arts Library etc. Libraries are organized in a way to access the materials in an easy an effective way. There are several systems in practice which makes the library organized. Library is basically concerned about acquisition, preservation and administration of its resources. In order to carry out these tasks a system is implemented. All these processes have been carried out manually before the advancement of new technologies. Now the computer automated system is in practice to carry out these systems which makes all these processes effective and efficient. These computer automated systems make easy for the members to access the available resources where as it makes easy for the librarians to keep track and maintain the library resources.

THE PROCESS

The Data Collection:

We have visited our school library and had a conversation with the librarian and collected some data. The collected data mainly consists of:

- Name of books given to students.
- Details of student collecting the book.
- If that particular book is available or not.

Data in CSV form:

After collecting the data, we have organised it by category in excel spreadsheet and converted the data to CSV format. CSV (comma separated Values), is a delimited text file that uses a comma to separate Values. Each line of the file is a data record. Each record consists of one or more fields, separated by commas. CSV format helps to track the data more easily while there is need to transform it into well-formed tables in Python.

Writing the Python code:

While writing the code. we have made use of libraries like:

- Pandas: Pandas is a useful library in data analysis. It can be used to perform data manipulation and analysis. Pandas provide powerful and easy-to-use data structures, as well as the means to quickly perform operations on these structures. We have made list of data frames to organize the data in a two-dimensional manner in python.

- NumPy: NumPy can be used to perform a wide variety of mathematical operations on arrays. It adds powerful data structures to python that guarantee efficient calculations with arrays and matrices and it supplies an enormous library of high-level mathematical functions to operate on these arrays and matrices.

- Matplotlib: Matplotlib is a visualization library in Python for 2D plots of arrays. Matplotlib is written in Python and makes use of the NumPy library. We have used the matplotlib library to display the collected data in a pictorial and graphical by making use of various types of manner graphs like live charts, bar charts and scatter charts.

- Basic python functions: Basic python functions like if, elif, else and input functions have been used to the fullest to make the data display more user friendly and streamlined plus goal was to not confuse the user when they access the data.

Working with the finished systems:

Using these different libraries and functions, we have made a system completely user friendly and based on the comfort of the user. The user can choose which data they want to see and how they want to see it.

- They can select if they want to see the data just of one category.
- They can choose if they want to see the data in a tabular form or a pictorial/graphical form.
- They can also choose the type of graph through which they want to see the data displayed (whether line graphs, bar graphs or scatter graphs).

DEVELOPMENT ENVIRONMENT

Software:

(1) Operating system (windows 8 or later): windows 10 is selected as our operating system because of additional file system, improved performance on multicore processors, improved boot performances, security features and better GUI.

(2) Programming Language (Python): The reason of selecting Python is that we are studying this language in our school syllabus and also, it is free and open source programming language.

Hardware:

(2) Processor: Intel i3 (or higher) or AMD ryzen processor

(2) RAM: Minimum 2 GB required.

(3) screen resolution: Monitor with screen resolution minimum 1024 X 768.

(4) Hard disk: Minimum 2GB is required for installing programs and storing data and files.

BIBILIOGRAPHY

- NCERT Informatics Practices Textbook class 12th
- Informatics Practices Textbook by Sumit Arora for class 12th
- School Library to collect data.
- https://www.google.com
- https://www.python.org.in
- https://www.tutorialaicsip.com/

PYTHON CODE

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

lo=str(input("set file location -- "))
name=str(input('enter name of file -- '))
location=lo+'\\'+name+'.csv'



#List all book
def viewall():
    #print("==================")
    print("List of All Records")
    print("==================")
    df=pd.read_csv(location,index_col='admno')#"C:\\Users\\DELL\\Downloads\\students.csv"
    print(df)

#search a book
def search():

    #print("================")
    print("search a book")
    print("================")
    df=pd.read_csv(location,index_col='book')#"C:\\Users\\DELL\\Downloads\\students.csv"
    list1=list(df.index)
```

```
    book=str(input('name of book -- '))
    search=book in list1
    if search == True:
        print("================")
        print("yes , book is avaialable")
        row=book
        del df['quantity']
        z=df.loc[row, : ]
        print(z)
    else:
        print("================")
        print("sorry , book not available now")

#Delete Existing book
def deleterecord():
    #print("================")
    print("delete record")
    print("================")
    x=pd.read_csv(location,index_col='book')#"C:\\Users\\DELL\\Downloads\\students.csv"
    print(x)
    print("1.for row deletion")
    print("2.for column deletion")
    p=int(input("enter 1 or 2 --  "))
    if p==1:
        y=input("enter book name -- ")
        z=x.drop(y,axis=0)
        print("================")
        print("Resulting Data")
        print(z)
```

```
 elif p==2:
        y=input("enter column name -- ")
        z=x.drop(y,axis=1)
        print("================")
        print("Resulting Data")
        print(z)


#graph of books
def graph():
    #print("================")
    print("type of graphs \n (1) line , (2)bar , (3)scatter ")
    print("================")
    choice=str(input("enter name of type of graph -- "))
    X=pd.read_csv(location)#"C:\\Users\\DELL\\Downloads\\students.csv"
    if choice== 'bar' :
        X.plot(kind='bar',x='book',y='quantity')
        plt.xlabel('NAME OF BOOKS')
        plt.ylabel('QUANTITY OF BOOKS')
        plt.show()
    elif choice== 'line':
        X.plot(x='book',y='quantity')
        plt.xlabel('NAME OF BOOKS')
        plt.ylabel('QUANTITY OF BOOKS')
        plt.show()
    elif choice== 'scatter':
        X.plot(kind='scatter',x='book',y='quantity')
        plt.xlabel('NAME OF BOOKS')
        plt.ylabel('QUANTITY OF BOOKS')
        plt.show()
```

```
#name and data of person
def searchname():
    #print("================")
    print("search name of person")
    print("================")
    df=pd.read_csv(location,index_col='Name')#"C:\\Users\\DELL\\Downloads\\students.csv"
    list1=list(df.index)


    name=str(input('name of individual -- '))
    ser=name in list1
    if ser == True:
        print("================")
        print("Yes ,data available")
        print("DATA - ")
        y=name
        del df['quantity']
        z=df.loc[y,:]
        print(z)
    else:
        print("================")
        print("data not available")
# adding new data
def adddata():
    global location
    print("adding new Records")
    print("==================")
    x=f=pd.read_csv('C:\\Users\\DELL\\Desktop\\students.csv')
    print(x)
```

```
 list1=[]
    num=str(input('do you want to enter new record (yes|no) -- '))
    while num != 'no':
        admno=int(input('enter admno -- '))
        name=str(input('enter name of student -- '))
        book=str(input('enter name of book -- '))
        quantity=int(input('enter total quantity of books -- '))
        list2=[admno,name,book,quantity]
        #print(list2)
        list1.append(list2)
        num=str(input('next record (yes|no) -- '))
    df=pd.DataFrame(list1,columns=['admno','Name','book','quantity'])
    #print(df)
    newdf=x.append(df,ignore_index=True)
    print(newdf)
    ans=str(input('DO YOU WANT TO SAVE UPDATED DATA IN NEW FILE (yes|no) -- '))
    if ans == 'yes':
        location=str(input("set file location -- "))
        filename=str(input("set file name -- "))
        newdf.to_csv(location+'\\'+filename+'.csv',index=False)
        print("saved at location --",location,'named as ',filename)
    else:
        print('data updated shown but not saved ')


print("\n")
print("\t \t \t LIBRARY MANAGEMENT SYSTEM")
print("Main Menu")
print("==================================")
```

```
print("1. Add a new book ")
print("2. Delete Existing book")
print("3. Search a book")
print("4. List of all data")
print("5. Graph [books vs quantity]")
print("6. Person data available")
print("7. Exit")
print("==================================")
print('\n')
choice = int(input('Enter your choice -- '))
print("==================================")
print('\n')
while choice < 7:
    if choice == 1 :
        adddata()
    elif choice == 2:
        deleterecord()
    elif choice == 3:
        search()
    elif choice == 4:
        viewall()
    elif choice == 5:
        graph()
    elif choice == 6:
        searchname()
    elif choice == 7:
    print("Software Terminated")
    print("================================================")
    print('\n')
```

```
print("Main Menu")
  print("=================================")
  print("1. Add a new book ")
  print("2. Delete Existing data")
  print("3. Search a book")
  print("4. List of all data")
  print("5. Graph [books vs quantity]")
  print("6. Person data available")
  print("7. Exit")
  print('\n')
  choice = int(input('Enter your choice -- '))
```

OUTPUT

List all data

```
========== RESTART: C:¥Users¥DELL¥Desktop¥cbseproject¥cbseproject.py ========
set file location -- C:¥Users¥DELL¥Desktop
enter name of file -- data


                        LIBRARY MANAGEMENT SYSTEM
Main Menu
====================================
1. Add a new book
2. Delete Existing book
3. Search a book
4. List of all data
5. Graph [books vs quantity]
6. Person data available
7. Exit
====================================


Enter your choice -- 4
====================================


List of All Records
===================
            Name           book  quantity
admno
1          APARNA        Tinkers         2
2         ARCHANA      Elevation         4
3          SUNITA     Sing to It         5
23             OM         Nation         6
5             JAY  Paradise Lost         2
6           SAKSHI  War and Peace         5
7             NEHA      Elevation         5
8           PANKAG      Kidnapped         4
9             ARUN         Indica         6
10           ASHOK        Tinkers         5
11           SAHIL      Kidnapped         3
12      ABHILAKSH      Kidnapped         2
13           ATUL      Kidnapped         1
14           GARV        macbeth         1
15         PIYUSH          ncert        10
```

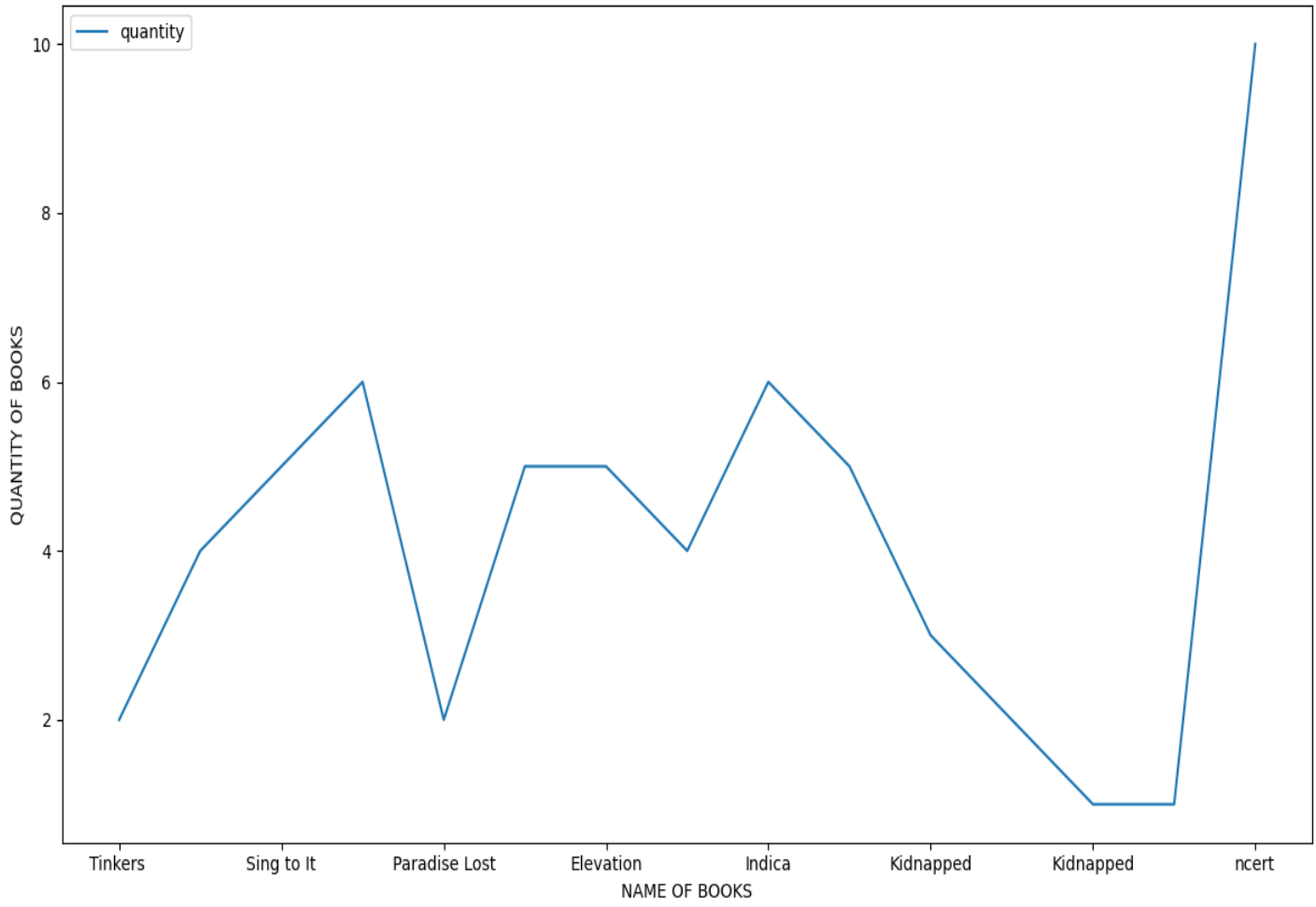
Person data available

```
Enter your choice -- 6
search name of person
================
name of individual -- OM
================
Yes ,data available
DATA -
admno        23
book     Nation
Name: OM, dtype: object
==================================================
```

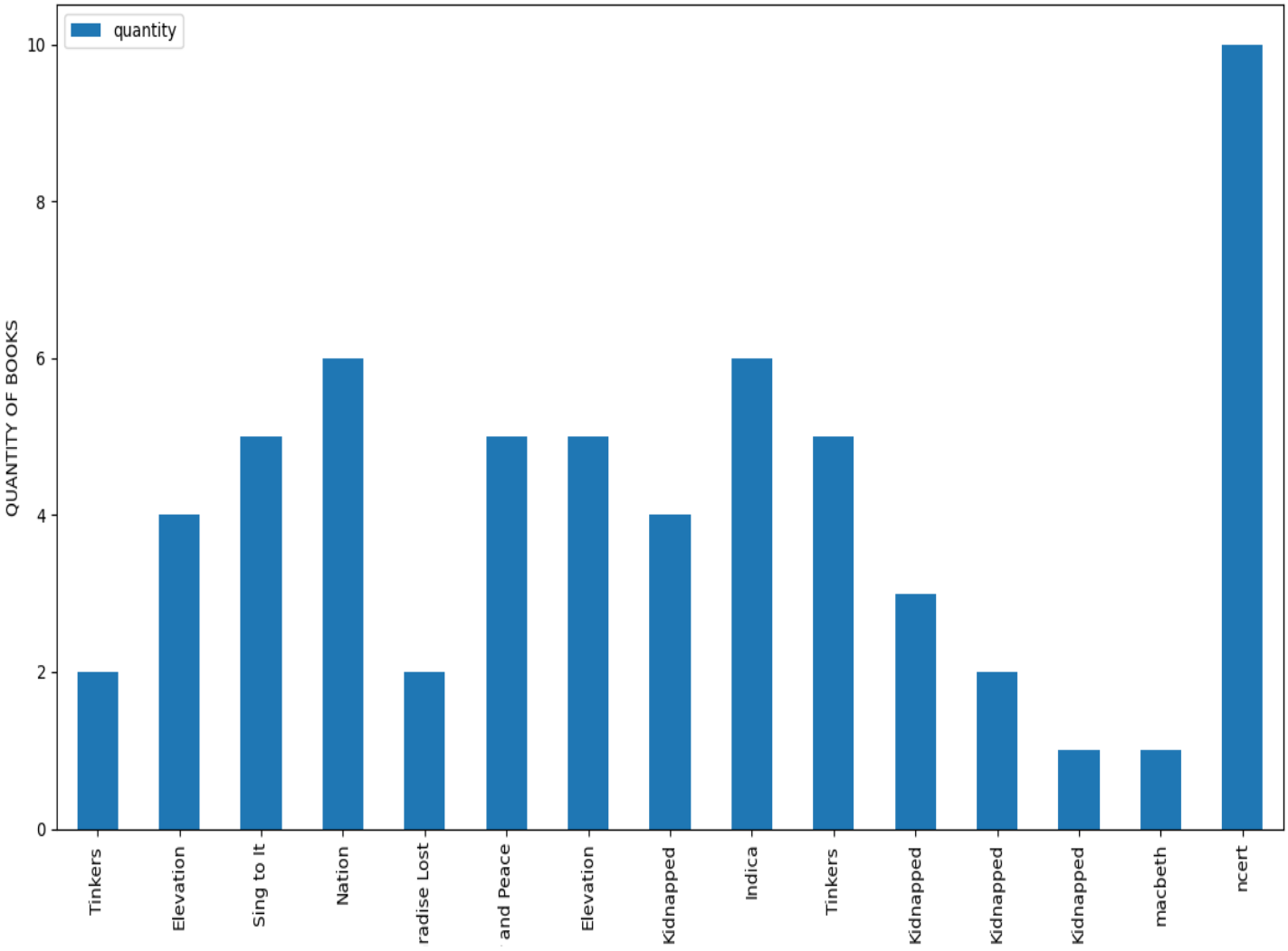
Search a book

```
Enter your choice -- 3
search a book
================
name of book -- Kidnapped
================
yes , book is avaialable
           admno       Name
book
Kidnapped      8     PANKAG
Kidnapped     11      SAHIL
Kidnapped     12  ABHILAKSH
Kidnapped     13       ATUL
=================================================


Main Menu
====================================
1. Add a new book
2. Delete Existing data
3. Search a book
4. List of all data
5. Graph [books vs quantity]
6. Person data available
7. Exit


Enter your choice -- 3
search a book
================
name of book -- FUNCTIONS
================
sorry , book not available now
=================================================
```

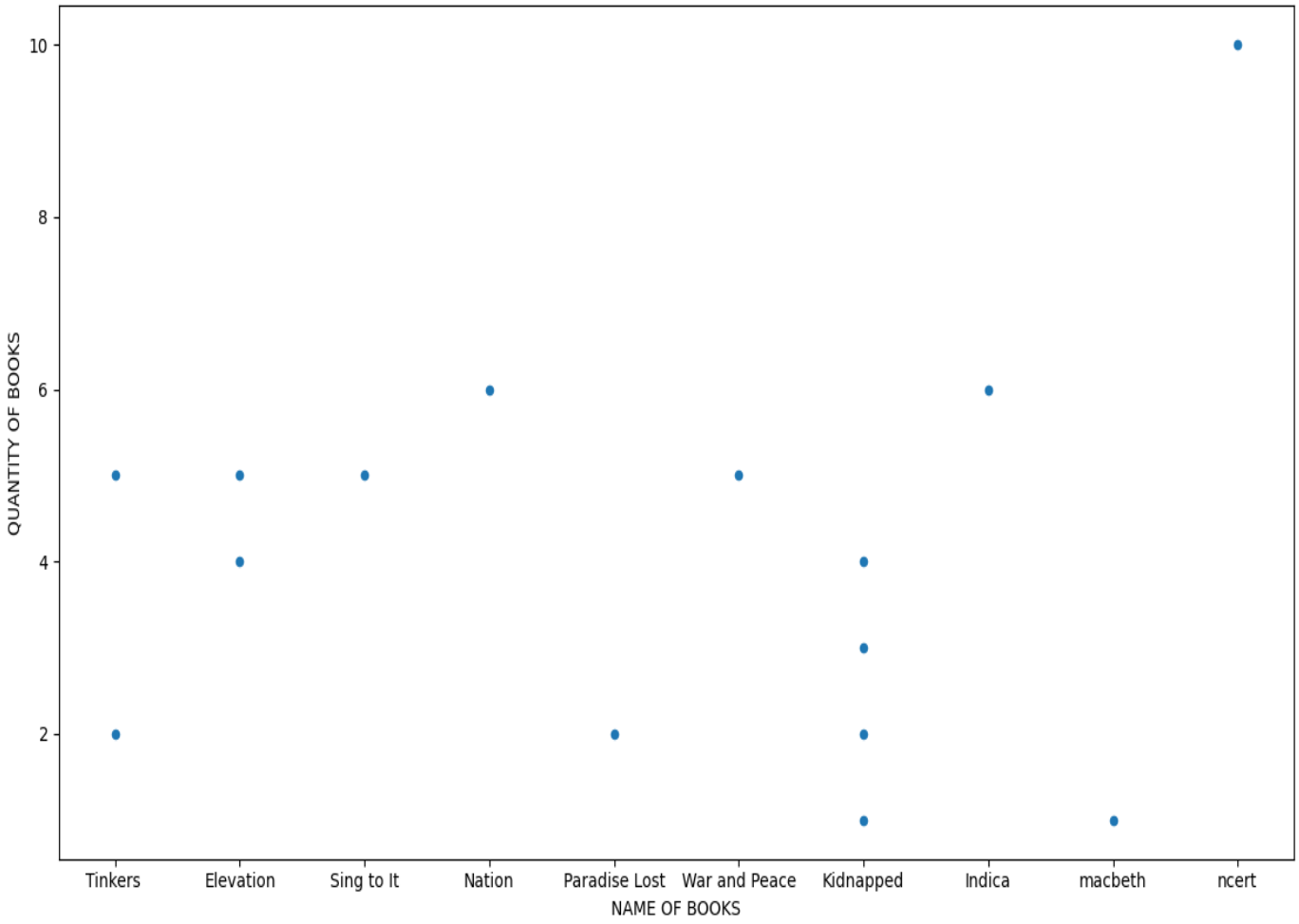
Line graph


quantity
10
8
6
4
2
QUANTITY OF BOOKS
Tinkers
Sing to It
Paradise Lost
Elevation
Indica
Kidnapped
Kidnapped
ncert
NAME OF BOOKS

Bar graph


quantity
QUANTITY OF BOOKS
0
2
4
6
8
10
Tinkers
Elevation
Sing to It
Nation
radise Lost
and Peace
Elevation
Kidnapped
Indica
Tinkers
Kidnapped
Kidnapped
Kidnapped
macbeth
ncert

Scatter chart



For row deletion

```
Enter your choice -- 2
=====================================


delete record
=================
                admno        Name  quantity
book
Tinkers             1      APARNA         2
Elevation           2     ARCHANA         4
Sing to It          3      SUNITA         5
Nation             23          OM         6
Paradise Lost       5         JAY         2
War and Peace       6      SAKSHI         5
Elevation           7        NEHA         5
Kidnapped           8      PANKAG         4
Indica              9        ARUN         6
Tinkers            10       ASHOK         5
Kidnapped          11       SAHIL         3
Kidnapped          12   ABHILAKSH         2
Kidnapped          13        ATUL         1
macbeth            14        GARV         1
ncert              15      PIYUSH        10
1.for row deletion
2.for column deletion
enter 1 or 2 --  1
enter book name -- Kidnapped
=================
Resulting Data
                admno      Name  quantity
book
Tinkers             1    APARNA         2
Elevation           2   ARCHANA         4
Sing to It          3    SUNITA         5
Nation             23        OM         6
Paradise Lost       5       JAY         2
War and Peace       6    SAKSHI         5
Elevation           7      NEHA         5
Indica              9      ARUN         6
Tinkers            10     ASHOK         5
macbeth            14      GARV         1
ncert              15    PIYUSH        10
================================================
```

For column deletion

```
Enter your choice -- 2
delete record
================
                admno       Name  quantity
book
Tinkers             1     APARNA         2
Elevation           2    ARCHANA         4
Sing to It          3     SUNITA         5
Nation             23         OM         6
Paradise Lost       5        JAY         2
War and Peace       6     SAKSHI         5
Elevation           7       NEHA         5
Kidnapped           8     PANKAG         4
Indica              9       ARUN         6
Tinkers            10      ASHOK         5
Kidnapped          11      SAHIL         3
Kidnapped          12  ABHILAKSH         2
Kidnapped          13       ATUL         1
macbeth            14       GARV         1
ncert              15     PIYUSH        10
1.for row deletion
2.for column deletion
enter 1 or 2 --  2
enter column name -- quantity
================
Resulting Data
                admno       Name
book
Tinkers             1     APARNA
Elevation           2    ARCHANA
Sing to It          3     SUNITA
Nation             23         OM
Paradise Lost       5        JAY
War and Peace       6     SAKSHI
Elevation           7       NEHA
Kidnapped           8     PANKAG
Indica              9       ARUN
Tinkers            10      ASHOK
Kidnapped          11      SAHIL
Kidnapped          12  ABHILAKSH
Kidnapped          13       ATUL
macbeth            14       GARV
ncert              15     PIYUSH
================================================
```

Adding new data

```
Enter your choice -- 1
adding new Records
==================
    admno       Name                    book  quantity
0       1     APARNA          End and Means         2
1       2    ARCHANA    Vision of the Past         4
2       3     SUNITA  Myth of Independence         5
3      23         OM    A Nation is Making         6
4       5        JAY          Paradise Lost         2
5       6     SAKSHI          War and Peace         5
6       7       NEHA  Theory of Relativity         5
7       8     PANKAG              Kidnapped         4
8       9       ARUN                 Indica         6
9      10      ASHOK  Circle of the Region         5
10     11      SAHIL              Kidnapped         3
11     12  ABHILAKSH              Kidnapped         2
12     13       ATUL              Kidnapped         1
13     14       GARV                macbeth         1
do you want to enter new record (yes|no) -- yes
enter admno -- 15
enter name of student -- RAHUL
enter name of book -- macbeth
enter total quantity of books -- 0
next record (yes|no) -- no
    admno       Name                    book  quantity
0       1     APARNA          End and Means         2
1       2    ARCHANA    Vision of the Past         4
2       3     SUNITA  Myth of Independence         5
3      23         OM    A Nation is Making         6
4       5        JAY          Paradise Lost         2
5       6     SAKSHI          War and Peace         5
6       7       NEHA  Theory of Relativity         5
7       8     PANKAG              Kidnapped         4
8       9       ARUN                 Indica         6
9      10      ASHOK  Circle of the Region         5
10     11      SAHIL              Kidnapped         3
11     12  ABHILAKSH              Kidnapped         2
12     13       ATUL              Kidnapped         1
13     14       GARV                macbeth         1
14     15      RAHUL                macbeth         0
DO YOU WANT TO SAVE UPDATED DATA IN NEW FILE (yes|no) -- yes
```