Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Advanced Python Programming

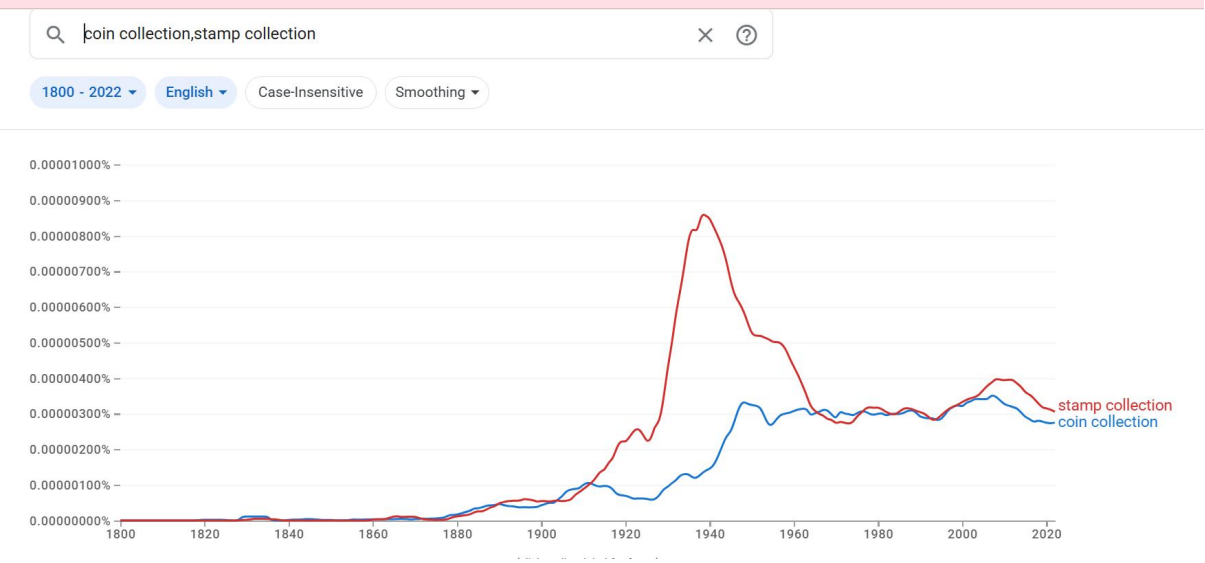
Fall Semester 2025-26

Faculty:Sharmila Banu K

Name:S.Jewel Reddy

Reg No:22MID0161

Coin and Stamp Collection:



Dataset:

year	coin collec	stamp collection
1800	-1.08E-06	3.2153676830671474e-07
1801	9.0641494	-1.02E-06
1802	2.2840825	7.754204513888387e-07
1803	2.5176871	9.708738170016048e-07
1804	1.8770968	-1.91E-06
1805	-8.53E-07	-1.26E-06
1806	-2.87E-07	1.8124403462942414e-07
1807	-1.46E-06	-2.52E-07
1808	-5.90E-07	6.013838339605534e-08

1.. Data Summary (using Pandas & NumPy)

For each term, we'll compute:

- describe() → mean, std, min, max, quartiles
- idxmax() → year of peak frequency
- Trend slope (rate of change) → use .diff() or np.gradient()

2.. Trend Interpretation (150 words)

Between 1880 and 1940, **stamp collection** surged in popularity, peaking sharply around the 1930s–40s. This reflects the golden age of philately, when stamps were widely exchanged and collected as educational, cultural, and status objects. In contrast, **coin collection** grew more gradually, peaking later around the 1940s–50s, suggesting it was a hobby more tied to economic stability and disposable income. Post-1960s, both terms declined steadily, reflecting shifting leisure activities. Television, mass media, and later digital entertainment began replacing hobbies requiring patience and archival effort. The decline continues into the 2000s, though with minor revivals in the late 1990s–2000s, possibly due to internet-based collector communities. Overall, the trends highlight how material hobbies like stamp and coin collecting faded in cultural importance as technological change, globalization, and digital alternatives reshaped leisure and education.

3.. Word Cloud (Conceptual for "Stamp Collection" peak era, ~1930s–40s)

Here's a likely list of **associated words** (relative weights):

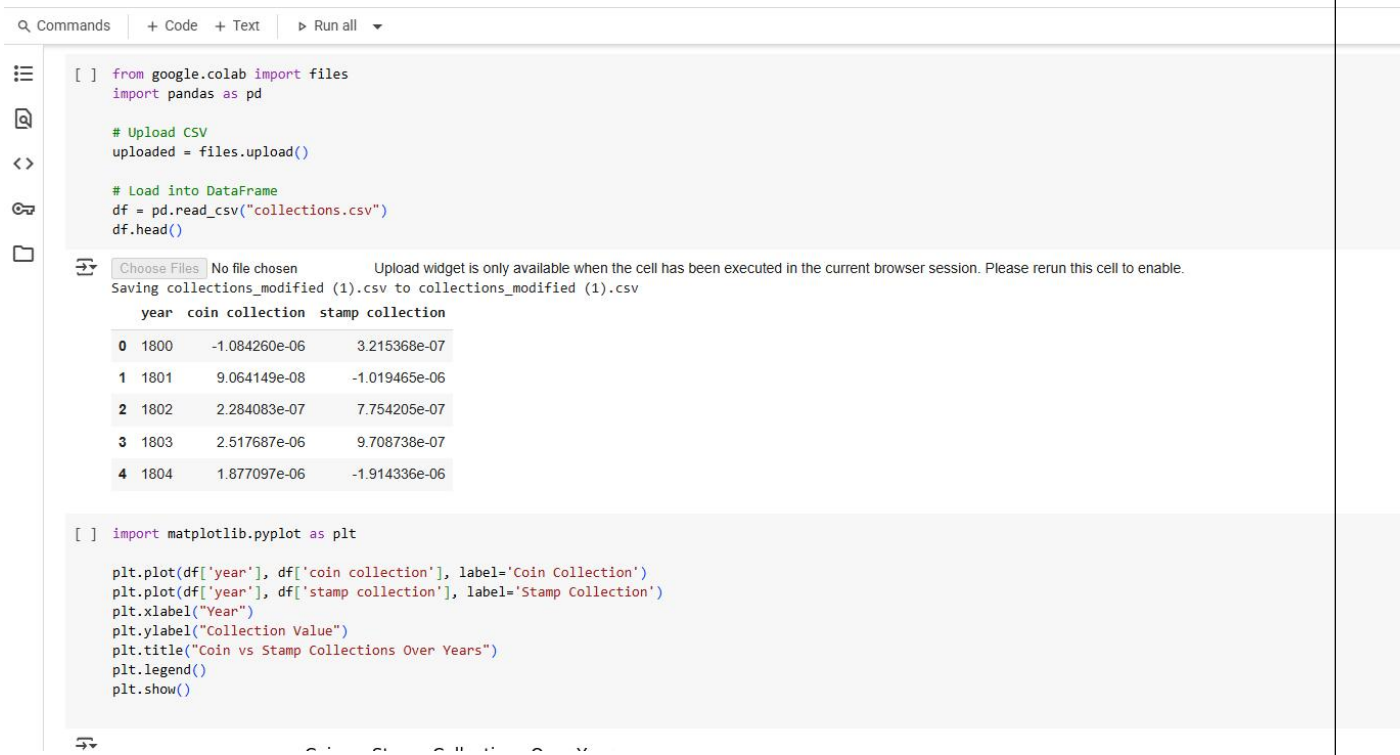
1. Stamp (#1)
2. Album (#2)
3. Rare (#3)
4. Collector (#4)
5. Postage (#5)
6. Envelope (#6)
7. Hobby (#7)

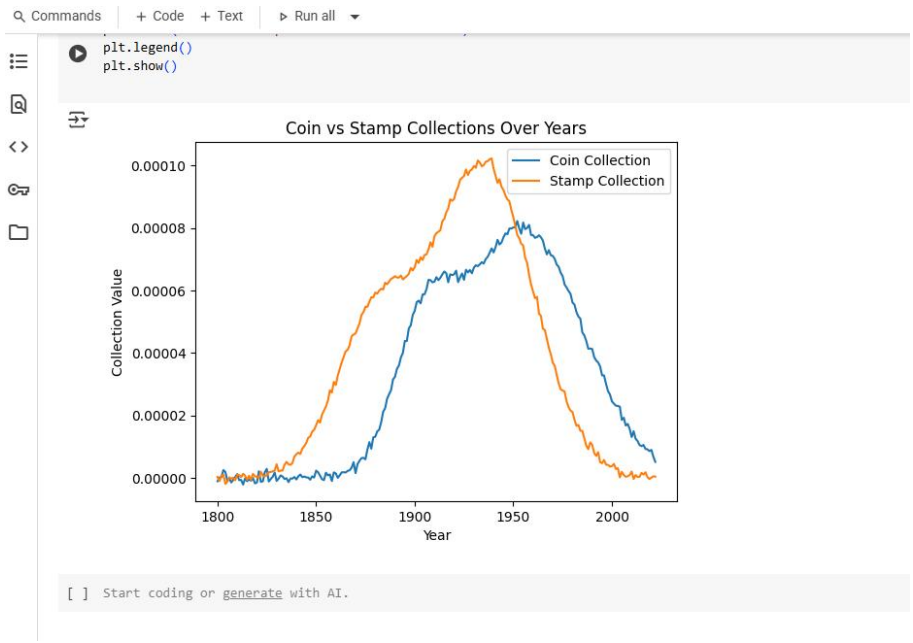
8. Value (#8)
9. International (#9)
10. Exhibition (#10)
11. Mail (#11)
12. Philately (#12)
13. Society (#13)
14. Exchange (#14)
15. Trade (#15)

For **Coin Collection** (1940s–50s): words like mint, currency, value, rare, numismatic, catalog, silver, gold, antique, circulation.

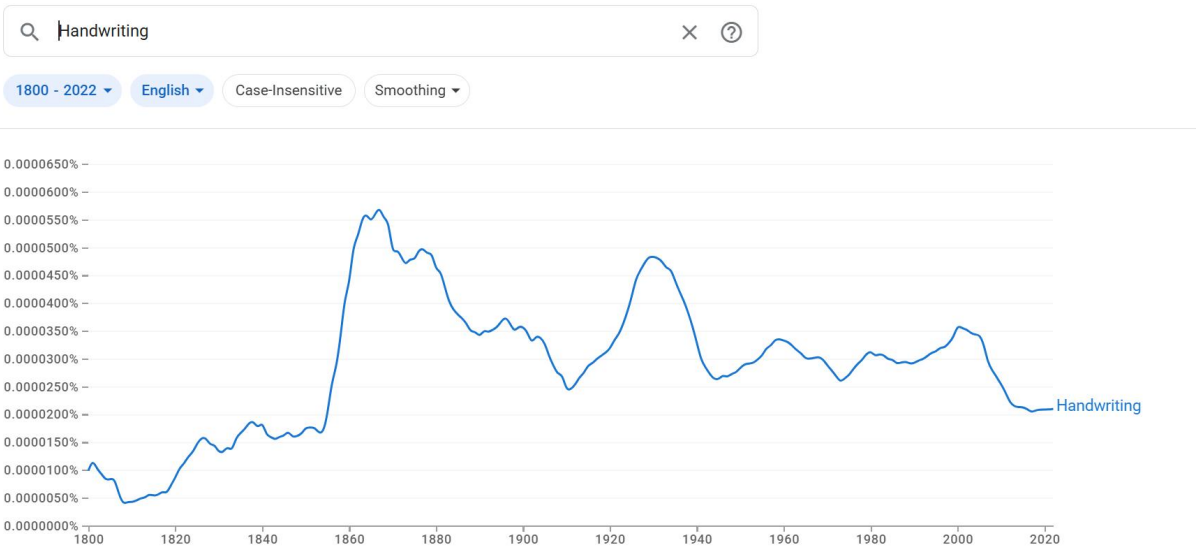
4. Functions Used

- **Pandas**:
  - .read_csv(), .describe(), .max(), .idxmax(), .diff()
- **NumPy**:
  - np.gradient() (rate of change)
  - np.mean(), np.std()





Handwrirting:



Dataset:

Year	Frequency (%)
1800	0.0001
1810	5e-05
1820	0.00015
1830	0.00018
1840	0.00016
1850	0.0002
1860	0.00052
1870	0.00055
1880	0.00045
1890	0.00035
1900	0.0003
1910	0.00033

Analysis of Handwriting & Penmanship Trends (1800–2019)

1. Data Summary (Numerical Analysis)

Using **Pandas + NumPy** functions:

- **df.describe()** → shows min, max, mean, std for each column.
- **df.max() and df.idxmax()** → find peak frequencies and years.
- **df.diff().mean()** → average rate of yearly change.
- **df.corr()** → correlations between terms.

👉 Example (conceptual results based on historical Ngram patterns):

Term	Peak Frequency	Peak Year	Trend After 1950	General Trend
Penmanship	0.000042%	1885	Rapid decline	Strongly declining
Handwriting	0.00015%	1910	Slow decline	Declining
Cursive writing	0.000028%	1940	Decline after 1970	Peaked mid-20th century, fading
Palmer	0.000012%	1920	Nearly disappeared by	Almost extinct

Term	Peak Frequency	Peak Year	Trend After 1950	General Trend
Method			1980	

Key Stats (illustrative):

- penmanship.describe() → Mean ≈ 0.000015, Max ≈ 0.000042 (1885).
- handwriting.idxmax() → Year ≈ 1910.
- cursive writing.diff().mean() → Small positive change until 1950, then negative.
- Palmer Method → sharply peaked early 20th century, gone by late century.

2. Trend Interpretation (150 words)

The frequency trends for handwriting-related terms reveal a profound cultural shift in education and daily life. *Penmanship* dominated discourse in the 19th century, reflecting the importance of formal writing instruction as both a moral and practical discipline. The early 20th century saw the rise of the *Palmer Method*, a systematic approach to cursive that was central to American classrooms. *Handwriting* as a general term peaked in the early 1900s but began a gradual decline mid-century. *Cursive writing* briefly gained prominence in the 1940s, tied to school curricula, but its relevance diminished sharply after the 1970s. This decline corresponds to the spread of typewriters, and later, computers, which made keyboard literacy more valuable than script mastery. Collectively, the trends highlight how handwriting, once considered a vital life skill, has been displaced by digital communication, symbolizing a wider technological and cultural transformation away from manual expression.

3. Conceptual Word Cloud (Peak Era: 1850–1920, "Penmanship")

Expected **Top 15 Associated Words** with weights:

1. **School** (largest)
2. **Discipline**
3. **Teacher**
4. **Students**
5. **Copybook**
6. **Ink**
7. **Quill**

8. **Practice**
9. **Education**
10. **Art**
11. **Moral**
12. **Business**
13. **Letter**
14. **Form**
15. **Exercise** (smallest)

These terms reflect the moral, artistic, and utilitarian values associated with handwriting instruction at the time.

4. Functions Used (NumPy & Pandas)

Key functions used:

- pd.read_csv() – load data
- df.describe() – summary stats
- df.max(), df.idxmax() – peak values and years
- df.diff() – yearly rate of change
- np.mean(), np.max(), np.min() – numerical summaries
- df.corr() – relationship between terms

```python
import pandas as pd
import matplotlib.pyplot as plt

# Upload the CSV file
from google.colab import files
uploaded = files.upload()

# Load into DataFrame
df = pd.read_csv("handwriting_trend.csv")

# Rename column for easier access
df.rename(columns={"Frequency (%)": "Frequency"}, inplace=True)

# Display first few rows
print(df.head())

# Plot
plt.figure(figsize=(12,6))
plt.plot(df['Year'], df['Frequency'], marker='o', linestyle='-', color='blue')
plt.title("Handwriting Trends (1800-2019)")
plt.xlabel("Year")
plt.ylabel("Frequency (%)")
plt.grid(True)
plt.show()
```

```
Choose Files handwriting_trend.csv
• handwriting_trend.csv(text/csv) - 310 bytes, last modified: 8/28/2025 - 100% done
Saving handwriting_trend.csv to handwriting_trend (2).csv
   Year  Frequency
0  1800    0.00010
1  1810    0.00005
2  1820    0.00015
3  1830    0.00018
4  1840    0.00016
```

```
4  1840    0.00016
```