Lab Exercise - Python Libraries and Packages

Part 1 – Implement Basic Data Structures using Numpy, Pandas

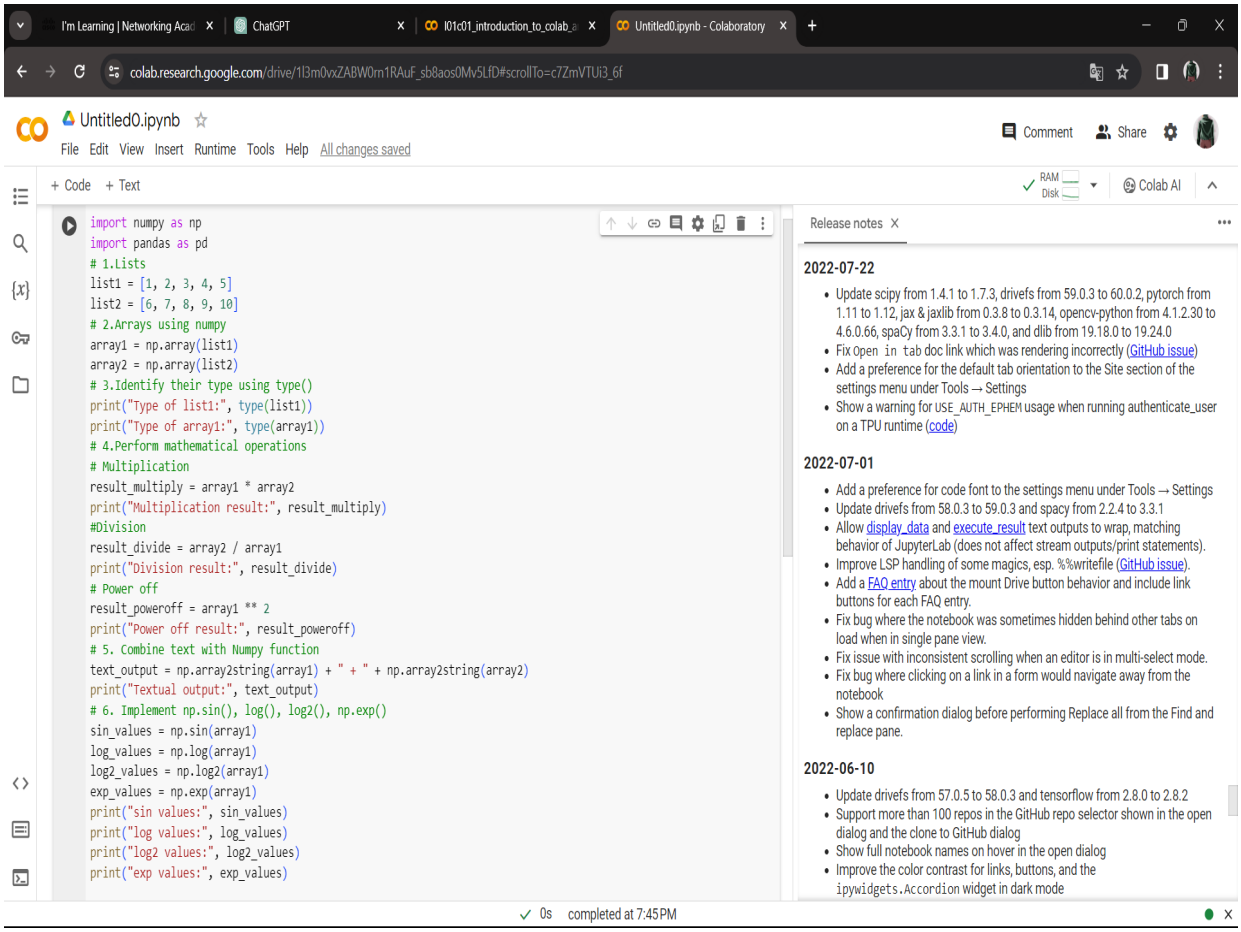
1. Lists

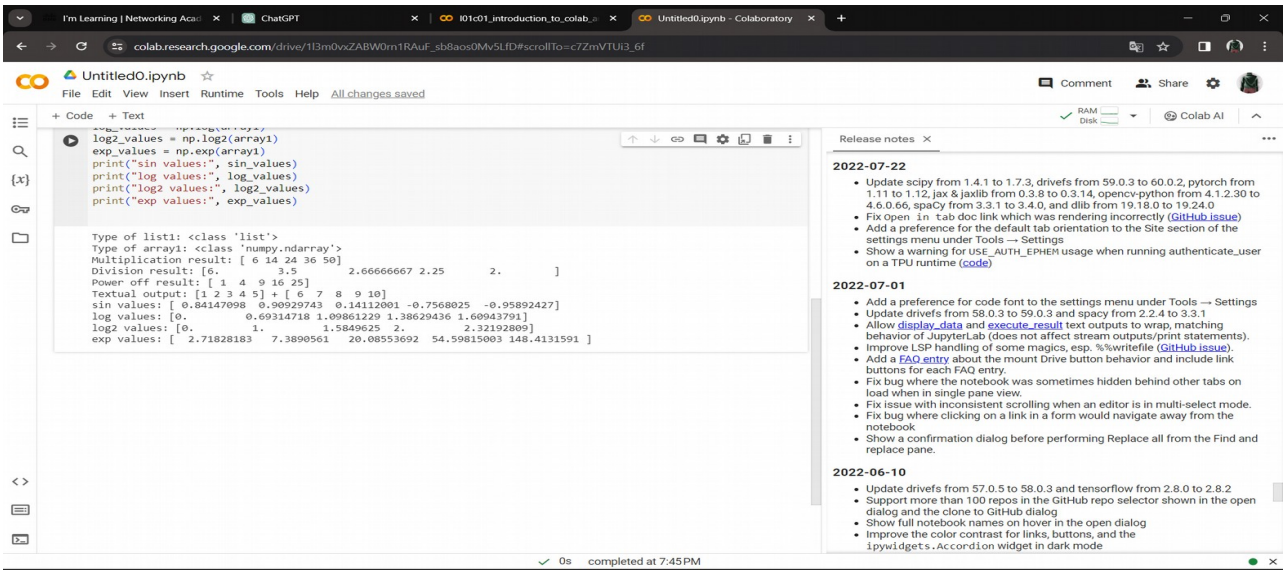
2. Arrays

3. Identify their type using type()

4. Perform mathematical operations on these datasets created - multiplication, division, poweroff

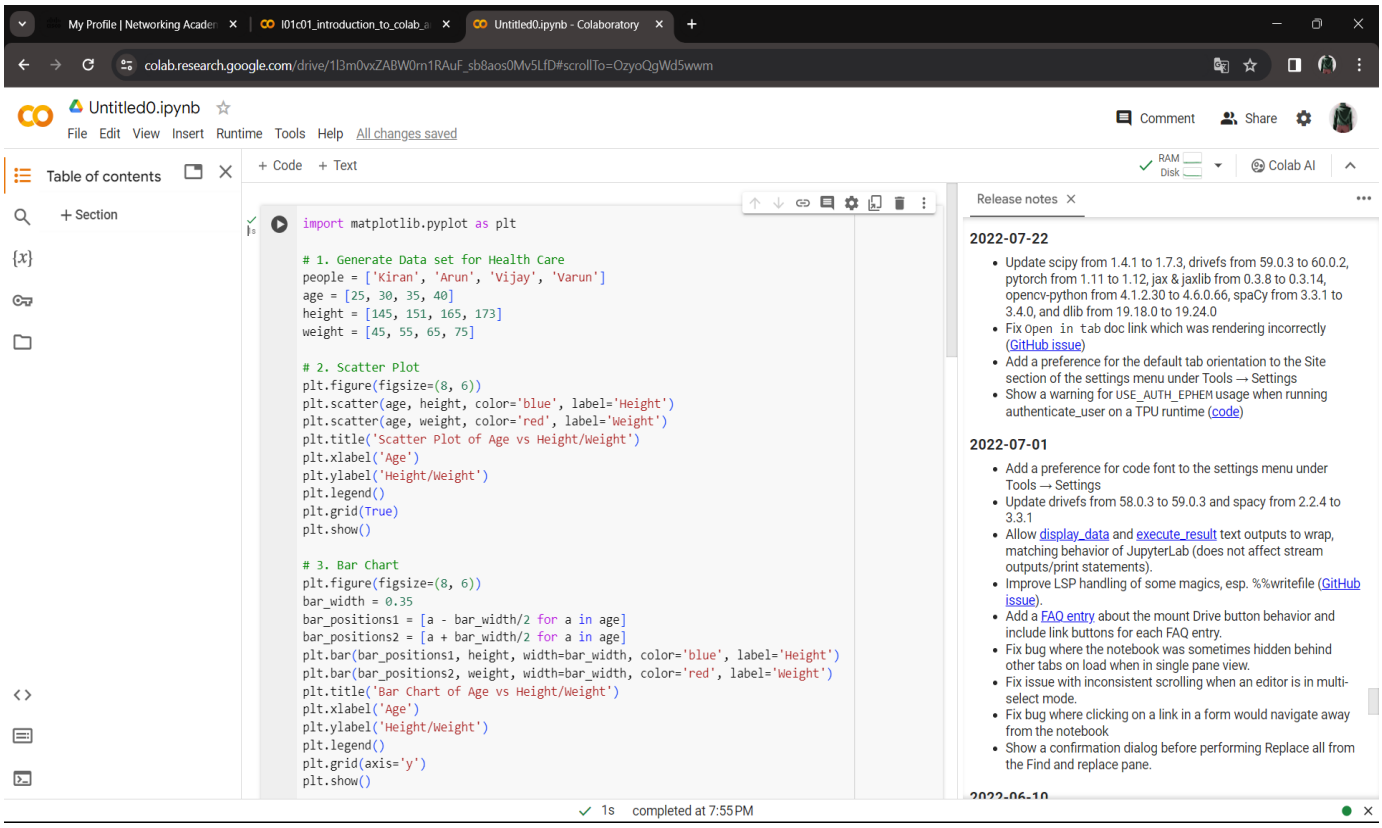
5. Combine text with Numpy fuction to generate a textual output - ”Addition of Two: array1 +array 2 6. Implement np.sin(), log(), log2(), np.exp())

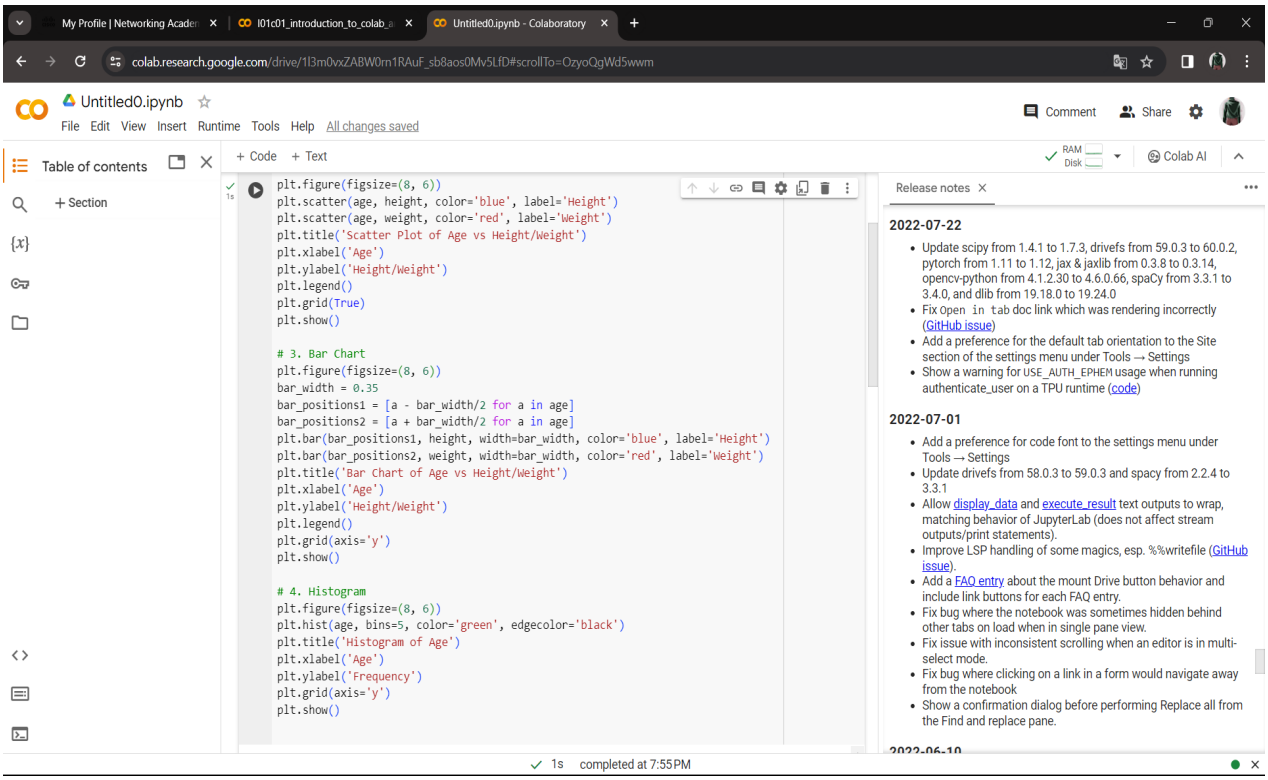




Part 2 – Visualization of Data using matplotlib, pyplots Packages

1. Generate a Data set for Health Care using the following: people = [’kiran’, arun’, ’vijay’, ’varun’] age =[25, 30, 35, 40, 45] height =[145, 151, 165, 173] weight=[45, 55, 65, 75]
2. Using the generated dataset given above. Generate the following graphs and justify the relationships among the vectors.
3. Scatter Plot
4. Bar Chart
5. Histogram
6. Provide Graph Title, labels for X, Y axis with proper justification and explaination of the graph.

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+ Code + Text
RAM
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Colab AI
plt.figure(figsize=(8, 6))
plt.scatter(age, height, color='blue', label='Height')
plt.scatter(age, weight, color='red', label='Weight')
plt.title('Scatter Plot of Age vs Height/Weight')
plt.xlabel('Age')
plt.ylabel('Height/Weight')
plt.legend()
plt.grid(True)
plt.show()
# 3. Bar Chart
plt.figure(figsize=(8, 6))
bar_width = 0.35
bar_positions1 = [a - bar_width/2 for a in age]
bar_positions2 = [a + bar_width/2 for a in age]
plt.bar(bar_positions1, height, width=bar_width, color='blue', label='Height')
plt.bar(bar_positions2, weight, width=bar_width, color='red', label='Weight')
plt.title('Bar Chart of Age vs Height/Weight')
plt.xlabel('Age')
plt.ylabel('Height/Weight')
plt.legend()
plt.grid(axis='y')
plt.show()
# 4. Histogram
plt.figure(figsize=(8, 6))
plt.hist(age, bins=5, color='green', edgecolor='black')
plt.title('Histogram of Age')
plt.xlabel('Age')
plt.ylabel('Frequency')
plt.grid(axis='y')
plt.show()
Release notes
2022-07-22
Update scipy from 1.4.1 to 1.7.3, drivefs from 59.0.3 to 60.0.2, pytorch from 1.11 to 1.12, jax & jaxlib from 0.3.8 to 0.3.14, opencv-python from 4.1.2.30 to 4.6.0.66, spaCy from 3.3.1 to 3.4.0, and dlib from 19.18.0 to 19.24.0
Fix Open in tab doc link which was rendering incorrectly (GitHub issue)
Add a preference for the default tab orientation to the Site section of the settings menu under Tools → Settings
Show a warning for USE_AUTH_EPHEM usage when running authenticate_user on a TPU runtime (code)
2022-07-01
Add a preference for code font to the settings menu under Tools → Settings
Update drivefs from 58.0.3 to 59.0.3 and spacy from 2.2.4 to 3.3.1
Allow display_data and execute_result text outputs to wrap, matching behavior of JupyterLab (does not affect stream outputs/print statements).
Improve LSP handling of some magics, esp. %%writefile (GitHub issue).
Add a FAQ entry about the mount Drive button behavior and include link buttons for each FAQ entry.
Fix bug where the notebook was sometimes hidden behind other tabs on load when in single pane view.
Fix issue with inconsistent scrolling when an editor is in multi-select mode.
Fix bug where clicking on a link in a form would navigate away from the notebook
Show a confirmation dialog before performing Replace all from the Find and replace pane.
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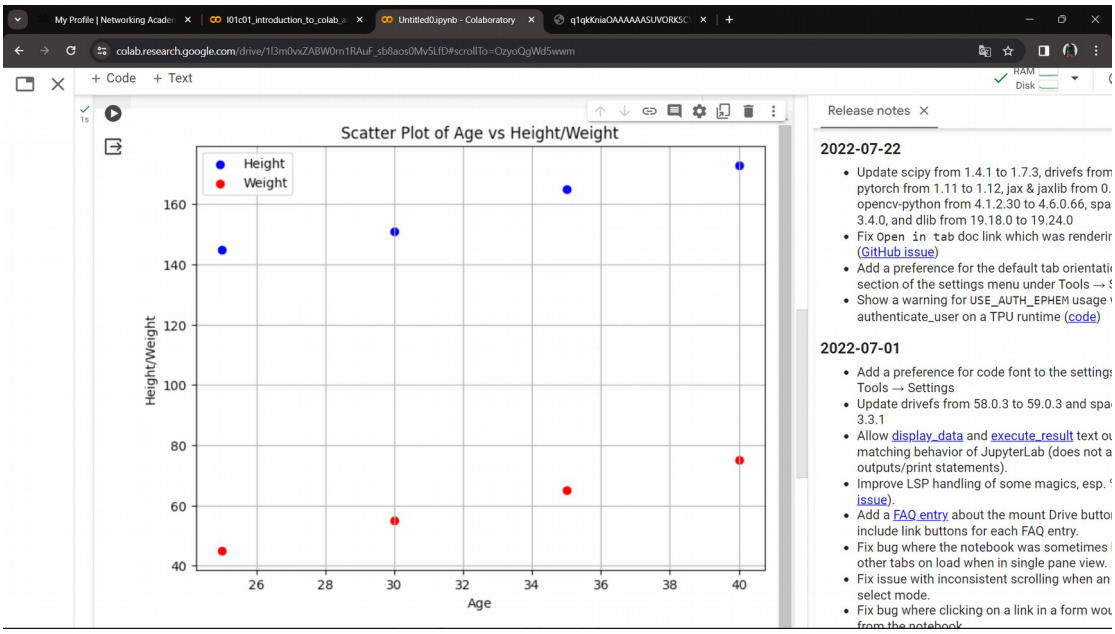
Scatter Plot of Age vs Height/Weight
Height
Weight
Height/Weight
Age
160
140
120
100
80
60
40
26
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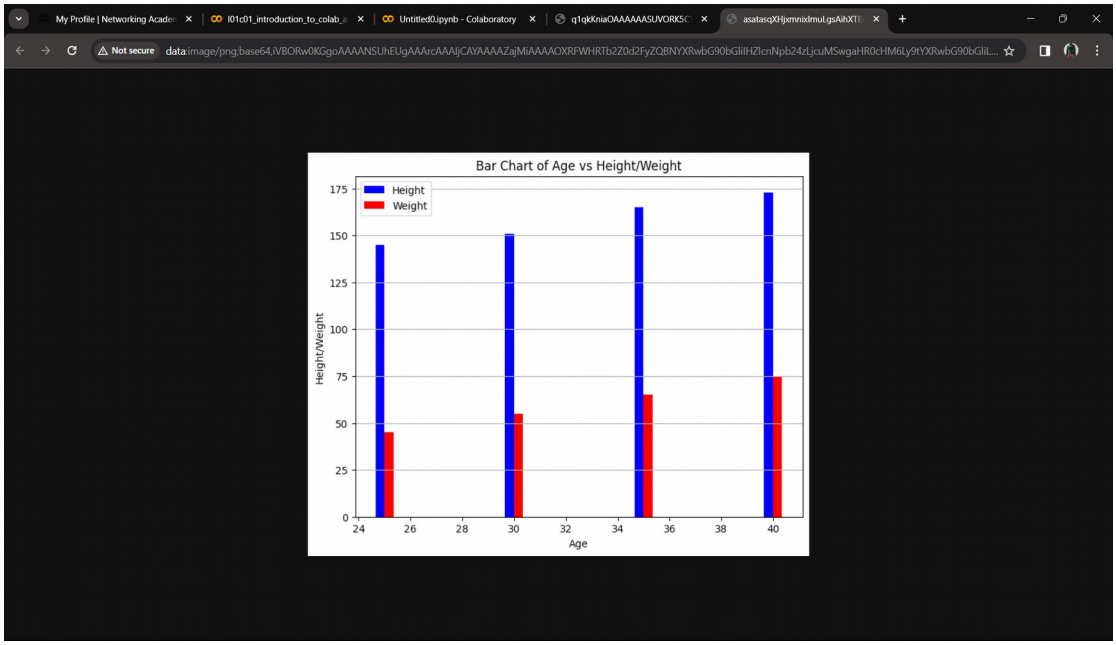
38
40
Release notes
2022-07-22
2022-07-01


Bar Chart of Age vs Height/Weight
Height
Weight
Height/Weight
Age
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25
50
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100
125
150
175
24
26
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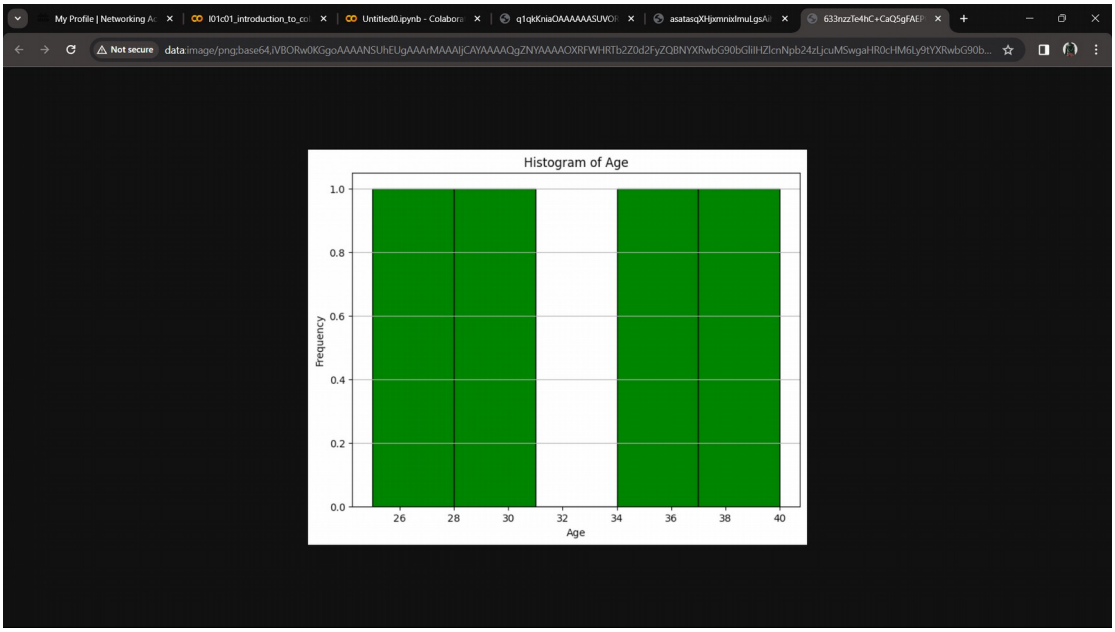
30
32
34
36
38
40


Histogram of Age
Frequency
Age
0.0
0.2
0.4
0.6
0.8
1.0
26
28
30
32
34
36
38
40

Part 3 – Access Data from Various Data Sources using builtin Function of Numpy, Pandas

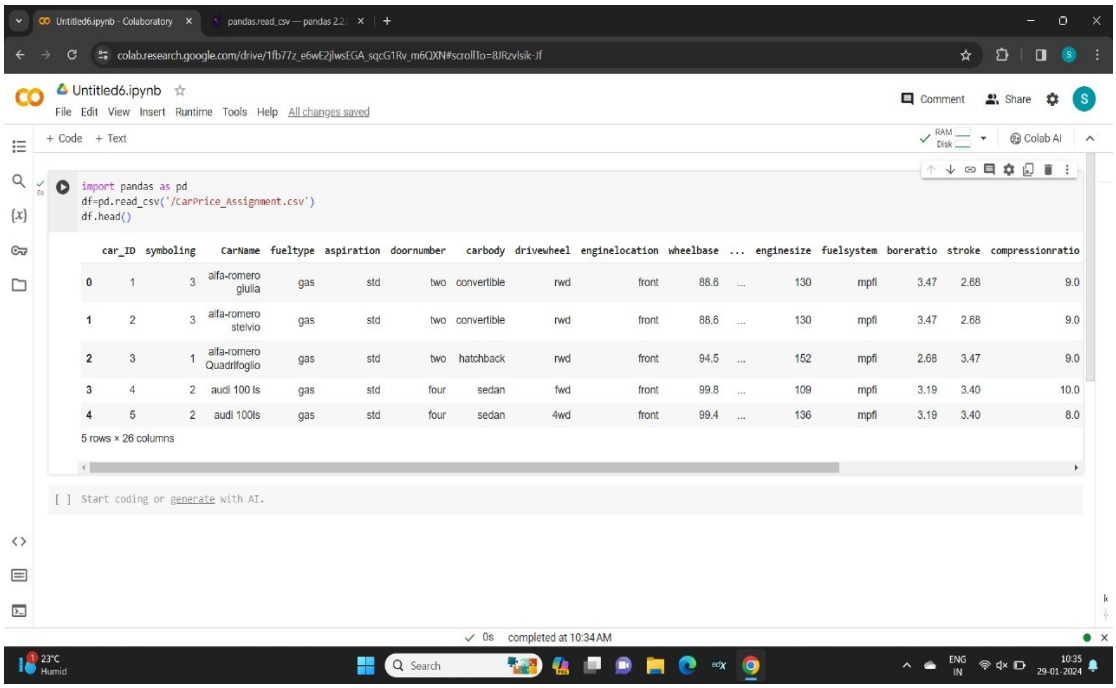
1. Generate your own dataset using MS Excel and Notepad to prepare the dataset. Save it in Google Drive and access it in Google Colab

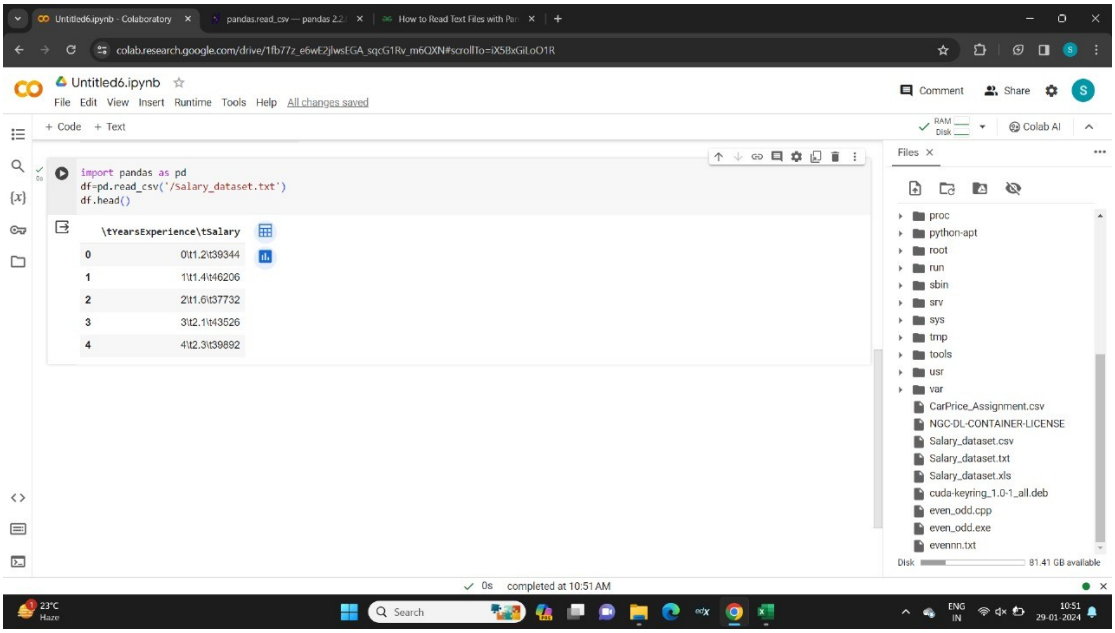
. 2. Upload the text file using tab seperated value(.tsv) and access the data from the file.

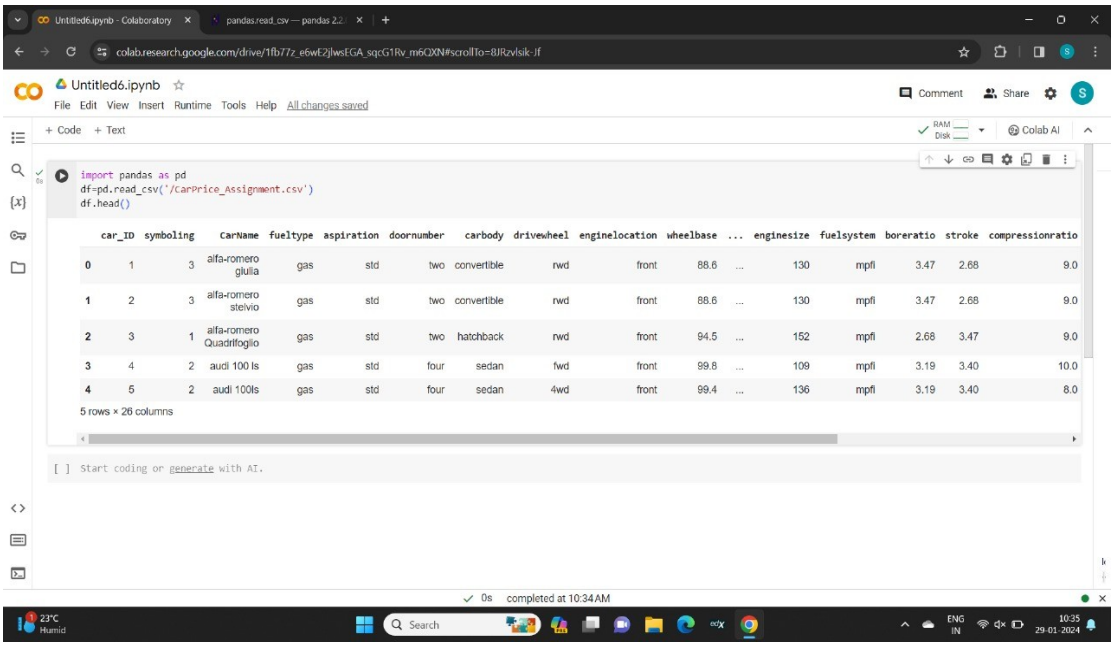
3. Upload the text file using comma seperated value(.csv) and access the data from file.

4. Access the excel file using .xlsx

5. Access the text from the URL



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import pandas as pd
df=pd.read_csv('/CarPrice_Assignment.csv')
df.head()
car_ID symboling CarName fueltype aspiration doornumber carbody drivewheel enginelocation wheelbase ... enginesize fuelsystem boreratio stroke compressionratio
0 1 3 alfa-romero giulia gas std two convertible rwd front 88.6 ... 130 mpfi 3.47 2.68 9.0
1 2 3 alfa-romero stelvio gas std two convertible rwd front 88.6 ... 130 mpfi 3.47 2.68 9.0
2 3 1 alfa-romero Quadrifoglio gas std two hatchback rwd front 94.5 ... 152 mpfi 2.68 3.47 9.0
3 4 2 audi 100 ls gas std four sedan fwd front 99.8 ... 109 mpfi 3.19 3.40 10.0
4 5 2 audi 100ls gas std four sedan 4wd front 99.4 ... 136 mpfi 3.19 3.40 8.0
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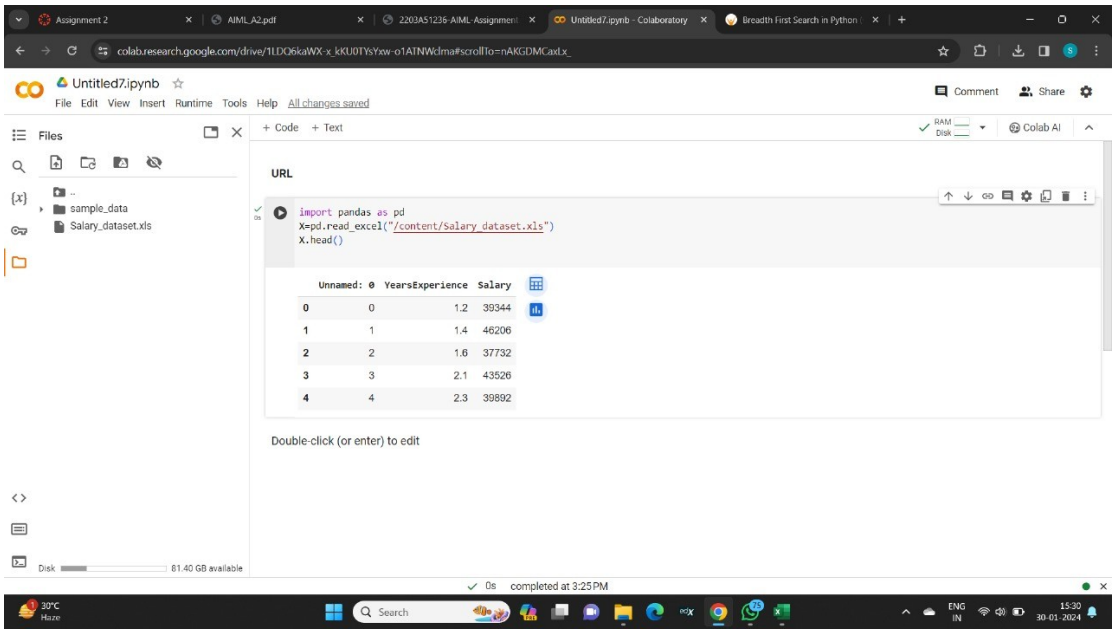
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Salary_dataset.xls
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import pandas as pd
X=pd.read_excel("/content/Salary_dataset.xls")
X.head()
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2 2 1.6 37732
3 3 2.1 43526
4 4 2.3 39892
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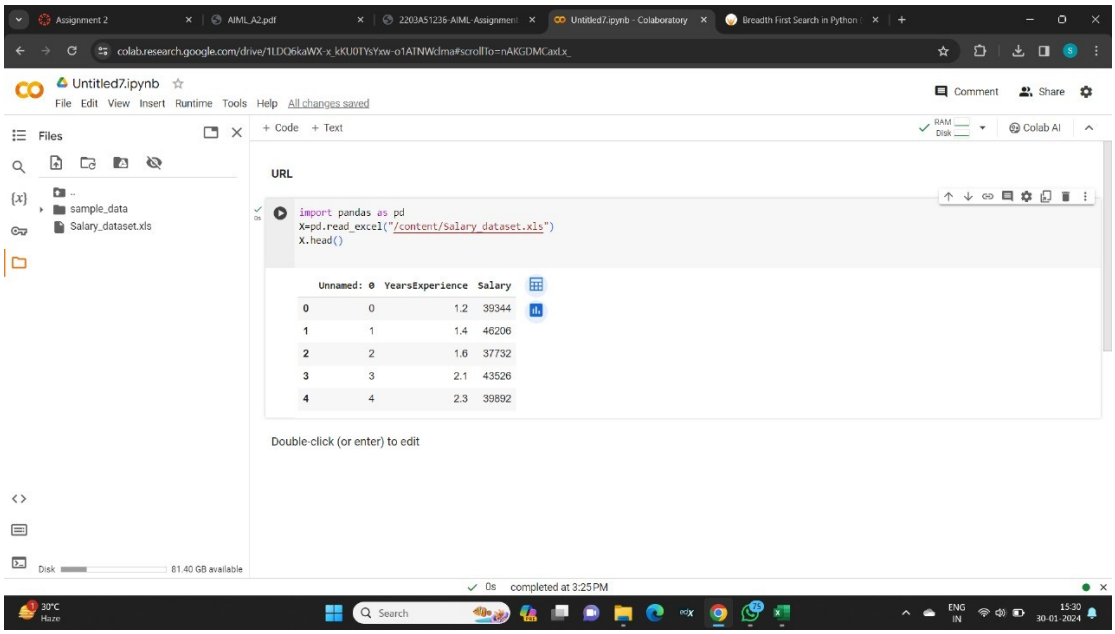
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Breadth First Search in Python
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sample_data
Salary_dataset.xls
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import pandas as pd
X=pd.read_excel("/content/Salary_dataset.xls")
X.head()
Unnamed: 0 YearsExperience Salary
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1 1 1.4 46206
2 2 1.6 37732
3 3 2.1 43526
4 4 2.3 39892
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