# Complete Pandas Tutorial with Examples

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1. Introduction to Pandas
Pandas is a Python library used for data analysis and manipulation.

Installation:
pip install pandas

Importing Pandas:
import pandas as pd

2. Pandas Data Structures
Series (1D Data) and DataFrame (2D Data)

Creating a Series:
import pandas as pd
data = [10, 20, 30, 40]
s = pd.Series(data)
print(s)

Creating a DataFrame:
data = {'Name': ['Alice', 'Bob'], 'Age': [25, 30]}
df = pd.DataFrame(data)
print(df)

3. Reading & Writing Data
df = pd.read_csv('data.csv')
df.to_csv('output.csv', index=False)

4. Accessing Data
print(df.shape)
print(df['Name'])

5. Filtering & Sorting
df[df['Age'] > 28]
df.sort_values(by='Age', ascending=False)

6. Modifying Data
df['Salary'] = [50000, 60000]
df.drop(columns=['Salary'], inplace=True)

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7. Grouping & Aggregation
df.groupby('City')['Age'].mean()

8. Handling Missing Data
df.fillna(0, inplace=True)
df.dropna(inplace=True)

9. Merging & Concatenation
merged_df = pd.merge(df1, df2, on='ID')
df_concat = pd.concat([df1, df2], axis=1)

10. Export Data
df.to_excel('data.xlsx', index=False)
df.to_json('data.json')

Summary: Pandas is a powerful library for data analysis.