

## Python Tutorials

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### Serie 1 : Get Started

Exercise 1: Print the sum of the current number and the previous number

Exercise 2: Print characters from a string.

Exercise 3: Remove first 5 characters from a string

Exercise 4: Remove last 5 characters from a string

Exercise 5: Remove first or last n characters from a string

Exercise 6: Write a function to solve 2nd order equation

Exercise 7: Ask a number and displays its multiplication table (from 1 to 10)

Exercise 8: Ask the user to enter a string and display it in reverse

Exercise 9: Ask for a password of 4 digits. Try until the password is not all positive value and 4 digits. Show the final password

Exercise 10: Generate and display a list of squares of numbers from 1 to 10

### Serie 2: Panda Library

Exercise 1: Create a DataFrame with the following data:

- Columns: "Name", "Age", "City"
- Rows: ("Maxwell", 27, "Kumasi"), ("Zossin", 24, "Abomey") and ("Nafi", 23, "Ouaga")

Exercise 2: Using the DataFrame created in Exercise 1, display the first 2 rows

Exercise 3: Calculate and print the average age of the people in the DataFrame

Exercise 4: Filter the DataFrame to show only the rows where the city is "Ouaga"

Exercise 5: Add a new column "Salary" to the DataFrame with arbitrary values, and display the updated DataFrame

Exercise 6: Rename the column "City" to "Location" in the DataFrame and display the updated DataFrame

Exercise 7: Group the DataFrame by "City" and count the number of occurrences for each city.

Exercise 8: Sort the DataFrame by the "Age" column in descending order and display the result

Exercise 9: Save the DataFrame to a CSV file named "wascal\_people.csv"

Exercise 10: Load the DataFrame from the "wascal\_people.csv" file you created in Exercise 9 and display its contents.

Problem Serie 2:

Country	Energy Consumption (TWh)	Renewable Energy (%)	CO2 Emissions (Mt)	Population (millions)
CountryA	450	30	50	67
CountryB	4000	20	500	331
CountryC	600	40	80	83
CountryD	6500	25	900	1439
CountryE	1200	15	200	1380

Exercise 1: Calculate the energy consumption per capita for each country. Display the results as a DataFrame.

Exercise 2: Identify the country with the highest CO2 emissions per capita. Display the country and the amount of emissions per capita.

Exercise 3: Calculate the total renewable energy consumption for each country and display the results.

Exercise 4: Calculate the correlation between total energy consumption and CO2 emissions. Interpret the result.

Exercise 5: Suppose each country increases its energy consumption by 5% per year for 5 years. Calculate and display the projected energy consumption for each country after 5 years.

### Serie 3: Matplotlib Library

Exercise 1: Create a simple line plot for the following data points: X: [1, 2, 3, 4, 5] and Y: [2, 3, 5, 7, 11]. Label the axes and give the plot a title

Exercise 2: Create a bar chart showing the sales of five products: Products: ['A', 'B', 'C', 'D', 'E'] and Sales: [100, 150, 200, 250, 300]. Label the axes and give the chart a title

Exercise 3: Create a pie chart representing the market share of four companies: Companies: ['Company A', 'Company B', 'Company C', 'Company D'] and Market Share: [30, 20, 25, 25]. Add labels and a title to the pie chart

Exercise 4: Generate a histogram of a dataset representing the ages of a group of people. Ages: [22, 23, 24, 22, 25, 26, 24, 23, 22, 27, 28, 29, 27, 26, 25]. Set appropriate bins and add a title and labels.

Exercise 5: Create a scatter plot showing the relationship between study hours and scores: Study Hours: [1, 2, 3, 4, 5, 6, 7, 8] and Scores: [50, 55, 60, 65, 70, 75, 80, 82]. Add axis labels and a title, and include a trend line.

### Problem Serie 3: Matplotlib and Pandas Library

Country	Year	Total Energy Production (TWh)	Total Energy Consumption (TWh)	Renewable Energy (% of Total)	CO2 Emissions (Mt)	Energy Efficiency (%)	Population (millions)
CountryA	2023	550	450	35	50	82	67
CountryB	2023	4000	4100	20	500	85	331
CountryC	2023	600	580	45	75	90	83
CountryD	2023	7000	6500	25	900	80	1439
CountryE	2023	1200	1300	15	200	75	1380
CountryF	2023	800	700	50	30	88	213
CountryG	2023	1200	1150	30	100	78	125
CountryH	2023	600	550	40	40	87	38
CountryI	2023	1100	1000	10	300	70	146
CountryJ	2023	900	850	33	70	79	26

Exercise 1: Analyze the share of total energy production and consumption over the years for countries. Create pie graph to visualize these shares

Exercise 2: Rank the countries based on their energy efficiency and visualize the rankings in a horizontal bar chart. Highlight the top three and bottom three countries in terms of energy efficiency.

Exercise 3: Investigate the relationship between the percentage of renewable energy in total production and CO2 emissions. Create a scatter plot to illustrate this relationship and fit a regression line

Exercise 4: Analyze how population size affects total energy consumption. Create a scatter plot of population versus total energy consumption and calculate the correlation coefficient

Exercise5: Assuming a 4% annual increase in energy consumption for the next 5 years, project the future energy consumption for each country. Present this data in a table format

Exercise 6: Compare the energy systems of two selected countries by examining their energy production, consumption, efficiency, and CO2 emissions. Create a grouped bar chart for visual comparison.

Exercise 7: Calculate the total renewable energy produced by each country and visualize it in a pie chart to show the distribution of renewable energy across the countries

Exercise 8: Examine the gap between total energy production and consumption for each country. Present this information using a horizontal bar chart.

Exercise 9: Hypothetically assess how a 10% increase in renewable energy production would affect CO2 emissions for each country. Calculate and visualize the new CO2 emissions

Exercise 10: Analyze the relationships among Total Energy Production, Population, and CO2 emissions for each country. Create three scatter plots to visualize these relationships: Energy Production vs. CO2 Emissions, Population vs. CO2 Emissions and Energy Production vs. Population.