Loops, Conditions, and GDP Growth Calculation

1. Introduction

We will learn how to use loops and conditions in Python by analyzing GDP data. The goal is to calculate the year-over-year GDP growth rate for specific countries.

2. Basic Syntax of Loops and Conditions

2.1 Loops

Loops allow us to execute a block of code repeatedly. In Python, the two most common loops are:

1. **For Loop**: Used to iterate over a sequence (like a list or a range of numbers).

```
for item in sequence:
    # Code block
```

2. **While Loop**: Repeats as long as a condition is `True`.

```
while condition:
    # Code block
```

2.2 Conditions

Conditions allow us to execute code based on specific criteria.

1. **If Statement**: Executes a block of code if the condition is true.

```
if condition:
    # Code block
```

2. **Elif and Else Statements**: Handle additional conditions or execute code when no conditions are met.

```
if condition1:
    # Code block 1
elif condition2:
    # Code block 2
else:
    # Default code block
```

3. Example Dataset and Problem Statement

We are provided with a dataset that includes annual GDP figures for various countries. Each row represents a year, and we aim to calculate the GDP growth rate for consecutive years.

GDP Growth Formula:

To calculate GDP growth:

[\text{Growth Rate} = \frac{\text{GDP}_{\text{current year}} - \text{GDP}_{\text{previous year}}}{\text{GDP}_{\text{previous year}}} \times 100]

4. Exercise: Calculate GDP Growth

Problem:

Write a Python program to:

1. Extract GDP data for a specific country.
2. Use a loop to calculate the year-over-year GDP growth.
3. Use conditions to handle missing or invalid data.

Code Example:

Here's a sample solution:

```
# Sample GDP data for demonstration
# Columns: Year, Country, GDP

data = [
    {"Year": 2020, "Country": "Norway", "GDP": 1000},
    {"Year": 2021, "Country": "Norway", "GDP": 1100},
    {"Year": 2022, "Country": "Norway", "GDP": None},  # Missing value example
    {"Year": 2020, "Country": "Portugal", "GDP": 800},
    {"Year": 2021, "Country": "Portugal", "GDP": 850},
]

# Filter data for a specific country
country = "Norway"
country_data = [row for row in data if row["Country"] == country]

# Sort data by year (if not already sorted)
country_data.sort(key=lambda x: x["Year"])

# Calculate GDP growth
print(f"Year-over-Year GDP Growth for {country}:")
for i in range(1, len(country_data)):
    prev_gdp = country_data[i - 1]["GDP"]
    curr_gdp = country_data[i]["GDP"]

    # Check for missing values
    if prev_gdp is None or curr_gdp is None:
        print(f"Year {country_data[i]['Year']}: Data unavailable")
```

```
        continue

    # Calculate growth rate
    growth_rate = ((curr_gdp - prev_gdp) / prev_gdp) * 100
    print(f"Year {country_data[i]['Year']}: {growth_rate:.2f}%")
```

5. Summary

In this tutorial, you learned:

- How to use loops to iterate over data.
- How to use conditions to handle special cases.
- How to calculate GDP growth rates using Python.