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Welcome to this session:
Task Walkthrough - Task 2 - 4

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators answering questions.

Safeguarding & Welfare

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- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**
- No question is daft or silly - **ask them!**
- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions. Moderators are going to be answering questions as the session progresses as well.
- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

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- For all **non-academic questions**, please submit a query: ***www.hyperiondev.com/support***
- **Report a safeguarding incident: *www.hyperiondev.com/safeguardreporting***
- We would love your feedback on lectures: ***Feedback on Lectures***
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

Learning Outcomes

- **Manipulate strings** using Python string methods to analyze and transform text.
- **Perform basic mathematical operations and implement user inputs** for computational tasks.
- **Apply conditional logic** to make decisions and evaluate scenarios programmatically.
- **Use loops and iterations** to process datasets programmatically.
- **Load and manipulate datasets** using pandas DataFrames.
- **Visualize data effectively** with matplotlib and seaborn to uncover trends and patterns.

Task Walkthrough

You are working as a data scientist for a retail company. Your goal is to analyze sales data and present insights to the management team.

- Load the sales dataset (sales.csv) into a pandas DataFrame.
- Perform basic manipulations:
  - Filter sales data for transactions above $1000.
  - Calculate the total revenue for each product category using iterations.
  - Use conditionals to label sales as “high,” “medium,” or “low” based on revenue thresholds.
- Visualize the data:
  - Create a bar chart to show total sales by product category.
  - Use a scatter plot to show the relationship between sales and profit.
  - Create a heatmap of sales volume by month and product category.

Which of the following is NOT a fundamental data type in Python?

A. String
B. Float
C. Dictionary
D. Boolean

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What is the purpose of the if statement in Python?

A. To create a loop for repeated actions
B. To execute code conditionally based on a logical test
C. To define a new function
D. To store multiple values in a single variable

Variables and String Manipulation

- Variables are containers that hold information.
- A string is simply a way to represent text in programming and is identified with the presence of quotation marks (“ ”)
- Strings can be joined, cut up, and measured.
- Built-in methods to manipulate strings

Data Types Recap

- Data types in programming define the type of data a variable can hold and how that data can be used.
- Data types: Integers, Floats, Strings, and Booleans.
- Data types can be converted from one type to another - Within reason!
- Arithmetic operations in Python: +, -, /, *, %, **
- Arithmetic built-in functions

Conditional Statements Recap

- Conditional statements are like the decision-makers in programming.
- They allow your code to choose different paths based on specific conditions.
- Conditional statements: if, elif, and else
- Comparison operators
- Logical operators: and, or & not

greater than	>
less than	<
equal to	==
not	!
greater than or equal to	>=
less than or equal to	<=
not equal to	!=

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Iteration

- Iteration refers to the process of executing a set of instructions repeatedly.
- For loops and while loops are commonly used to handle repetitive tasks in Python.
- Condition-based iteration allows the loop to continue or stop based on a condition (e.g., user input or reaching a specific value)

For Loops

- For loops are control flow structures used to iterate over a sequence (such as a list, tuple, string, etc.) and execute a block of code for each element in the sequence.
- For loops are used when you know the number of times you want to execute a block of code.

```
for item in sequence:
    # code block to be executed
```

While Loops

- While loops are control flow structures that repeatedly execute a block of code as long as a specified condition is true.
- These are used when you want to execute a block of code repeatedly as long as a specified condition is true. They continue iterating until the condition becomes false.

```
while condition:
    # code block to be executed
```

For Loops – Range Function

- Range is a built-in Python function used to generate a sequence of numbers. It is commonly used with for loops.
- Ranges in for loops are a way to specify a sequence of numbers that you want to iterate over. The range() function generates this sequence of numbers based on the arguments you provide.

```
range(start, stop, step)
```

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Summary

- ★ **String Manipulation:**
  Length calculation, character replacement, and word reversal.
- ★ **Numerical Operations:**
  Basic arithmetic, comparisons, and summary statistics.
- ★ **Conditional Logic:**
  Using if-elif-else statements for decision-making.
- ★ **Modular Programming:**
  Breaking down a larger task into smaller, manageable modules.
- ★ **Integrating Multiple Skills:**
  Combining string and numerical operations for comprehensive problem-solving.

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Q & A SECTION

Please use this time to ask any questions relating to the topic, should you have any.

Thank you for attending

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