

Python Programming

Unit 06 – Lecture 03: Pandas Basics (Series and DataFrame)

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Repository: <https://github.com/tali7c/Python-Programming>

Core Concepts
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Agenda

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Learning Outcomes

- Explain what Pandas is used for

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- Create and manipulate Series and DataFrames

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- Use `head()`, `tail()`, column selection, and basic iteration

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- Explain what Pandas is used for
- Create and manipulate Series and DataFrames
- Use `head()`, `tail()`, column selection, and basic iteration
- Perform vectorized operations on columns

Why Pandas?

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- Powerful cleaning and transformation functions
- Easy grouping/aggregation and missing value handling

Series and DataFrame

- **Series:** 1D labeled array

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- **Series:** 1D labeled array
- **DataFrame:** 2D table with labeled columns

Create a DataFrame

```
import pandas as pd

df = pd.DataFrame({
    "name": ["Asha", "Bilal", "Charu"],
    "marks": [88, 76, 91]
})
```

Useful Methods

- `df.head(n), df.tail(n)`

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- `df.info()`, `df.describe()`

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- `df.head(n), df.tail(n)`
- `df.info(), df.describe()`
- Select a column: `df["marks"]`

Add/Delete Columns

```
df ["cgpa"] = df ["marks"] / 10
del df ["cgpa"]
```

Vectorized Operations

- Column math applies element-wise (fast)

```
df["marks_plus_5"] = df["marks"] + 5
df["passed"] = df["marks"] >= 50
```

Demo: Series + DataFrame Operations

- File: demo/pandas_basics_demo.py

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- File: demo/pandas_basics_demo.py
- Shows:
 - creating Series/DataFrame
 - head/tail
 - selecting and adding columns
 - basic boolean filtering

Checkpoint 1

Question: What is the difference between Series and DataFrame?

Checkpoint 2

Question: How do you select the "marks" column from a DataFrame?

Think-Pair-Share

Discuss:

- Why are vectorized operations preferred over loops in Pandas?

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- Pandas simplifies tabular data handling
- Series is 1D; DataFrame is 2D
- Column operations are vectorized and efficient

Exit Question

Write one line to create a new column "cgpa" from "marks".