



PANDAS BASIC

PANEL DATA

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TOPIC OUTLINE

Pandas

Pandas DataFrame

Pandas Series

Common Operations in Pandas



PANDAS



PANDAS

pandas is an open-source Python library designed for efficient data manipulation and analysis. It provides data structures like Series and DataFrames to effectively clean, transform, and analyze large datasets and integrates seamlessly with other Python libraries, such as numpy and matplotlib.



PANDAS PACKAGE

loading pandas package

```
import pandas as pd
```

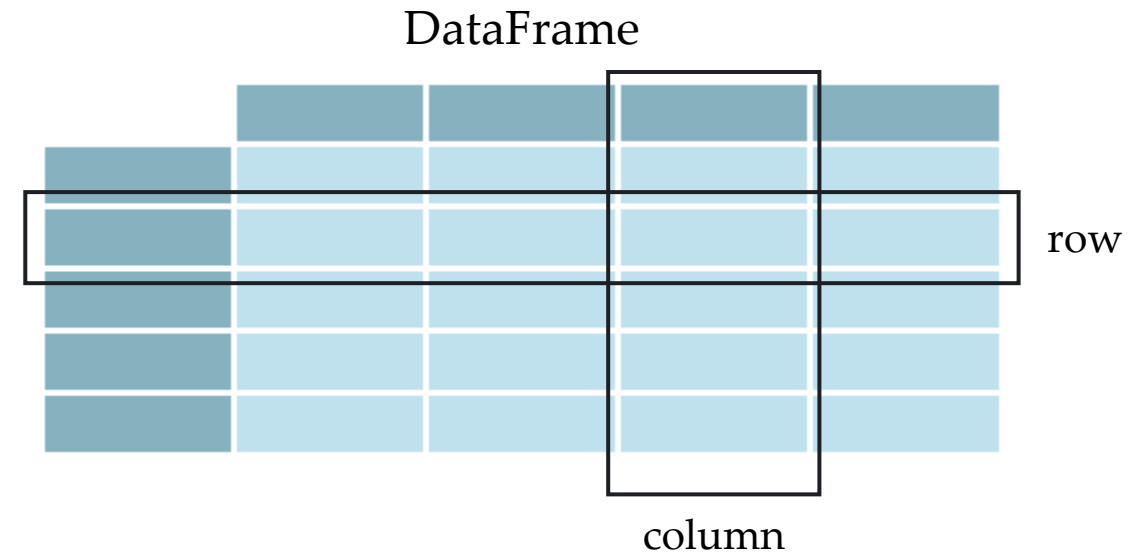
The community agreed alias for pandas is pd , so loading pandas as pd is assumed standard practice for all of the pandas documentation.



PANDAS_DATAFRAME

DataFrame is a two-dimensional data structure that stores data in columns, where each column contains values of a single data type (e.g., int, str, float). However, different columns can have different data types.

Pandas data table representation



CREATING DATAFRAME

```
import pandas as pd

data = {
    "Name": [ 'Henry' , 'Owen' , 'Ada' ] ,
    "Age": [22 , 35 , 58] ,
    "Sex": [ 'M' , 'M' , 'F' ]
}

df = pd.DataFrame(data)
```

DataFrame

Name	Age	Sex
Henry	22	M
Owen	35	M
Ada	58	F

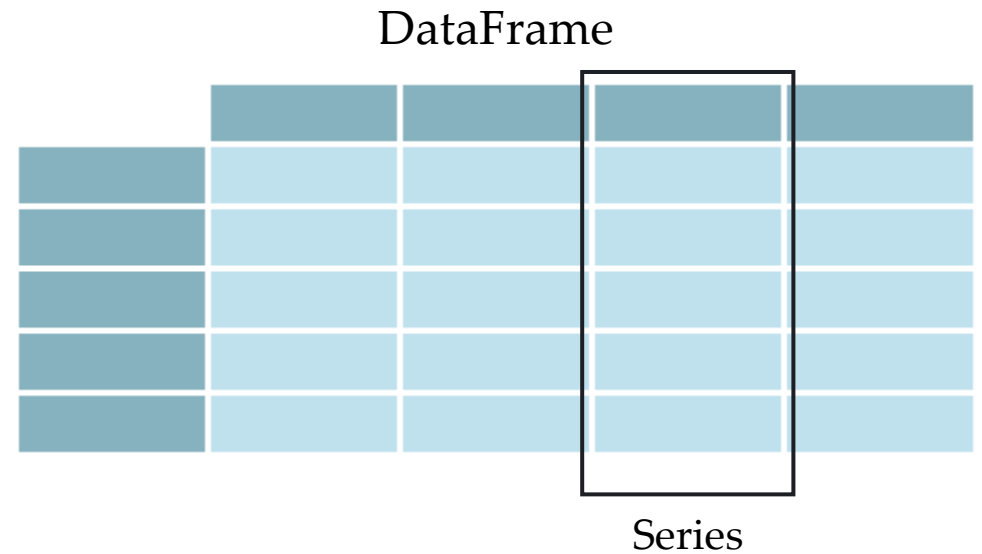
When using a Python dictionary of lists, the dictionary keys will be used as column headers and the values in each list as columns of the DataFrame.



PANDAS SERIES

pandas Series is a one-dimensional labeled array that can hold data of a single type (e.g., int, float, str).

pandas data table representation



Each column in a DataFrame is a Series.



SELECTING A COLUMN

```
df["Age"]
```

```
0    22
1    35
2    58
Name: Age, dtype: int64
```

```
df["Name"]
```

```
0    Henry
1     Owen
2      Ada
Name: Name, dtype: object
```

```
df["Sex"]
```

```
0    M
1    M
2    F
Name: Sex, dtype: object
```

DataFrame

Name	Age	Sex
Henry	22	M
Owen	35	M
Ada	58	F

Each column in a DataFrame is a Series.



CREATING A SERIES

```
import pandas as pd

name = pd.Series(["Henry", "Owen", "Ada"])

age = pd.Series([22, 35, 58])

sex = pd.Series(['M', 'M', 'F'])
```

```
df = pd.DataFrame({

    "Name": name,

    "Age": age,

    "Sex": sex

})
```

DataFrame

Name	Age	Sex
Henry	22	M
Owen	35	M
Ada	58	F

You can create a DataFrame from multiple Series.



COMMON OPERATIONS IN PANDAS



COMMON OPERATIONS

1. Reading Data

```
df = pd.read_csv('data.csv') # Read a CSV file
```

2. Viewing Data

```
df.head() # Display the first 5 rows
```

```
df.tail() # Display the last 5 rows
```

```
df.info() # Summary of the DataFrame
```

```
df.describe() # Statistical summary
```

3. Selecting Data

```
df['column_name'] # Select a single column
```

```
df[['column1', 'column2']] # Select multiple columns
```

```
df.iloc[0] # Select row by index
```



COMMON OPERATIONS

4. Handling Missing Data

`df.dropna()` # Drop rows with missing values

`df.fillna(0)` # Fill missing values with 0

5. Data Manipulation

`df.sort_values('column_name')` # Sort by column

`df.groupby('column_name').mean()` # Group by column and calculate mean

6. Exporting Data

`df.to_csv('output.csv', index=False)` # Export to CSV



LABORATORY

