1. Creating DataFrames & Series

`pd.DataFrame()` - Create a DataFrame

python
CopyEdit
```python
import pandas as pd
df = pd.DataFrame({'A': [1, 2, 3], 'B': [4, 5, 6]})
print(df)
```

`pd.Series()` - Create a Series

python
CopyEdit
```python
s = pd.Series([10, 20, 30], name="Numbers")
print(s)
```

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2. Viewing & Inspecting Data

`df.head(n)` - View First n Rows

python
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```python
df.head(3)  # Shows first 3 rows
```

`df.tail(n)` - View Last n Rows

python
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```python
df.tail(2)  # Shows last 2 rows
```

`df.info()` - Get DataFrame Information

python
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```python
df.info()
```

`df.describe()` - Summary Statistics

python

```
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df.describe()  # Shows mean, count, min, max, etc.
```

df.shape - Get Dimensions of DataFrame

python
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```
rows, cols = df.shape  # Returns (rows, columns)
```

df.columns - Get Column Names

python
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```
print(df.columns)
```

df.dtypes - Get Column Data Types

python
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```
print(df.dtypes)
```

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3. Selecting & Filtering Data

df['column_name'] - Select a Single Column

python
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```
df['A']  # Returns a Series
```

df[['col1', 'col2']] - Select Multiple Columns

python
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```
df[['A', 'B']]
```

df.iloc[] - Select by Index Position

python
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```
df.iloc[0, 1]  # First row, second column
df.iloc[1:3]  # Rows 1 to 2
```

`df.loc[]` - Select by Label

python
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```python
df.loc[0, 'A']  # First row, 'A' column
df.loc[:, ['A', 'B']]  # All rows, columns 'A' and 'B'
```

`df[df['col'] > value]` - Filter Rows

python
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```python
df[df['A'] > 2]  # Select rows where 'A' > 2
```

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4. Adding, Modifying & Removing Columns

`df['new_col'] = values` - Add Column

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```python
df['C'] = [7, 8, 9]
```

`df.insert(position, column_name, values)` - Insert Column at Specific Position

python
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```python
df.insert(1, 'D', [10, 20, 30])
```

`df.drop(columns=['col_name'])` - Remove Column

python
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```python
df.drop(columns=['B'], inplace=True)  # Removes 'B' column
```

`df.rename(columns={'old_name': 'new_name'})` - Rename Columns

python
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```python
df.rename(columns={'A': 'Alpha'}, inplace=True)
```

5. Handling Missing Values

`df.isnull().sum()` - Count Missing Values

python
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```python
print(df.isnull().sum())  # Counts NaN in each column
```

`df.fillna(value)` - Fill Missing Values

python
CopyEdit
```python
df.fillna(0, inplace=True)  # Replace NaN with 0
```

`df.dropna()` - Drop Rows with Missing Values

python
CopyEdit
```python
df.dropna(inplace=True)
```

6. Sorting & Ordering Data

`df.sort_values(by='col_name')` - Sort by Column

python
CopyEdit
```python
df.sort_values(by='A', ascending=False, inplace=True)
```

`df.sort_index()` - Sort by Index

python
CopyEdit
```python
df.sort_index(inplace=True)
```

7. Grouping & Aggregating Data

df.groupby('col').agg() - Group by Column

python
CopyEdit
```python
df.groupby('A').agg({'B': 'sum'})
```

df.value_counts() - Count Unique Values

python
CopyEdit
```python
df['A'].value_counts()
```

df.pivot(index, columns, values) - Pivot Table

python
CopyEdit
```python
df.pivot(index='A', columns='B', values='C')
```

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8. Merging & Joining DataFrames

pd.concat([df1, df2]) - Concatenate DataFrames

python
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```python
df_combined = pd.concat([df1, df2])
```

df1.merge(df2, on='common_column') - Merge DataFrames

python
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```python
df_merged = df1.merge(df2, on='ID', how='inner')
```

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9. Working with Dates

pd.to_datetime(df['date_column']) - Convert to Datetime

python
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```python
df['date'] = pd.to_datetime(df['date'])
```

`df['date'].dt.year / .dt.month / .dt.day` - **Extract Year, Month, Day**

python
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```python
df['year'] = df['date'].dt.year
df['month'] = df['date'].dt.month
df['day'] = df['date'].dt.day
```

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10. Exporting & Importing Data

`df.to_csv('file.csv')` - **Save as CSV**

python
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```python
df.to_csv('output.csv', index=False)
```

`df.to_excel('file.xlsx')` - **Save as Excel**

python
CopyEdit
```python
df.to_excel('output.xlsx', index=False)
```

`pd.read_csv('file.csv')` - **Load CSV**

python
CopyEdit
```python
df = pd.read_csv('file.csv')
```

`pd.read_excel('file.xlsx')` - **Load Excel**

python
CopyEdit
```python
df = pd.read_excel('file.xlsx')
```

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11. Statistical Functions

`df.mean(), df.median(), df.std()` - **Compute Mean, Median, Standard Deviation**

```python
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df.mean()   # Column-wise mean
df.median() # Median
df.std()    # Standard deviation
```

df.corr() - Correlation Matrix

```python
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df.corr()
```

df.cumsum() - Cumulative Sum

```python
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df.cumsum()
```

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12. Applying Functions

df.apply(function, axis) - Apply Custom Function

```python
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df['A'] = df['A'].apply(lambda x: x * 2)  # Double values in column 'A'
```

df.map(function) - Apply Function to Series

```python
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df['B'] = df['B'].map(lambda x: x + 1)
```

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13. Creating Dummy Variables

pd.get_dummies(df['category_col']) - One-Hot Encoding

```python
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pd.get_dummies(df['Category'])
```

🚀 Summary

Category	Function
Creating Data	`pd.DataFrame()`, `pd.Series()`
Viewing Data	`df.head()`, `df.tail()`, `df.info()`
Selecting Data	`df.iloc[]`, `df.loc[]`, `df['col']`
Modifying Data	`df['new_col']`, `df.drop()`, `df.rename()`
Handling Missing Values	`df.isnull()`, `df.fillna()`, `df.dropna()`
Sorting & Filtering	`df.sort_values()`, `df[df['col'] > value]`
Grouping & Aggregating	`df.groupby()`, `df.value_counts()`
Merging DataFrames	`pd.concat()`, `df.merge()`
Exporting & Importing	`df.to_csv()`, `pd.read_csv()`
Statistical Functions	`df.mean()`, `df.corr()`, `df.std()`

This covers **most Pandas functions** you'll need in **data analysis and machine learning**.
🚀 Let me know if you need any specific explanations!