

BHARATHIDASAN UNIVERSITY Tiruchirappalli- 620024 Tamil Nadu, India

Programme: MBA (Financial Management)

Course Title : R and Python for Finance (NSE)

Course Code : FMEC2/24

Unit V : Financial Analytics and Development

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Spreadsheet Interaction in Python

This presentation explores the power of Python for interacting with spreadsheets, covering key libraries and practical examples.

🍘 by Dr. M. KAMAL

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🙆 Made with Gamma

Key Libraries for Spreadsheet Interaction

openpyxl

Works with Excel files (.xlsx and .xlsm). Supports reading, writing, and modifying Excel workbooks.

pandas

Ideal for working with tabular data in spreadsheets. Provides easy reading/writing of Excel files using read_excel and to_excel.

xlrd and xlwt

Used for older Excel formats (.xls). Deprecated in many cases.

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Reading Excel Files with Pandas

import pandas as pd

Read the spreadsheet into a DataFrame data = pd.read_excel('example.xlsx')

Display the first few rows print(data.head())

Display the last few rows print(data.tail())



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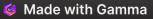
Writing to a Spreadsheet

import pandas as pd

```
# Example DataFrame
data = pd.DataFrame({
    'Name': ['Jamal', 'Balaji', 'Charlie'],
    'Age': [25, 30, 35],
    'Salary': [50000, 60000, 70000]
})
```

```
data.to_excel('output.xlsx', index=False)
```

```
print("Data written to output.xlsx")
```



Creating a New Spreadsheet

from openpyxl import Workbook

Create a new workbook
workbook = Workbook()

Select the active sheet
sheet = workbook.active

```
# Add data to the sheet
sheet['A1'] = 'Name'
sheet['B1'] = 'Age'
sheet['C1'] = 'Salary'
```

sheet.append(['Jamal', 25, 50000])
sheet.append(['Balaji', 30, 60000])

```
# Save the workbook
workbook.save('new_file.xlsx')
```

```
print("New spreadsheet created.")
```

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Object Orientation: Basics of Python Classes

```
class ExampleThree(object):
    def __init__(self, a, b):
        self.a = a
```

```
self.b = b
```

```
def addition(self):
    return self.a + self.b
```

```
c = ExampleThree(10, 15)
```

```
print(c.addition()) # Output: 25
```

```
c.a += 10
print(c.addition()) # Output: 35
```

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Simple Short Rate Class

import numpy as np

- def discount_factor(r, t):
 """
 - Function to calculate a discount factor.

Parameters

========

- r : float
 - positive, constant short rate
- t : float, array of floats
 future date(s), in fraction of years;
 e.g. 0.5 means half a year from now

Returns

======

df : float, array of floats
 discount factor(s)
"""

df = np.exp(-r * t)

use of NumPy universal function for vectorization
return df



Cash Flow Series Class

```
class cash_flow_series(object):
```

.....

Class to model a cash flow series.

Attributes

========

name : string

name of the object

time_list : list/array-like

list of (positive) year fractions

cash_flows : list/array-like

corresponding list of cash flow values
short_rate : instance of short_rate class
short rate object used for discounting

Methods

======

```
present_value_list :
```

returns an array with present values
net_present_value :

returns NPV for cash flow series

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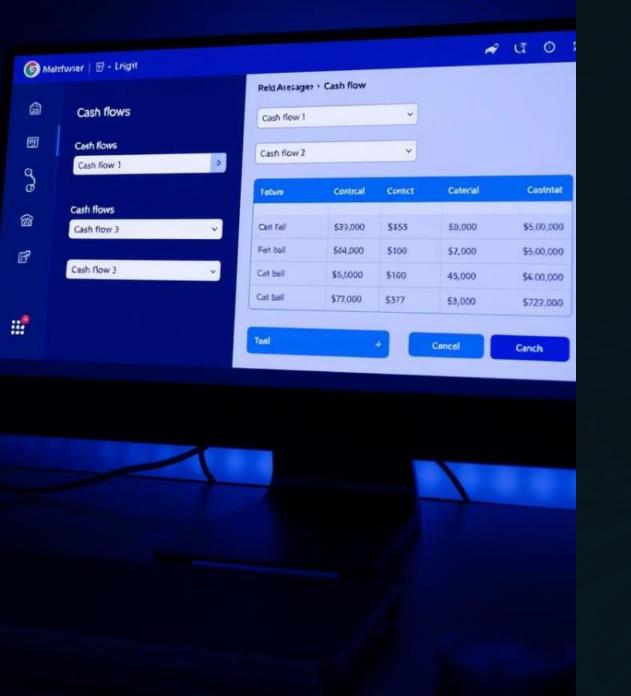
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Cash Flow Series Class with GUI

Design the Class

Hold a list of cash flows, each associated with a specific time period.

Create the GUI for user interaction.

\bigcirc

Link the Class and GUI

Allow user input, display cash flows, and calculate financial metrics.

Use Tkinter to create a window



Key Takeaways

1 Python for Spreadsheets

Python offers powerful tools for interacting with spreadsheets, enabling programmatic data manipulation.

Object-Oriented Programming

Classes provide a structured approach to modeling financial concepts, such as cash flow series.

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GUI Development

Tkinter allows for the creation of user-friendly interfaces for interacting with financial models.

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