Final Project: Building a Python Package

Fall 2023

Overview:
For the final project, students will develop a Python package focusing on a specific application or domain. Example domains include linear regression analysis, stock market analysis, or financial calculations. You need to choose your own topic (you cannot choose the example of linear regression package.) Form a team with a maximum of five members. Each member need to have a clear contribution and will be graded according on it. You can find teammates from all sections (A, B, WS).

Objectives:
To apply Python programming skills in a real-world project scenario.
To understand the process of designing, implementing, and documenting a Python package.
To learn about handling real-world data and dealing with common errors.

Example Project: Linear Regression Package

(1) Visualization Module: A class or set of functions for visualizing the relationship between variables (e.g., scatter plots).
(2) Regression Module: Functions or classes to implement linear regression, including fitting a model to data.
(3) Performance Evaluation Module: Tools to evaluate the model's performance, such as calculating Mean Squared Error (MSE).
(4) Statistical Testing Module: Implement statistical tests like t-test and f-test to assess the significance of the model.

Alternative Project Ideas:

(1) Stock Analysis Package: Modules for analyzing stock data, including trend analysis, moving averages, etc.
(2) Financial Calculations Package: Tools for calculating cash flows, present and future values, or other financial metrics.

Project Requirements:

(1) Functionality: The package must contain at least three main functionalities or modules.
(2) Error Handling:
    Identify potential user errors (e.g., incorrect data types, invalid inputs).
    Implement try-except blocks to handle these errors gracefully.

(3) Allowed Packages: Use only pandas, numpy, matplotlib, datetime, and yfinance. Avoid topics like web design and machine learning applications.

Steps for Students:
Team Discussion: Collaborate with your teammates to decide on the package topic.

Proposal Writing:

- Describe the chosen package, its purpose, and the target audience.
- Detail each module/functionality you plan to include.
- Outline how you will handle potential user errors.
- Explain how each allowed package (pandas, numpy, etc.) will be utilized.

Implementation:

- Develop the package in Python
- Test each module thoroughly

Documentation:

- Write clear documentation for your package, including installation and usage instructions.
- Include examples and use cases.

Evaluation Criteria:

- Functionality and usability of the package.
- Robustness and error handling.
- Code quality and adherence to Pythonic conventions.
- Quality and clarity of documentation.

Submission Guidelines:

- Submit the complete package code along with the documentation.
- Provide a report detailing your design decisions and challenges faced.