Group Members: Tyler Sanford, Joshua England, Ryan Brazill
Group Name: Python Overflow

REPORT

Understanding and utilizing Python libraries efficiently is a challenge for many developers, especially those new to programming or working on diverse projects. While Python offers extensive documentation, finding the right library or built-in function for a specific use case can be time-consuming.

Our project aims to develop a Database for Categorizing Python Libraries and Built-in Functions that allows users to search, filter, and explore various Python libraries and their associated functions based on categories, use cases, and dependencies.

Scope of Project:

- A web-based or command-line application with a database backend
- Categorization of Python libraries by functionality (e.g. Math, databases, data science, web development…)
- Detailed information on built-in functions and their use cases
- User-friendly search and filtering options
- Tagging and contributions

Project Context:
This project will involve designing and implementing a relational database using MySQL or PostgreSQL, alongside a web or command-line interface developed in Python. The database will store metadata on libraries, functions, usage examples, dependencies, and performance insights.

The intention of this project is to deliver a fully functional and searchable database that helps developers quickly find the most relevant Python libraries and functions for their needs.

Functional Requirements

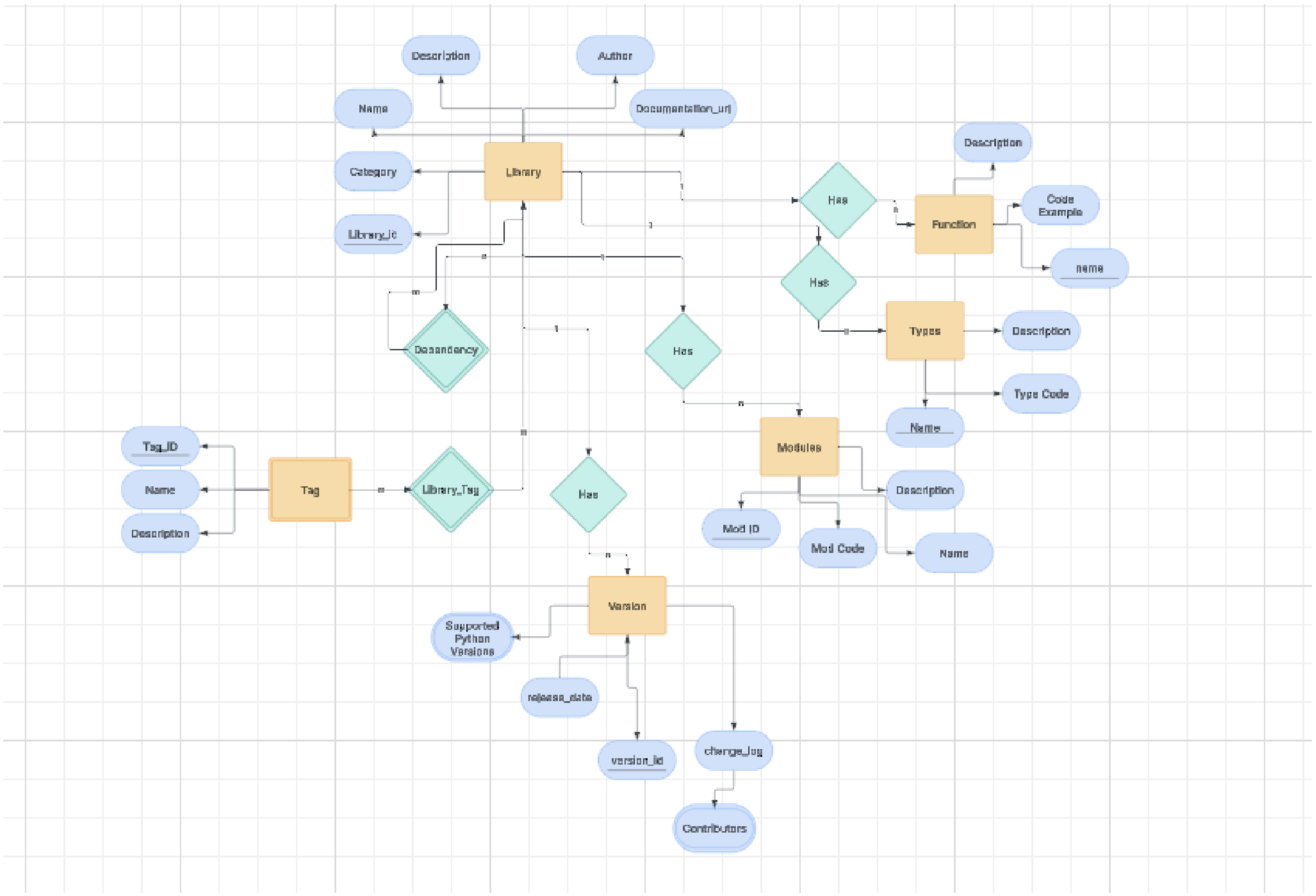
1) Admin security: Allow certain users to have a higher privilege and the ability to alter the database
2) Editing Libraries: Admins should be able to add libraries to the collection as well as update and remove libraries
3) Editing Functions: Admins should be able to add functions to the libraries as well as update and remove functions
4) Search Function: Allow users to search for python libraries and python functions by name

5) Filters: Include filters that users can use to help find specific types of functions based on use cases and categories
6) Detailed Function Information: Show users the details about each function such as valid syntax, return types, and example usages
7) Feedback Page: users can make suggestions to the admins about updates and changes they think would benefit them
8) Example Code: Add example code for each of the functions to show correct syntax and uses in context
9) Outside Resources: Add links to other site related to the functions users are looking at for better information on the topic

Entities

1) Library
2) Types
3) Modules
4) Contributors
5) Version
6) Function
7) Tag
8) Supported Versions

ER Diagram


Description
Author
Name
Documentation_url
Category
Library
Library_id
Description
Has
Function
Code Example
name
Has
Types
Description
Type Code
Name
Dependency
Has
Tag_ID
Name
Description
Tag
Library_Tag
Has
Modules
Description
Mod ID
Mod Code
Name
Version
Supported Python Versions
release_date
version_id
change_log
Contributors

Database Schema

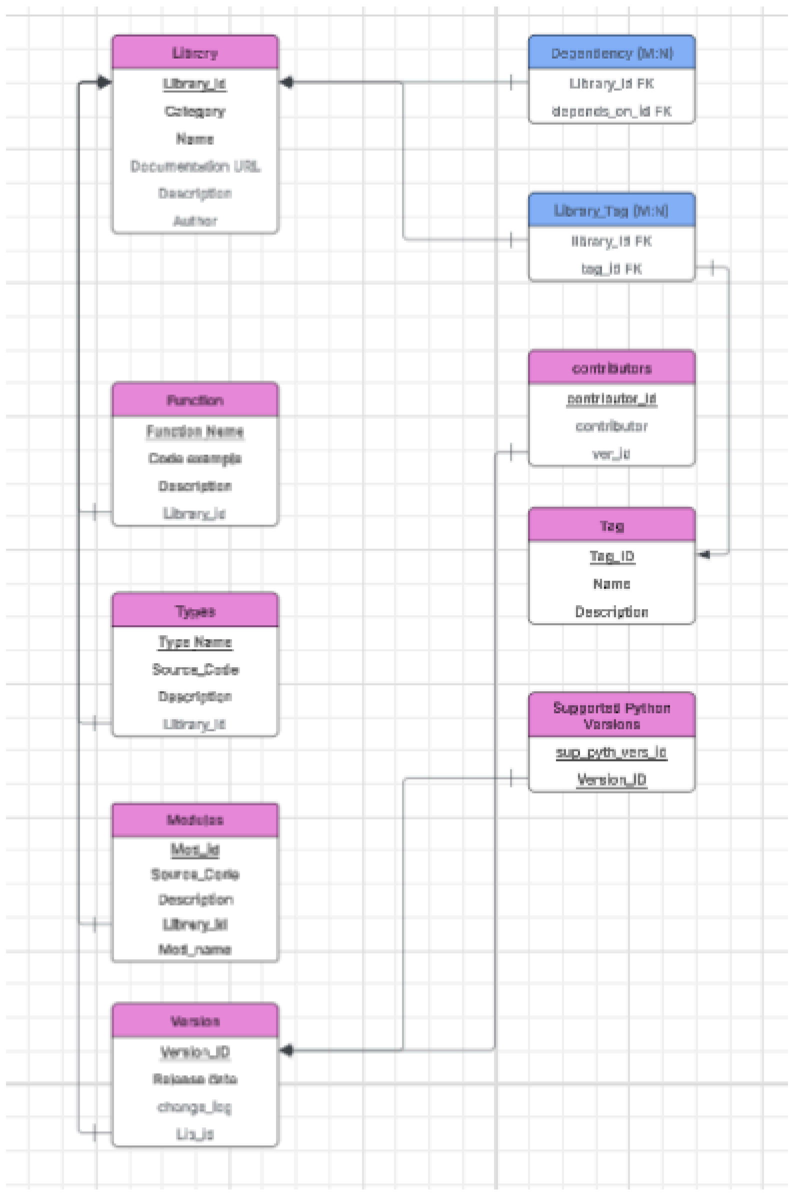
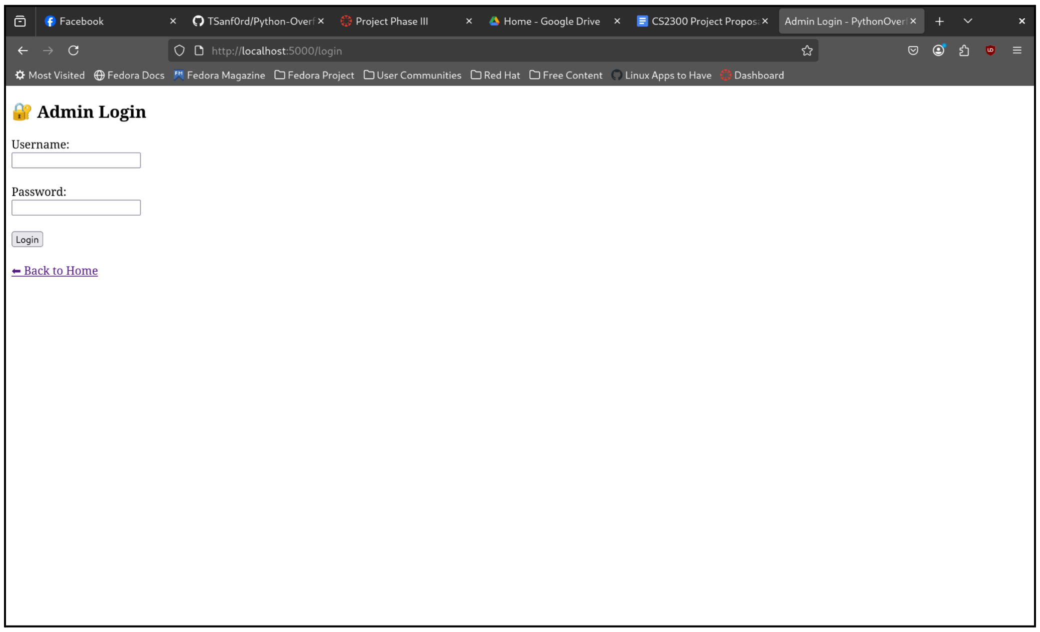


Table	Attribute	Type	Constraint
Library	Library_id	int	PK
Library	Category	string	
Library	Name	string	NOT_NULL
Library	Description	string	NOT_NULL
Library	Author	string	NOT NULL
Library	Documentation URL	string	
Library	License	string	
Library	Install_instructions	string	
Tag	Tag_id	int	PK
Tag	Name	string	NOT_NULL
Tag	Description	string	NOT_NULL
Version	Version_id	int	PK
Version	Release Date	date	NOT NULL
Version	change_log	string	NOT_NULL
Version	Library_id	int	FK
Contributors	Contributor_id	int	PK
Contributors	contributor	string	
Contributors	ver_id	int	FK
Modules	mod_id	INT	PK
Modules	Name	string	NOT NULL
Modules	mod_code	string	
Modules	Description	string	NOT_NULL
Modules	Library_id	int	FK
Types	Type_name	string	PK

Table	Attribute	Type	Constraint
Types	source_code	string	
Types	description	string	NOT_NULL
Types	Library_id	int	FK
Function	Function_name	string	PK
Function	Code_example	string	
Function	description	string	NOT_NULL
Function	Library_id	int	FK
Supported Python Versions	sup_pyth_vers_id	int	PK
Supported Python Versions	Python Version	int	FK
Dependency	Library_id	int	FK
Dependency	depends_on_id	int	FK
Library Tag	Library_id	int	FK
Library Tag	tag_id	int	FK

User Interface Design

Sign In Page



🔐 **Admin Login**

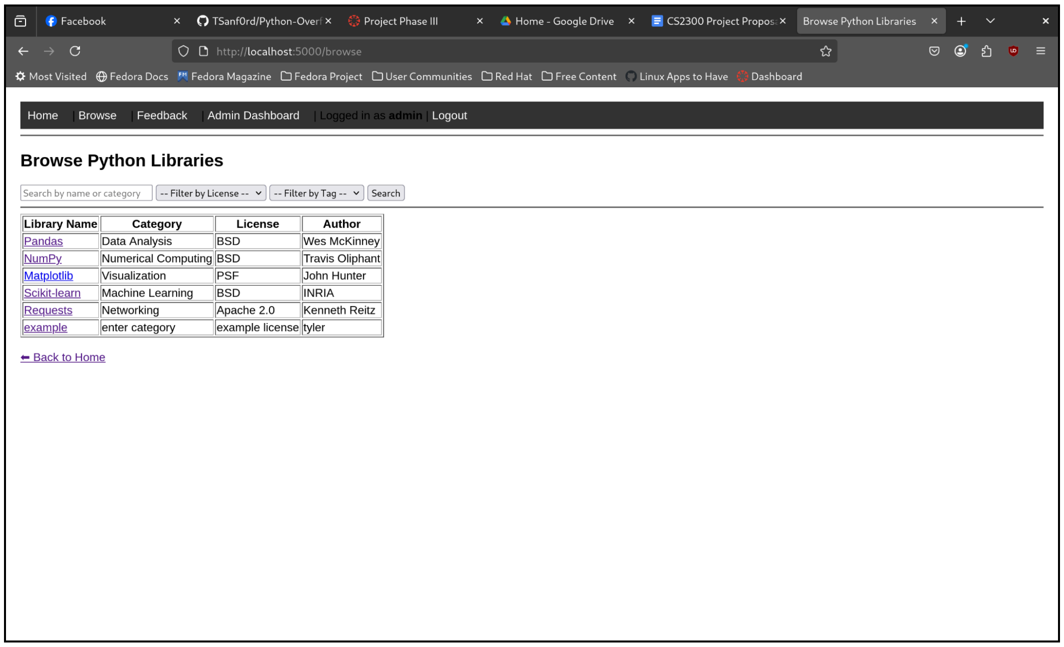
Username:

Password:

Login

⬅ Back to Home

Search Page



Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

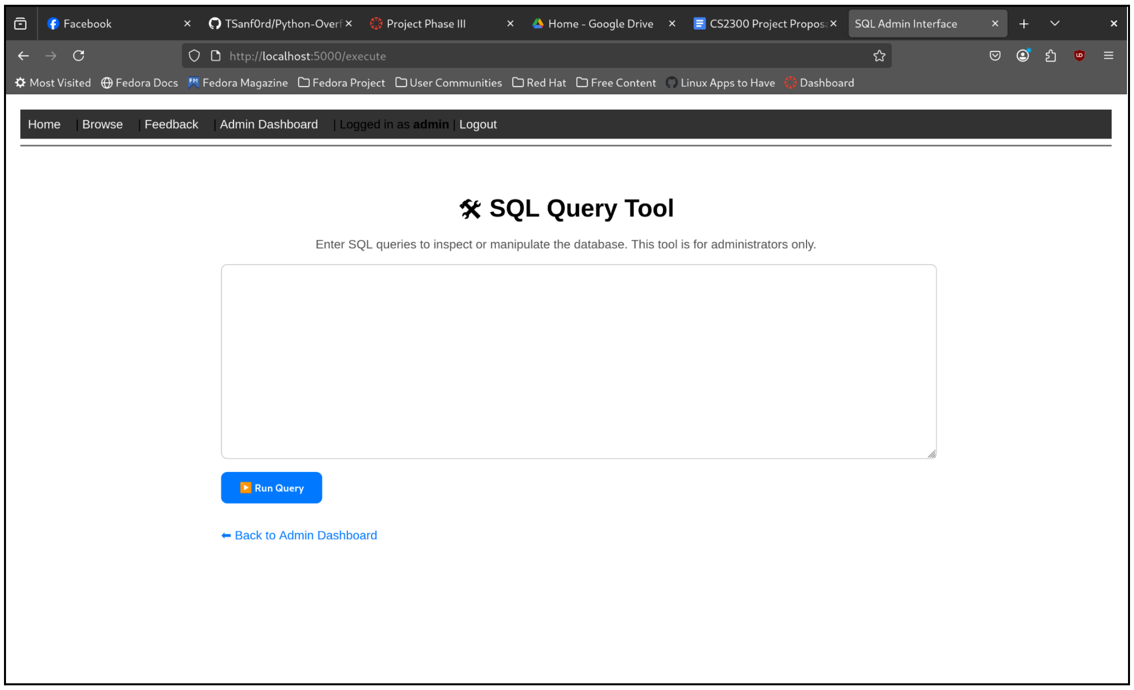
Browse Python Libraries

Search by name or category | -- Filter by License -- | -- Filter by Tag -- | Search

Library Name	Category	License	Author
Pandas	Data Analysis	BSD	Wes McKinney
NumPy	Numerical Computing	BSD	Travis Oliphant
Matplotlib	Visualization	PSF	John Hunter
Scikit-learn	Machine Learning	BSD	INRIA
Requests	Networking	Apache 2.0	Kenneth Reitz
example	enter category	example license	tyler

⬅ Back to Home

SQL query page


Home | Browse | Feedback | Admin Dashboard | Logged in as admin | Logout

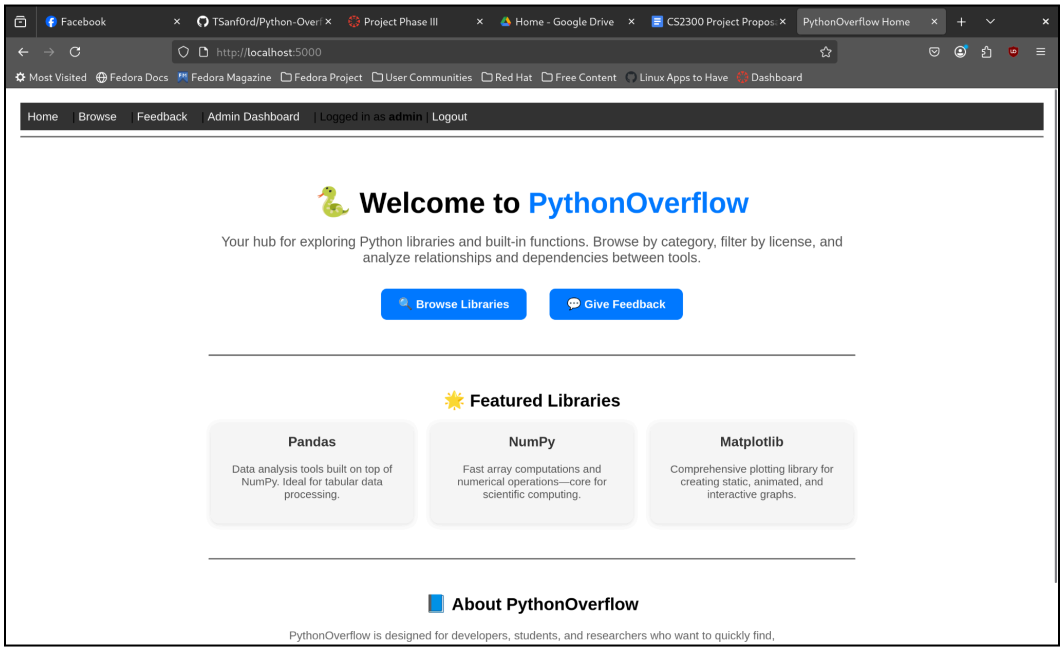
🛠 SQL Query Tool

Enter SQL queries to inspect or manipulate the database. This tool is for administrators only.

▶️ Run Query
⬅ Back to Admin Dashboard

User Manual and Documentation

When you first open the database manager, you will be greeted with the home screen. From here you can navigate to the *Browse* tab to browse the database, or you can go to the *Give Feedback* tab to leave feedback for the database.


Home | Browse | Feedback | Admin Dashboard | Logged in as admin | Logout

🐍 Welcome to PythonOverflow

Your hub for exploring Python libraries and built-in functions. Browse by category, filter by license, and analyze relationships and dependencies between tools.

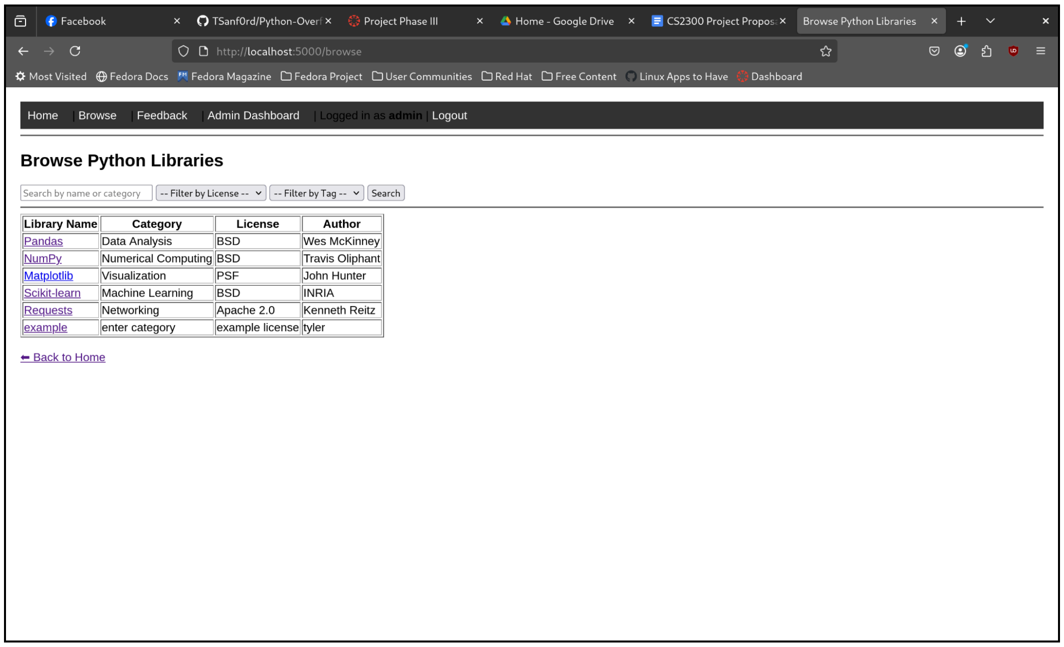
🔍 Browse Libraries
💬 Give Feedback

🌟 Featured Libraries

Pandas	NumPy	Matplotlib
Data analysis tools built on top of NumPy. Ideal for tabular data processing.	Fast array computations and numerical operations—core for scientific computing.	Comprehensive plotting library for creating static, animated, and interactive graphs.

📘 About PythonOverflow

PythonOverflow is designed for developers, students, and researchers who want to quickly find, Selecting the *Browse Libraries* button or *Browse* tab will take you to the following screen, allowing you to view the libraries and all their attributes if you click on the library name.

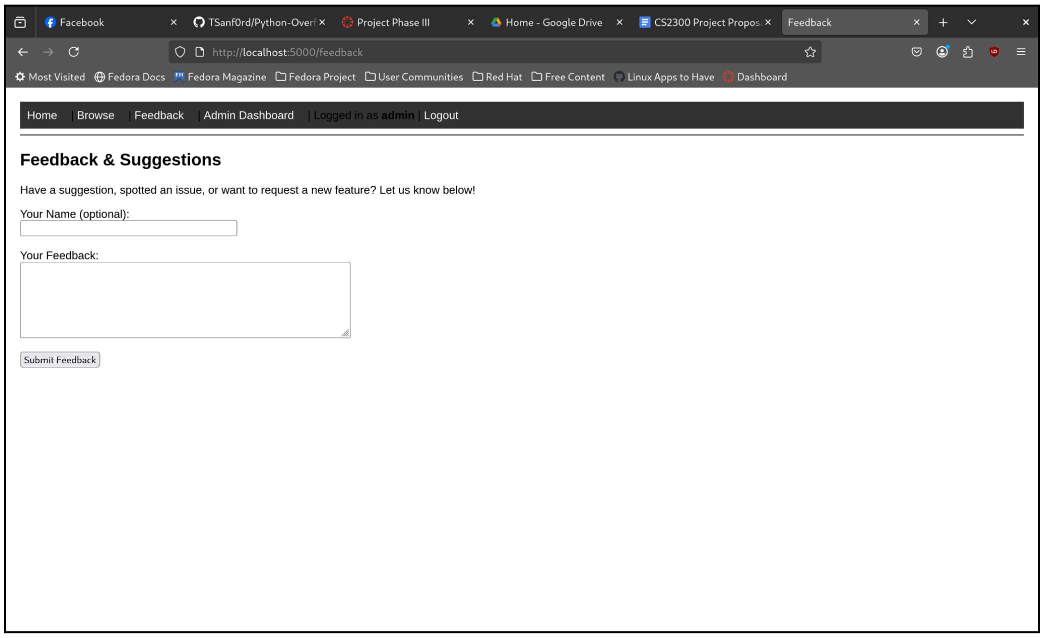


Browse Python Libraries

Library Name	Category	License	Author
Pandas	Data Analysis	BSD	Wes McKinney
NumPy	Numerical Computing	BSD	Travis Oliphant
Matplotlib	Visualization	PSF	John Hunter
Scikit-learn	Machine Learning	BSD	INRIA
Requests	Networking	Apache 2.0	Kenneth Reitz
example	enter category	example license	tyler

⬅ Back to Home

Alternatively, if you chose the *Give Feedback* button or the *Feedback* tab, you will be directed here, where you can type out your feedback.



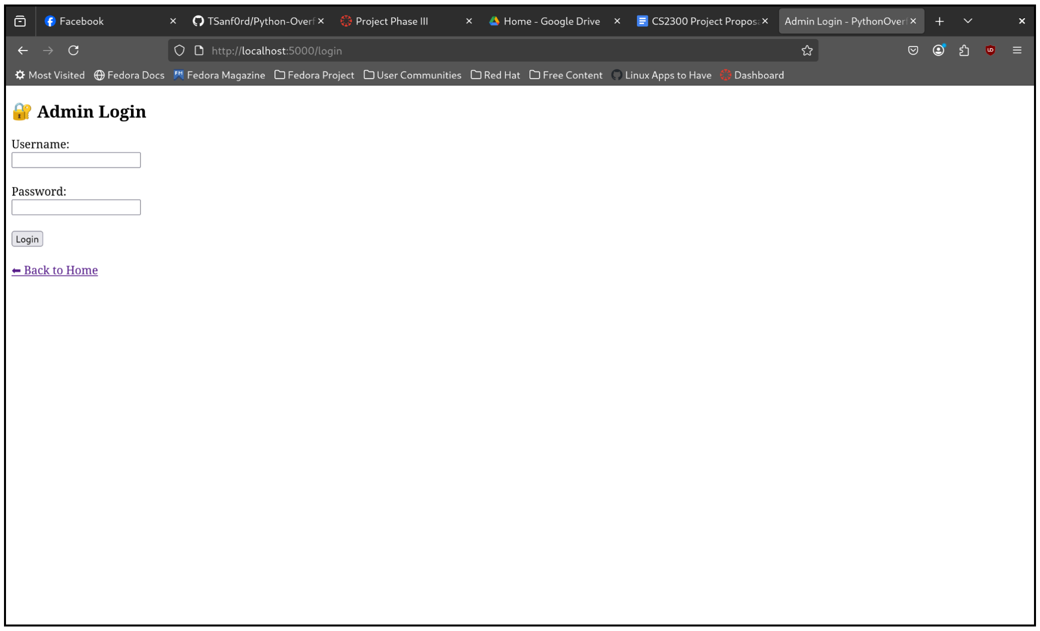
Feedback & Suggestions

Have a suggestion, spotted an issue, or want to request a new feature? Let us know below!

Your Name (optional):

Your Feedback:

If you choose to log in as the admin, you will be directed to the login page, and then subsequently the admin dashboard.



🔐 Admin Login

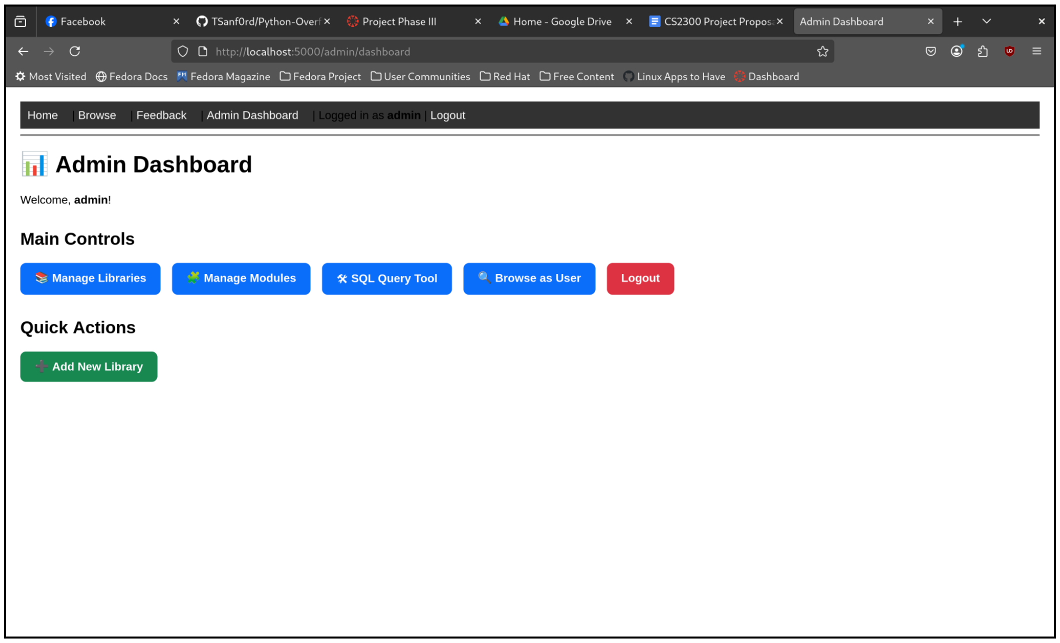
Username:

Password:

Login

⬅ Back to Home

From the admin dashboard, you can access admin privileges such as managing the libraries, managing the modules, and using the SQL query tool



Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

📊 Admin Dashboard

Welcome, **admin**!

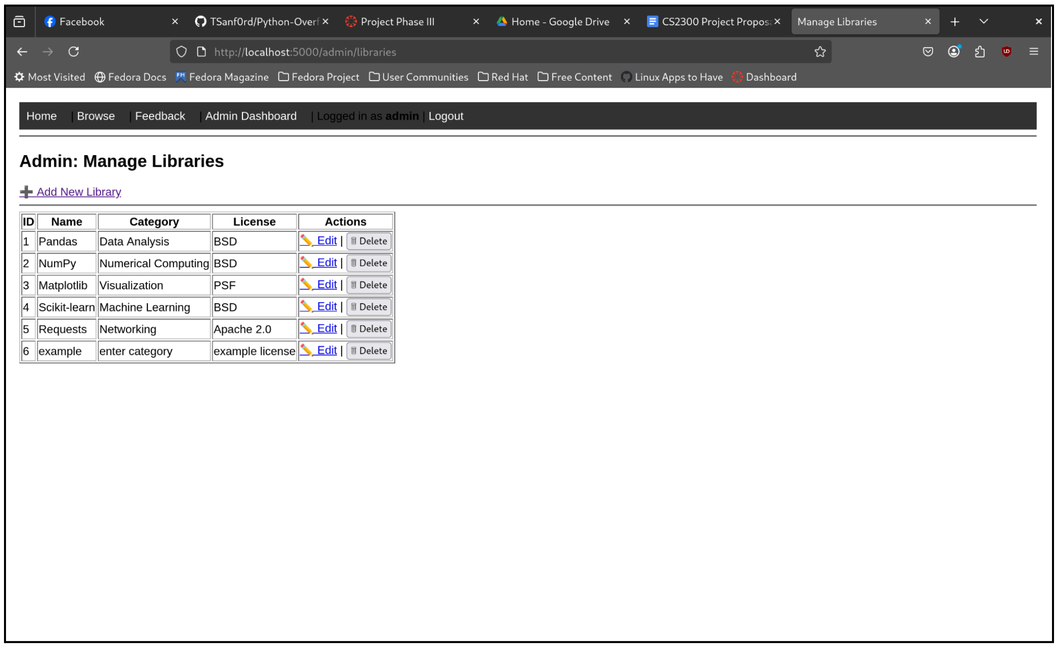
Main Controls

📚 Manage Libraries | 🧩 Manage Modules | 🛠 SQL Query Tool | 🔍 Browse as User | Logout

Quick Actions

➕ Add New Library

The *Manage Libraries* tool allows you to add, delete, and edit libraries from the database.

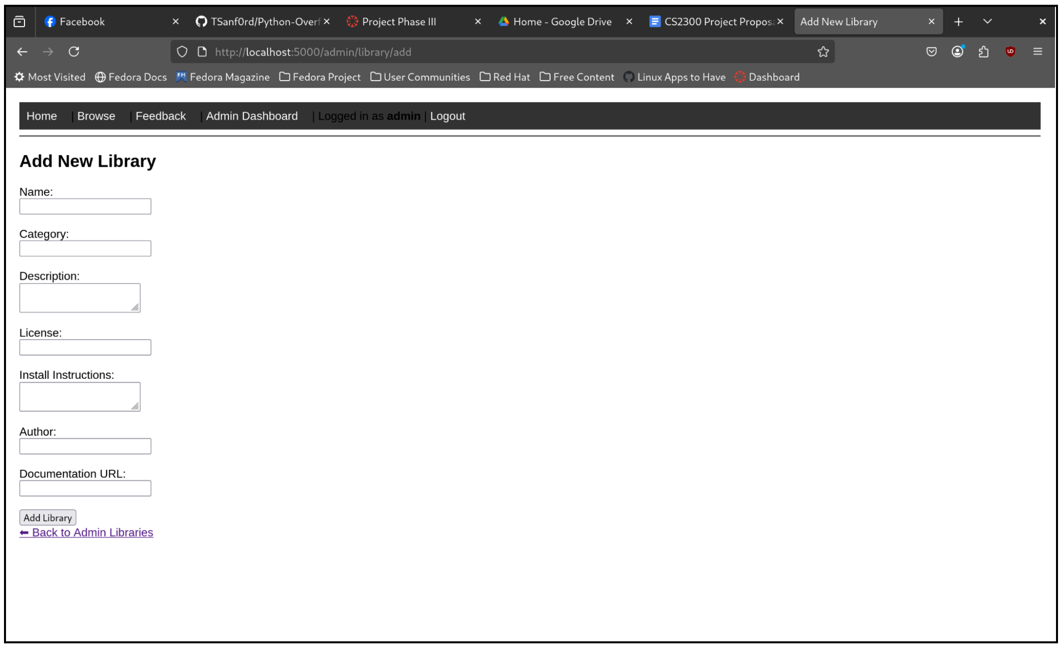


Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

Admin: Manage Libraries

➕ Add New Library

ID	Name	Category	License	Actions
1	Pandas	Data Analysis	BSD	✏️ Edit | 🗑 Delete
2	NumPy	Numerical Computing	BSD	✏️ Edit | 🗑 Delete
3	Matplotlib	Visualization	PSF	✏️ Edit | 🗑 Delete
4	Scikit-learn	Machine Learning	BSD	✏️ Edit | 🗑 Delete
5	Requests	Networking	Apache 2.0	✏️ Edit | 🗑 Delete
6	example	enter category	example license	✏️ Edit | 🗑 Delete



Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

Add New Library

Name:

Category:

Description:

License:

Install Instructions:

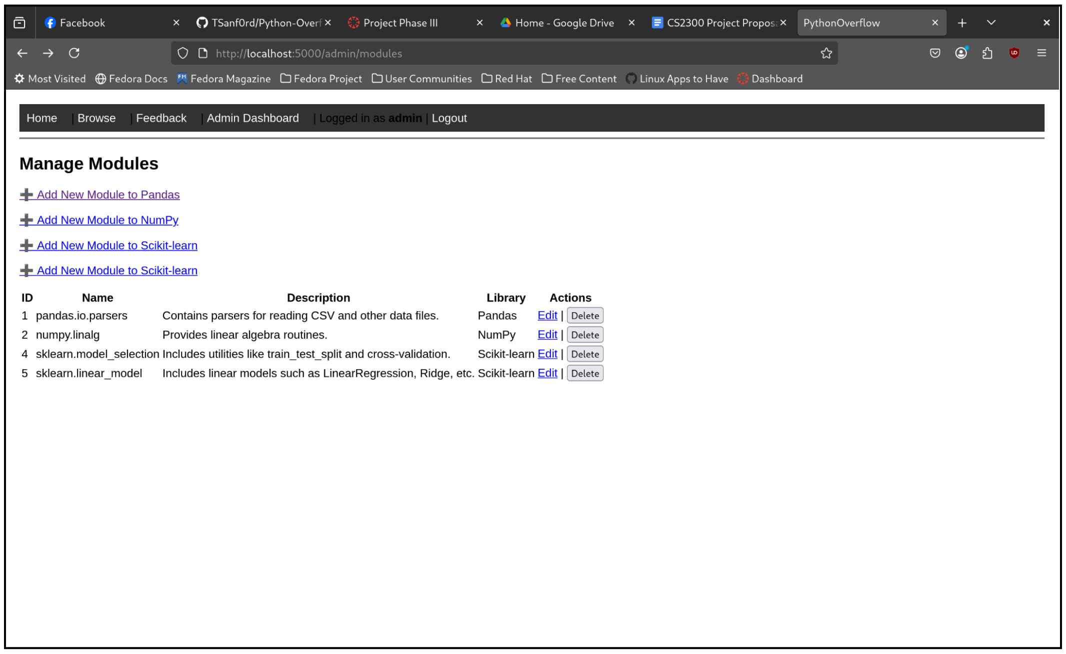
Author:

Documentation URL:

Add Library

⬅ Back to Admin Libraries

The *Manage Modules* tool allows you to add, delete, and edit the modules for each library in the database.


Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

Manage Modules

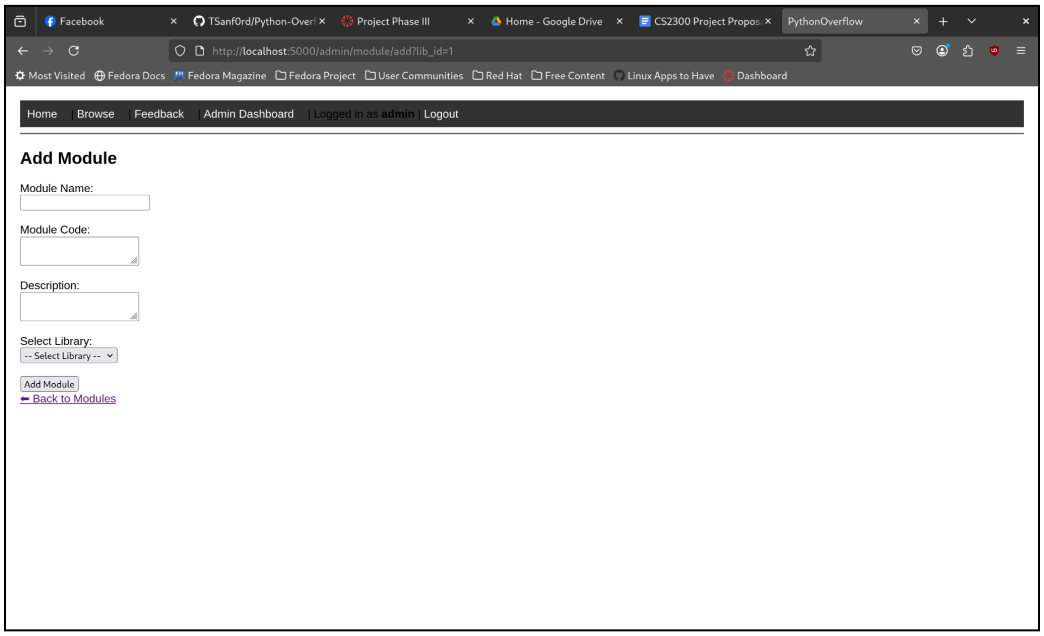
➕ Add New Module to Pandas

➕ Add New Module to NumPy

➕ Add New Module to Scikit-learn

➕ Add New Module to Scikit-learn

ID	Name	Description	Library	Actions
1	pandas.io.parsers	Contains parsers for reading CSV and other data files.	Pandas	Edit | Delete
2	numpy.linalg	Provides linear algebra routines.	NumPy	Edit | Delete
4	sklearn.model_selection	Includes utilities like train_test_split and cross-validation.	Scikit-learn	Edit | Delete
5	sklearn.linear_model	Includes linear models such as LinearRegression, Ridge, etc.	Scikit-learn	Edit | Delete


Home | Browse | Feedback | Admin Dashboard | Logged in as **admin** | Logout

Add Module

Module Name:

Module Code:

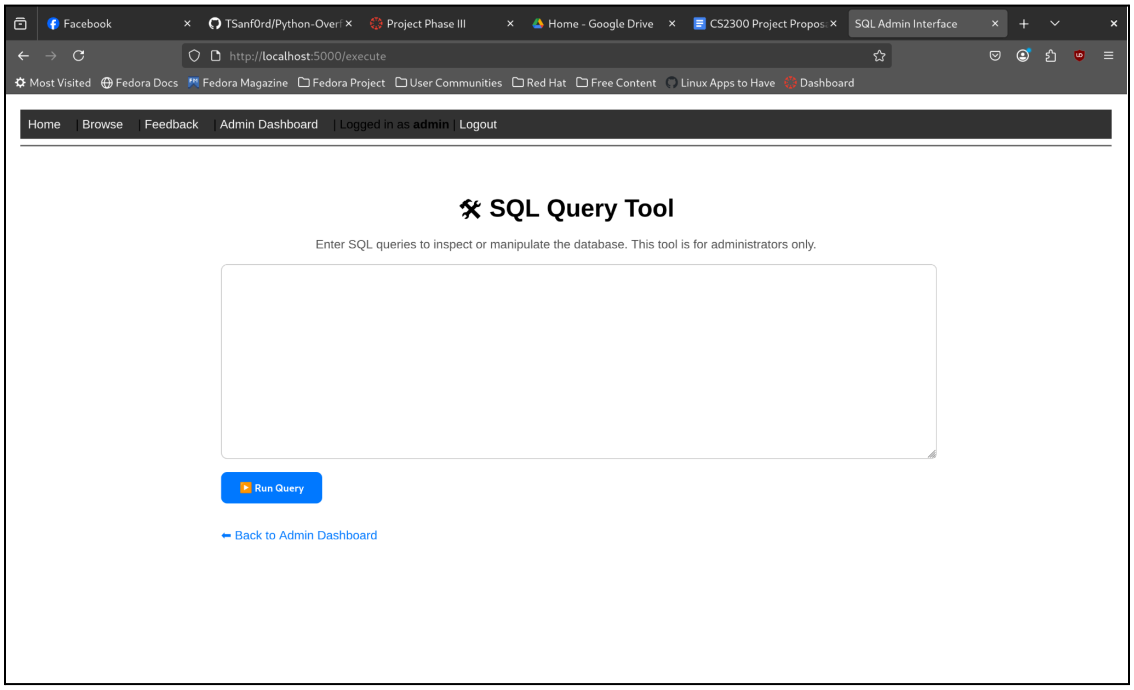
Description:

Select Library: -- Select Library --

Add Module

⬅ Back to Modules

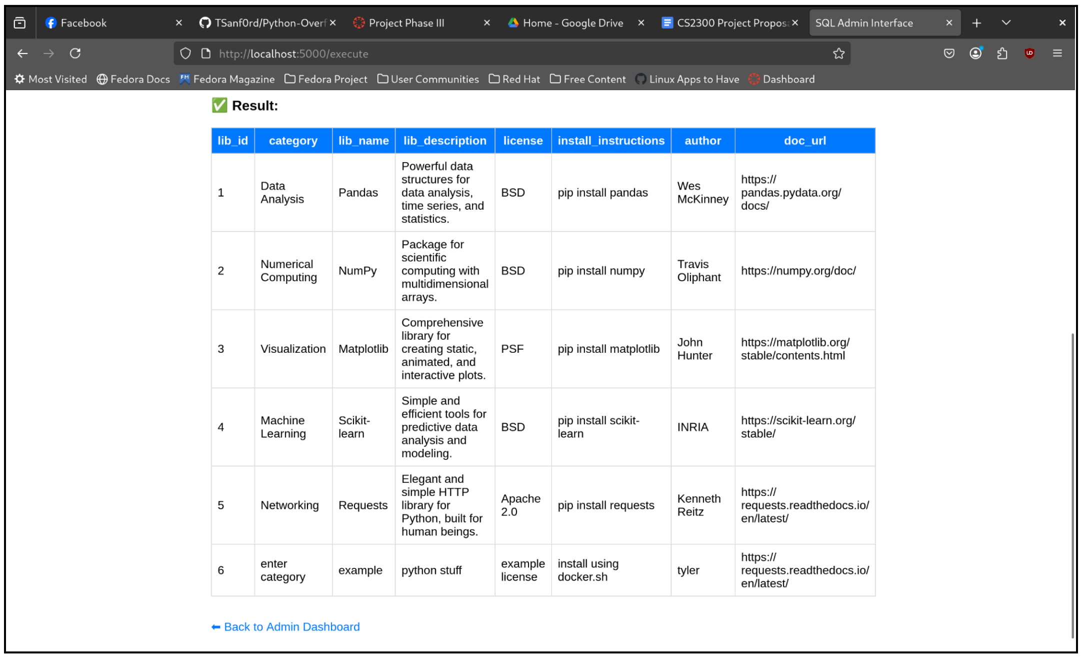
Finally, the *SQL Query Tool* allows you to run your own SQL query for whatever reason you may hope to do so.



🛠 SQL Query Tool

Enter SQL queries to inspect or manipulate the database. This tool is for administrators only.

Below is an example running “SELECT * FROM LIBRARY”



✅ **Result:**

lib_id	category	lib_name	lib_description	license	install_instructions	author	doc_url
1	Data Analysis	Pandas	Powerful data structures for data analysis, time series, and statistics.	BSD	pip install pandas	Wes McKinney	https://pandas.pydata.org/docs/
2	Numerical Computing	NumPy	Package for scientific computing with multidimensional arrays.	BSD	pip install numpy	Travis Oliphant	https://numpy.org/doc/
3	Visualization	Matplotlib	Comprehensive library for creating static, animated, and interactive plots.	PSF	pip install matplotlib	John Hunter	https://matplotlib.org/stable/contents.html
4	Machine Learning	Scikit-learn	Simple and efficient tools for predictive data analysis and modeling.	BSD	pip install scikit-learn	INRIA	https://scikit-learn.org/stable/
5	Networking	Requests	Elegant and simple HTTP library for Python, built for human beings.	Apache 2.0	pip install requests	Kenneth Reitz	https://requests.readthedocs.io/en/latest/
6	enter category	example	python stuff	example license	install using docker.sh	tyler	https://requests.readthedocs.io/en/latest/