Lab 1: Setting Up and Configuring the Development Environment for Building a Website

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1 Objectives

- Set up the Flask application development environment.
- Install the code editing environment.
- Install Python and Flask.
- Connect to MongoDB Atlas (Cloud Database).
- Learn how to upload and download data from GitHub.
- Understand routing and data handling in Flask.

2 Setting Up the Code Editing Environment

2.1 Installing VSCode

1. Download the Visual Studio Code installer for Windows at: `https://code.visualstudio.com/`.
2. Run the installer, named something like `VSCodeUserSetup-{version}.exe`.
3. Click **Next** to proceed and agree to the terms of use.
4. Choose the installation location (recommended to keep the default, C drive), then click **Next**.
5. Continue clicking **Next** until completion. It is recommended to check:
   - Add "Open with Code" action to Windows Explorer file context menu.
   - Add "Open with Code" action to Windows Explorer directory context menu.

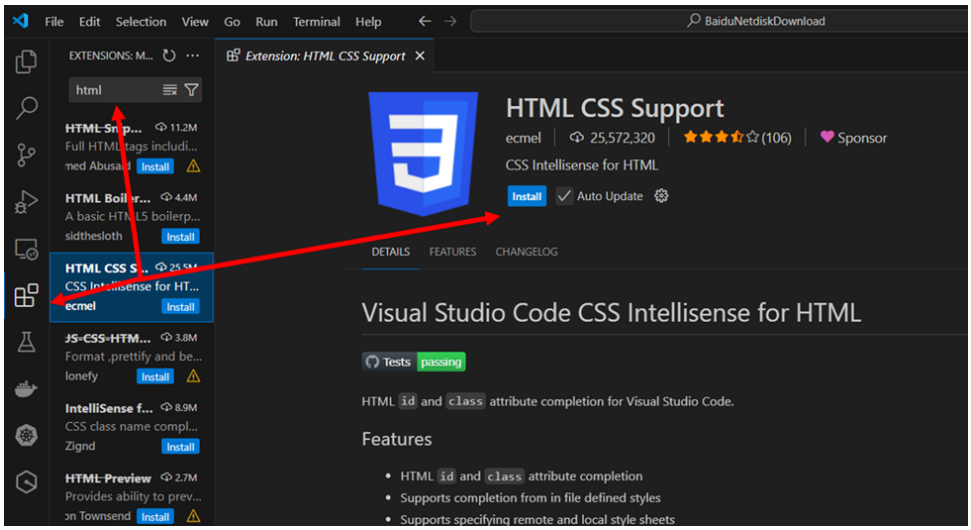
6. Installation complete, explore Visual Studio Code.

2.2 Extensions to Support Programming and Libraries

Recommended extensions:

- **Python**: Install Python (if not already installed) at: `https://www.python.org/downloads/`. Select the "Add Python to PATH" option during installation.
- **HTML CSS Support**: Supports writing HTML/CSS code.

Installation method: Press `Ctrl + Shift + X` or go to the Extensions icon in VS Code, search for the extension, and click **Install**.

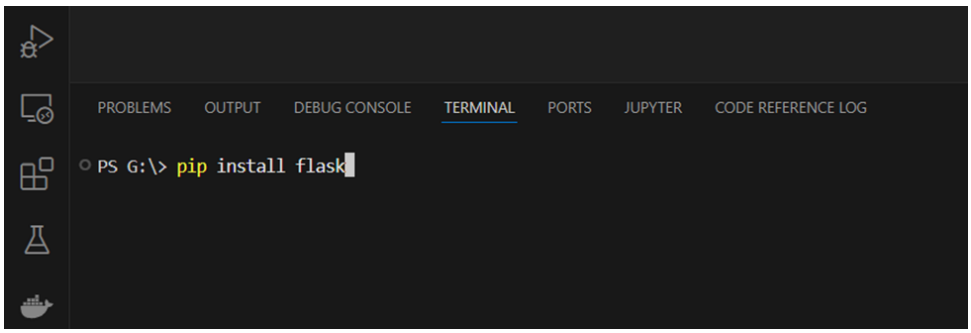


2.3 Required Libraries

- `flask`: Main web framework.
- `pymongo`: Library for connecting to MongoDB.
- `dnspython`: Supports Atlas connection (DNS URI).
- `python-dotenv`: Supports reading environment variables from a `.env` file.

Installation method: Open Terminal in VS Code, select **New Terminal**, then run:

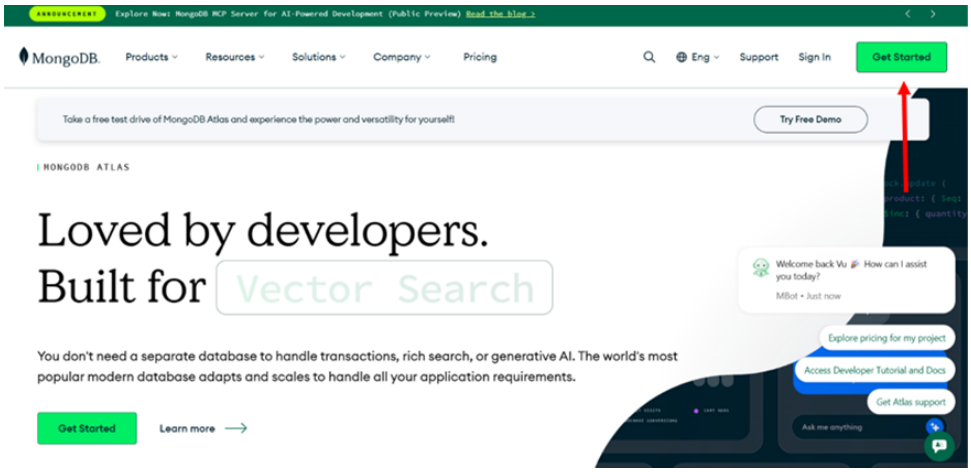
```
pip install flask
```



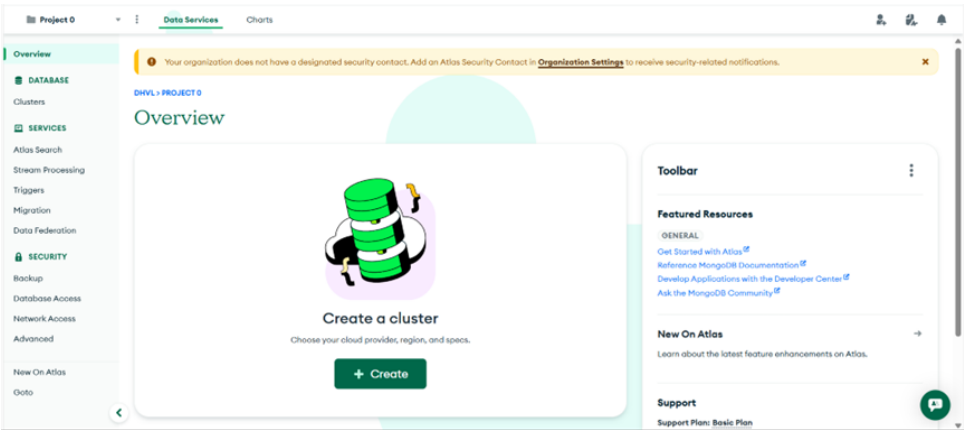
Repeat for other libraries: `pymongo`, `dnspython`, `python-dotenv`.

3 Connecting to MongoDB Atlas

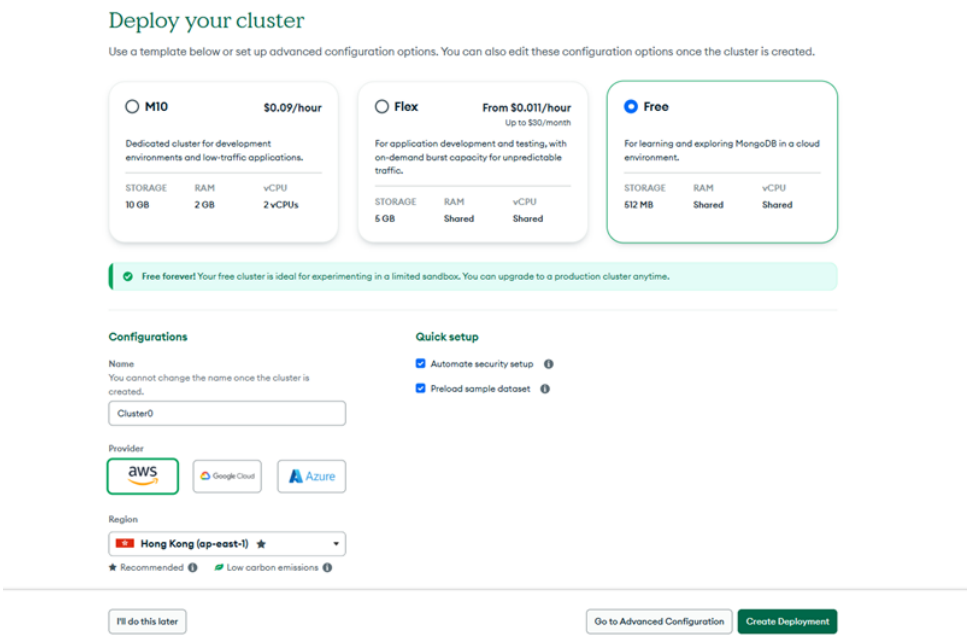
1. Visit `https://www.mongodb.com/atlas` and log in.
2. Select **Get Started** to sign up using email, Google, or GitHub.



3. After signing up, access the MongoDB Atlas Dashboard.

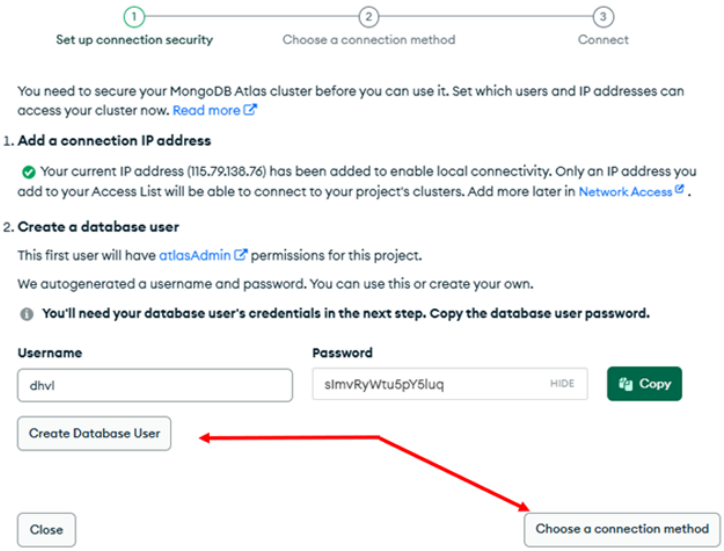


4. Click **Create** or **Build a Database** to create a new cluster.
5. Select the **Free (Shared Cluster - M0)** plan.
6. Choose a geographic region (e.g., AWS - Singapore or Google Cloud - Tokyo).
7. Name the cluster and click **Create Deployment**.

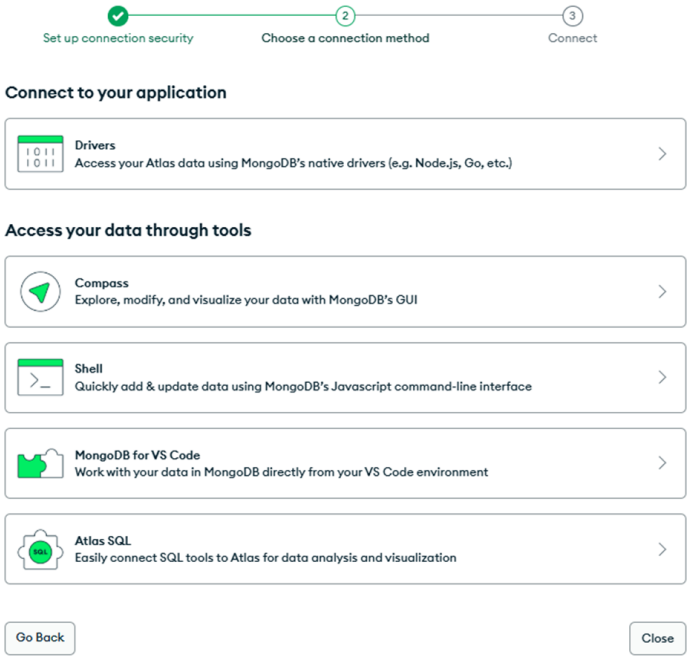


3.1 Creating a User and Connecting to the Cluster

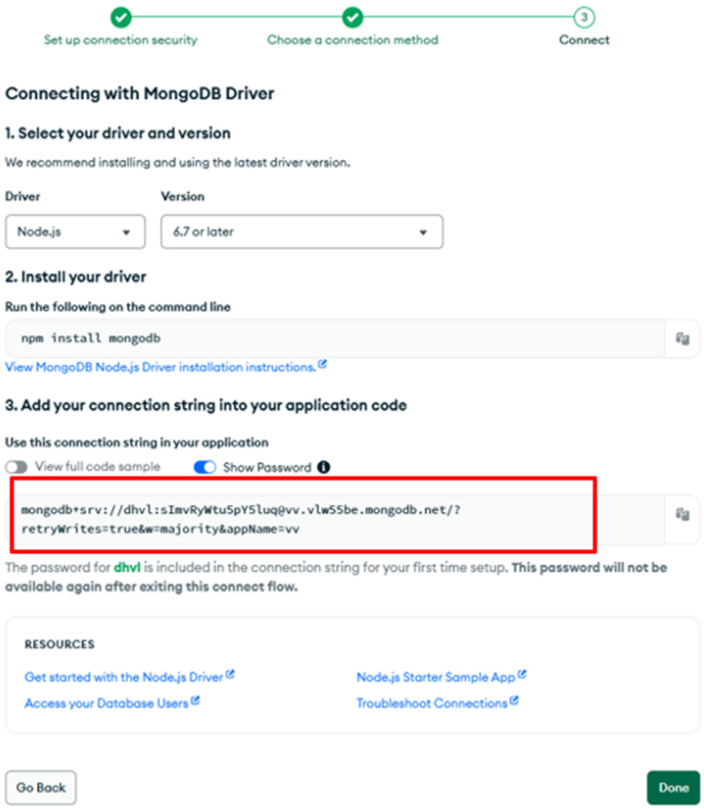
- Modify the username and password, then select **Create Database User**.



- Select **Method Drivers**.



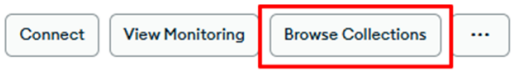
- At this step, save the connection string below for later use to connect the website to MongoDB.



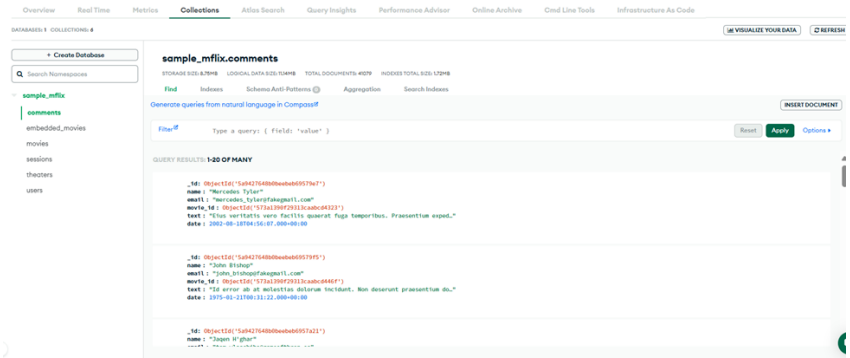
- Click **Done**.

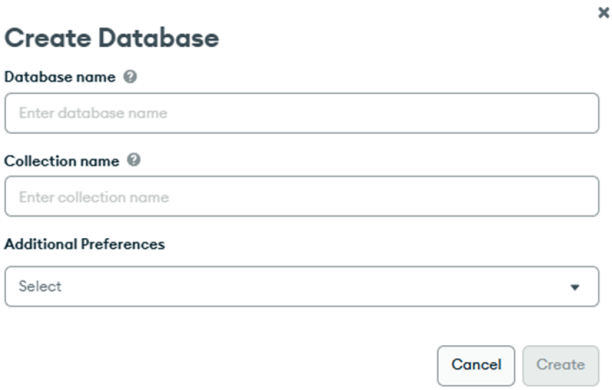
3.2 Creating a Database

1. In the Dashboard, select **Browse Collections**.

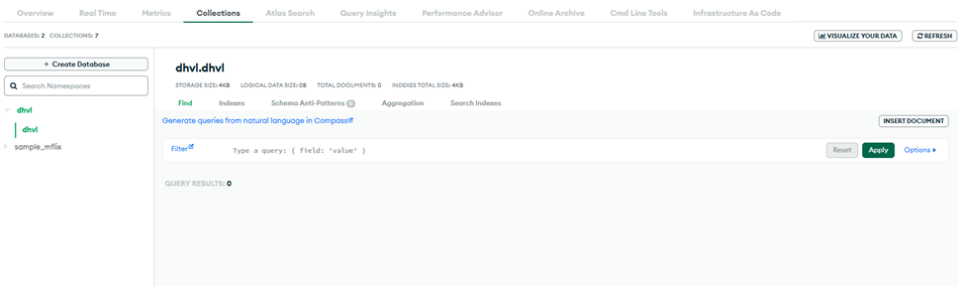


2. Click **Create Database**.
3. Enter:
   - **Database Name**: For example, `myDatabase`.
   - **Collection Name**: For example, `users`.
4. Click **Create**.





5. After successfully creating the database, students can input data into the database here:



4 Uploading and Downloading Data from GitHub

4.1 Downloading Data from GitHub

1. Go to GitHub, open the desired repository, click the **Code** button, and copy the HTTPS link (e.g., `https://github.com/username/repository.git`).
2. Open Terminal or Git Bash and run:

```
    git clone https://github.com/username/repository.git
```

```
PS D:\> git clone https://github.com/vuviet1207/vidu.git
Cloning into 'vidu'...
```

3. The folder will be downloaded to your machine.

4.2 Uploading a Project to GitHub

1. Create a new repository on GitHub: Click **New Repository**, name it, and click **Create Repository**.
2. In the terminal, navigate to the project folder and initialize Git:

```
    cd /path/to/project_folder
    git init
```

```
PS D:\> cd bt
PS D:\bt> git init
Initialized empty Git repository in D:/bt/.git/
```

3. Connect to the repository:

```
git remote add origin https://github.com/username/repository.git
```

```
PS D:\bt> git remote add origin https://github.com/vuviet1207/vidu.git
>>
```

4. Add, commit, and push:

```
git add .
git commit -m "First commit"
git push -u origin master
```

5. The folder or files will be uploaded to the specified GitHub repository.

5 Developing Your First Flask Application

1. Create a folder named `Lab1`.
2. Open VS Code, select File/Add Folder, and choose the `Lab1` folder.
3. Right-click the `Lab1` folder in VS Code, select New File, and create the following structure:

```
Lab1/
 app.py
 templates/
     hello.html
```

4. Open `app.py` to write the application.

```
from flask import Flask, render_template

app = Flask(__name__)

@app.route('/')
def hello():
    return render_template('hello.html')

if __name__ == '__main__':
    app.run(debug=True)
```

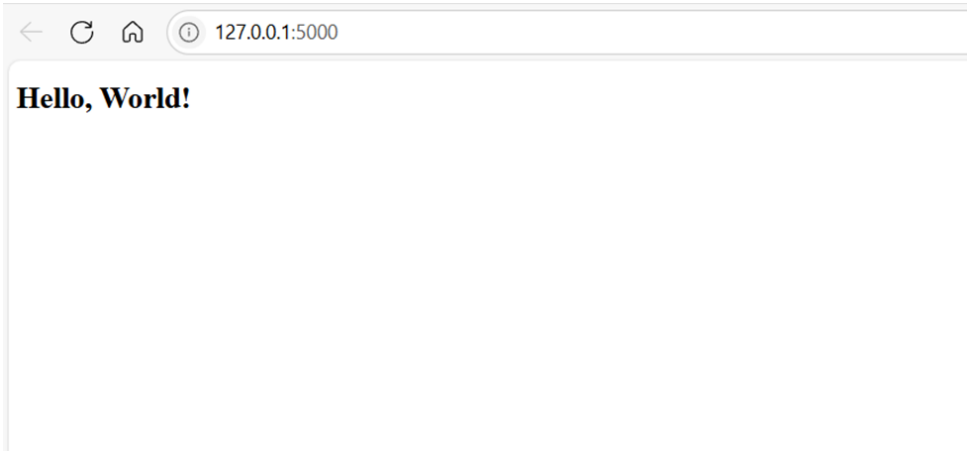
5. Open `hello.html` to add HTML content.

```html
<!DOCTYPE html>
<html>
<head>
    <title>Hello</title>
</head>
<body>
    <h1>Hello, World!</h1>
</body>
</html>
```

6. Run `app.py`; the terminal will display a link (e.g., `http://127.0.0.1:5000`).

```
PS D:\> & C:/Python313/python.exe d:/Lab1/app.py
 * Serving Flask app 'app'
 * Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with watchdog (windowsapi)
 * Debugger is active!
 * Debugger PIN: 541-036-351
```

7. Click the link to access the website.



6 Practical Exercises

6.1 Exercise 1: Create a Website Displaying a Linear Equation

Create a website that displays the linear equation: $y = 5x + 7$ with $x = -2$.

Requirements:

- Display the equation on the web interface.
- Calculate and display the value of y.
- Style the interface simply using CSS.

6.2 Exercise 2: Create a Website Displaying Student Information

Create a website that displays a student's personal information, including:

- Name.
- Student ID.
- Academic Year.
- Major.
- Hobbies.

Requirements:

- Present the information neatly using basic HTML tags.
- Use either `<table>` or `<ul>` to display the information.

6.3 Exercise 3: Develop a Website Using Flask Following the Provided Code

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8" />
    <title>Sample Form</title>
</head>
<body>

<h2>User Information Form</h2>

<form action="#" method="post">

  <label for="username">Username:</label><br>
  <input type="text" id="username" name="username" /><br><br>

  <label for="password">Password:</label><br>
  <input type="password" id="password" name="password" /><br><br>

  Gender:<br>
  <input type="radio" id="male" name="gender" value="male" />
  <label for="male">Male</label><br>

  <input type="radio" id="female" name="gender" value="female" />
  <label for="female">Female</label><br>

  <input type="radio" id="other" name="gender" value="other" />
  <label for="other">Other</label><br><br>

  <label for="membership">Membership Level:</label><br>
  <input list="Options" id="membership" name="membership" />
  <datalist id="Options">
    <option value="Thành viên Bạc"></option>
    <option value="Thành viên Vàng"></option>
    <option value="Thành viên Kim Cương"></option>
  </datalist><br><br>

  <label for="favcolor">Choose your favorite color:</label><br>
  <input type="color" id="favcolor" name="favcolor" /><br><br>

  <input type="checkbox" id="correct" name="correct" value="correct" />
  <label for="correct">Correct</label><br><br>

  <input type="submit" value="Submit" />

</form>

</body>
</html>
```

Requirements:

- Create a Flask website based on the provided code structure (shown in the image above).
- Modify the "User Information Form" in the code to "Student Information Form," personalized with the student's name (e.g., "Viet Vu Information Form").
- Use appropriate HTML tags to structure the content as specified in the code.
- Apply CSS for styling to match the design outlined in the provided code.

6.4 General Requirements

- Use Flask to create the server and handle routing.
- Use HTML to build the interface.
- Use basic CSS for styling (inline or separate CSS file).
- Apply basic HTML tags such as: `<h1>`, `<p>`, `<div>`, `<span>`, `<ul>`, `<li>`, `<table>`, etc.
- Folder structure:

```
Lab1/
 app.py
 templates/
    index.html
 static/
    style.css
```

6.5 Submission

- After completing the exercises, combine all folders into a folder named: `LAB1_StudentID_FullName`.
- Create a `.docx` file, paste screenshots of your exercise results into it, and include this file in the `LAB1_StudentID_FullName` folder.
- Upload the folder to GitHub following the instructions in the section on uploading and downloading data from GitHub.
- Deadline 23h59 29/05/2025