Stock Analysis Web Application

This is a web application for stock analysis and portfolio management. The application provides features for single stock analysis, multiple stock comparison, and AI-powered investment advice.

Prerequisites

Before running the application, make sure you have the following installed:

- Node.js (v14.0.0 or higher)
- npm (Node Package Manager)
- Postman (for testing backend code)
- MySQL Database (with MySQL Workbench)

Project Structure

```
├── frontend/           # Frontend files
|   ├── js/             # JavaScript files
|   ├── *.html          # HTML pages
|   └── *.css           # CSS stylesheets
├── server/             # Backend server
|   ├── routes/         # API routes
|   ├── utils/          # Utility functions
|   └── middleware/     # Middleware functions
└── package.json        # Project dependencies
```

Installation

1. Clone the repository:

```
git clone [repository-url]
cd [project-directory]
```

2. Install dependencies for the main project:

```
npm install
cd frontend
npm install
```

3. Install dependencies for the server:

```
cd server
npm install
```

4. For the ai agent folder

```
git clone https://github.com/dhh1995/PromptCoder
cd PromptCoder
pip install -e .
```

Database Configuration

1. Create a database in MySQL
2. Configure the following variables in your database connection:

```
host: '127.0.0.1',
user: 'root',
port: 3307,
password: '1234',
database: 'Stock_analysis_system'
```

Running the Application

1. Start the backend server:

```
cd server
node server.js
```

The server will start running on `http://localhost:3000`

2. Start the frontend:

```
cd frontend
npx http-server -p 3001 --cors
```

The frontend will be available at `http://localhost:3001`

Features

- User Authentication (Login/Register)
- Single Stock Analysis
- Multiple Stock Comparison
- Portfolio Management
- AI Investment Advice
- User Profile Management

API Endpoints

1. User Management

Register User

POST `/register`

- Parameters
  - `username` (string)
  - `password` (string)

Login User

POST `/login`

- Parameters
  - `username` (string)
  - `password` (string)

2. Stock Trading and Portfolio Management

Buy Stock

POST `/buy-stock`

- Parameters
  - `symbol` (stock ticker, e.g., AAPL)

    - `quantity` (number of shares)

View Held Stocks

GET `/active-stocks`

- Logic
    - Retrieve the stocks that the user holds and has not sold
    - Format timestamps to local time

3. Investment Advice

Single Stock Investment Advice

GET `/advice`

- Parameters
    - `symbol` (stock ticker)
    - `period` (investment years, e.g., 3)
    - `capital` (initial money, e.g., 3000)

Portfolio Investment Advice

GET `/portfolio-recommendation`

- Parameters
    - `investmentYears` (investment years, e.g., 3)
    - `maxPortfolioSize` (maximum portfolio size, e.g., 5)

4. Analyze Multiple Stocks

GET `/multiplestock-analysis`

- Parameters
    - `stocks` (comma-separated stock tickers, e.g., huohuf1y,huohuf2m)

Data Files

output.csv

Stores historical stock price data

- Format: `<Date>,<Stock Symbol>,<Open Price>,<High Price>,<Low Price>,<Close Price>,<Volume>`

Database Structure

Users Table (`users`)

Field	Description
email	User name
password	Hashed Password
balance	User Balance

Transactions Table (`transactions`)

Field	Description
email	User name
symbol	Stock Name
number	Quantity the user has bought
current price	Current stock price
is_sold	Whether Sold
timestamp	Transaction Timestamp

Environment Variables

Create a `.env` file in the server directory with the following variables:

```
PORT=3000
MONGODB_URI=your_mongodb_connection_string
JWT_SECRET=your_jwt_secret
```

API Keys Configuration

For the AI agent functionality, you need to configure the following API keys:

1. Create a `.env` file in the `ai-agent/PromptCoder2/Stockagent` directory with:

```
OPENAI_API_KEY=your_openai_api_key
ALPHA_VANTAGE_API_KEY=your_alpha_vantage_api_key
```

You can obtain these API keys from:

- OpenAI API Key: https://platform.openai.com/api-keys
- Alpha Vantage API Key: https://www.alphavantage.co/support/#api-key

Note: Make sure to keep your API keys secure and never commit them to version control.

Contributing

1. Fork the repository
2. Create your feature branch (`git checkout -b feature/AmazingFeature`)
3. Commit your changes (`git commit -m 'Add some AmazingFeature'`)
4. Push to the branch (`git push origin feature/AmazingFeature`)
5. Open a Pull Request

License

This project is licensed under the MIT License - see the LICENSE file for details.

Contact

For any questions or concerns, please contact the development team.

Environment Requirements

- Node.js
- postman(used to test the backend code)
- MySQL Database(workbench)

Program Running Steps

1. **Install dependencies:**

   ```
   npm install
   cd frontend
   npm install
   ```

2. **Configure the database:**

   - Create a database in MySQL.
   - configure the following variables:

     ```
     host: '127.0.0.1',
         user: 'root',
         port: 3307,
         password: 'YOUR PASSWORD',
         database: 'CONFIGURE WITH YOUR OWN
     DATABASE'
     ```

3. **Start the server(backend):**

   ```
   cd server
   node server.js
   ```

First, start the backend part. The backend server is running on the port 3000.

4. **Start the frontend:**

   cd frontend npx http-server -p 3001 --cors

Then start the frontend part. The service will run at `http://localhost:3001`.

5. **Run the ai agent part ** cd ai-agent cd PromptCoder2 cd Stockagent python app.py

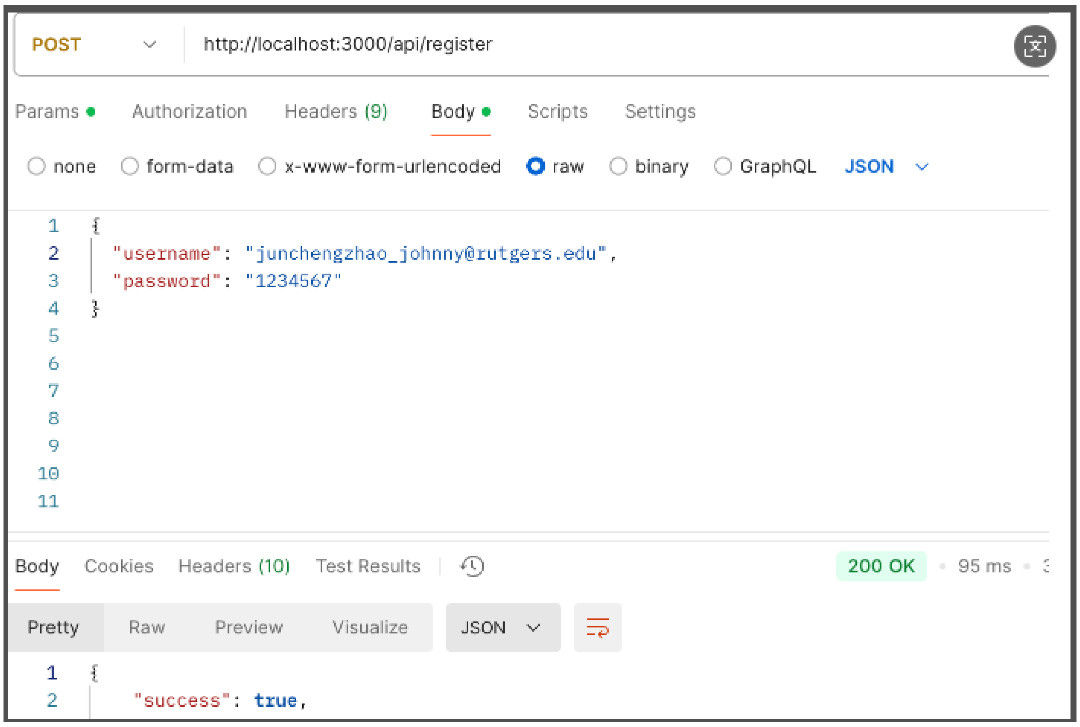
API Route Overview

1. User Management

Register User

POST `/register`

- Parameters
  - `username` (string)
  - `password` (string)
- **postman test(input and return format)**:



Body: [✓ raw] JSON

```
{
  "username": "junchengzhao_johnny@rutgers.edu",
  "password": "1234567"
}
```

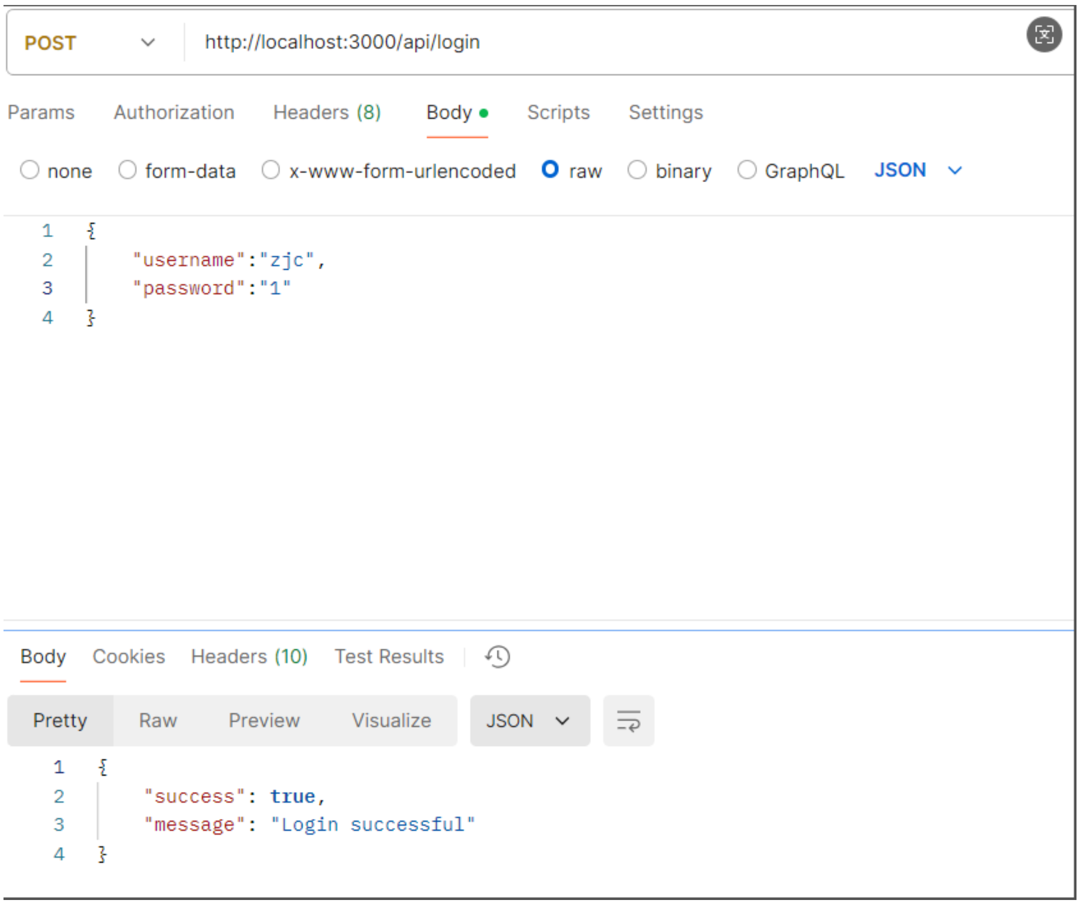
200 OK · 95 ms

```
{
    "success": true,
```

Login User

POST `/login`

- Parameters
  - `username` (string)
  - `password` (string)
- **postman test(input and return format)**:


POST http://localhost:3000/api/login

```
{
    "username":"zjc",
    "password":"1"
}
```

```
{
    "success": true,
    "message": "Login successful"
}
```

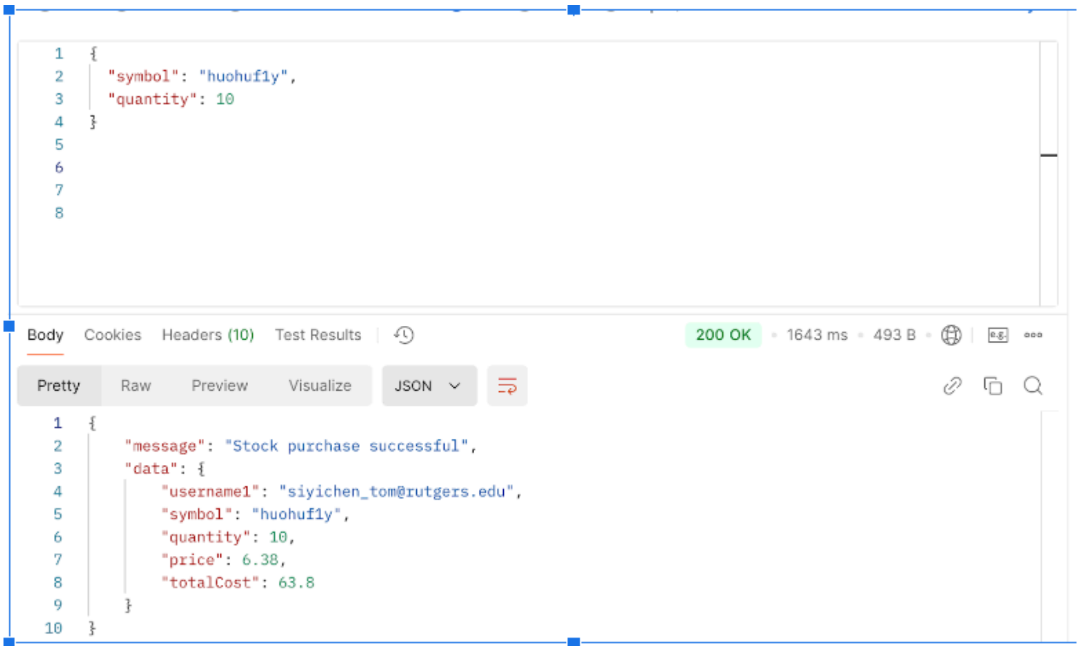
---

2. Stock Trading and Portfolio Management

Buy Stock

POST `/buy-stock`

- Parameters
  - `symbol` (stock ticker, e.g., AAPL)
  - `quantity` (number of shares)
- Logic
  1. Retrieve user balance.
  2. Query real-time stock price.
  3. Calculate total cost and verify if balance is sufficient.
  4. Record the transaction and update the balance.
- **postman test(input and return format)**:


```
{
  "symbol": "huohuf1y",
  "quantity": 10
}
```

Body Cookies Headers (10) Test Results 200 OK 1643 ms 493 B

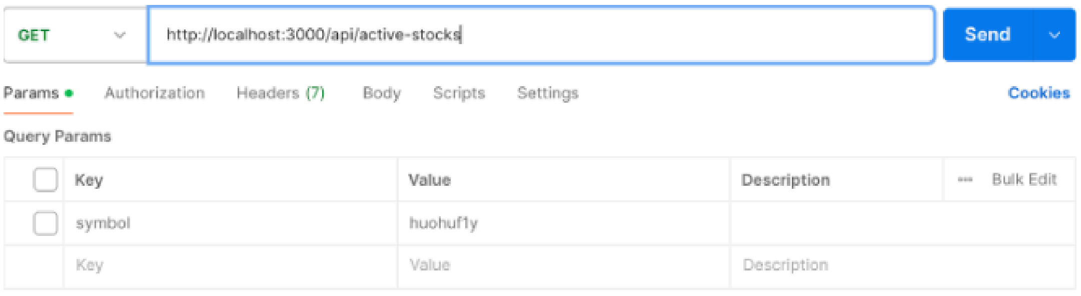
Pretty Raw Preview Visualize JSON

```
{
    "message": "Stock purchase successful",
    "data": {
        "username1": "siyichen_tom@rutgers.edu",
        "symbol": "huohuf1y",
        "quantity": 10,
        "price": 6.38,
        "totalCost": 63.8
    }
}
```

View Held Stocks

GET `/active-stocks`

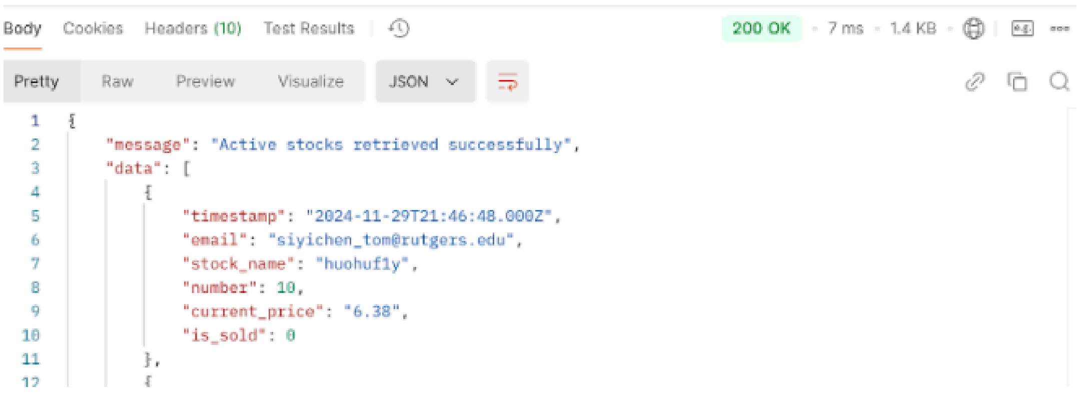
- Logic
  - Retrieve the stocks that the user holds and has not sold.
  - Format timestamps to local time.
- **postman test(input and return format)**:


GET http://localhost:3000/api/active-stocks Send

Params Authorization Headers (7) Body Scripts Settings Cookies

Query Params

	Key	Value	Description
☐	symbol	huohuf1y	
	Key	Value	Description


Body Cookies Headers (10) Test Results 200 OK 7 ms 1.4 KB

Pretty Raw Preview Visualize JSON

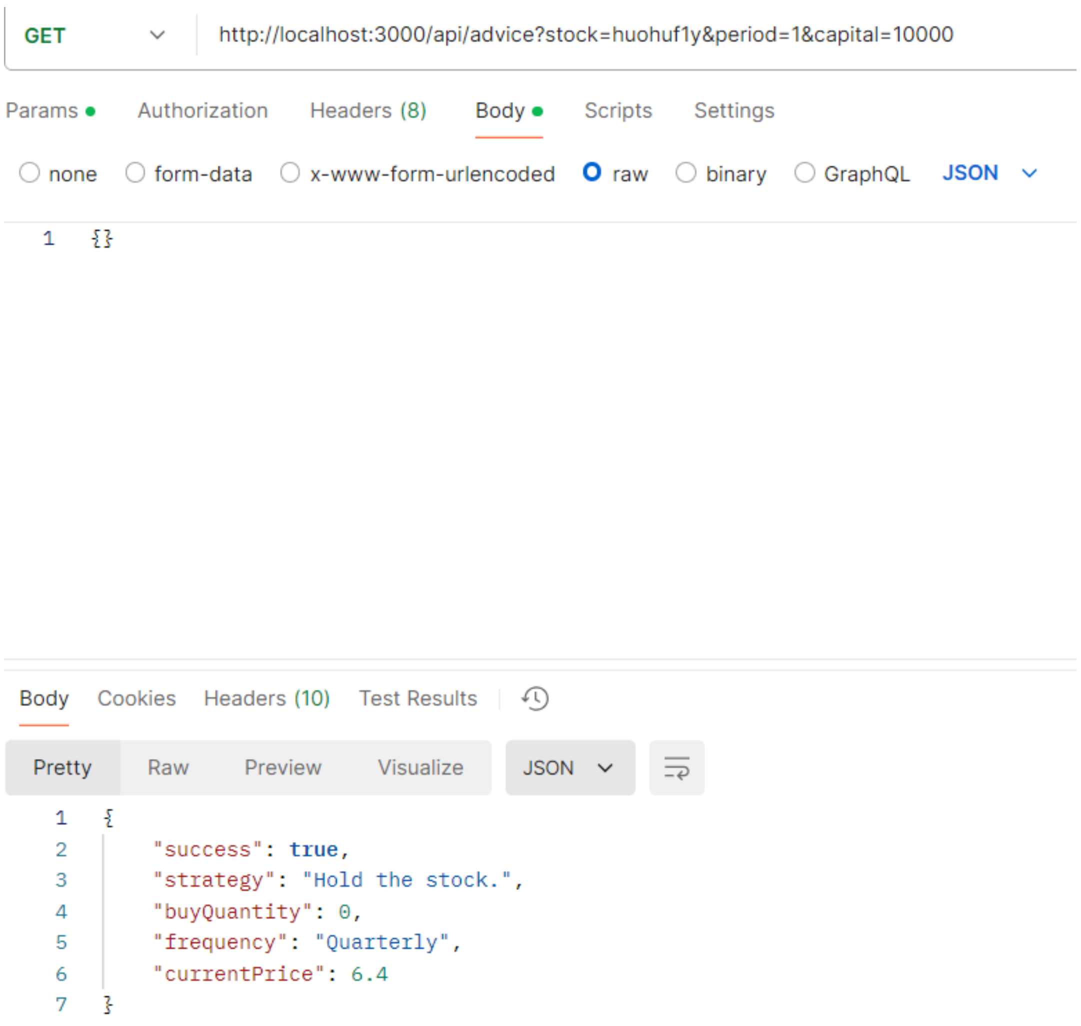
```
{
    "message": "Active stocks retrieved successfully",
    "data": [
        {
            "timestamp": "2024-11-29T21:46:48.000Z",
            "email": "siyichen_tom@rutgers.edu",
            "stock_name": "huohuf1y",
            "number": 10,
            "current_price": "6.38",
            "is_sold": 0
        },
        {
```

3. Investment Advice

Single Stock Investment Advice

GET `/advice`

- Parameters
  - `symbol` (stock ticker)
  - `period` (investment years, e.g., 3)
  - `capital` (initial money, e.g., 3000)
- Logic：
  - Get single stock advice based on historical data and provide recommendations.
- **postman test(input and return format)**:



GET http://localhost:3000/api/advice?stock=huohuf1y&period=1&capital=10000

Body: [✓ raw] JSON

```
{}
```

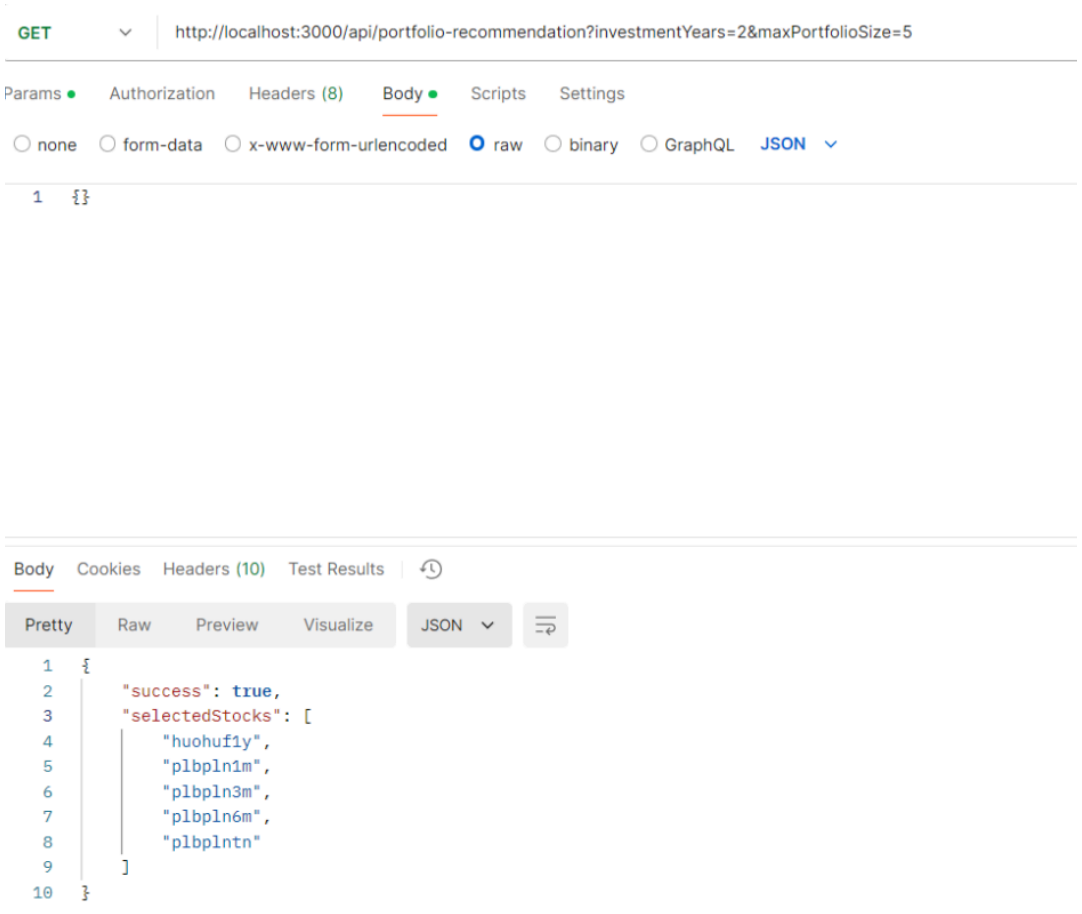
```
{
    "success": true,
    "strategy": "Hold the stock.",
    "buyQuantity": 0,
    "frequency": "Quarterly",
    "currentPrice": 6.4
}
```

.

Portfolio Investment Advice

GET `/portfolio-recommendation`

- Parameters
    - `investmentYears` (investment years, e.g., 3)
    - `maxPortfolioSize` (maximum portfolio size, e.g., 5)
- Logic
    - Read data from the `output.csv` file.
    - Fill missing dates and calculate return rates for each stock.
    - Build a correlation matrix and select stocks based on investment years and correlation.
- **postman test(input and return format)**:.



```
http://localhost:3000/api/portfolio-recommendation?investmentYears=2&maxPortfolioSize=5
```

```
{}
```

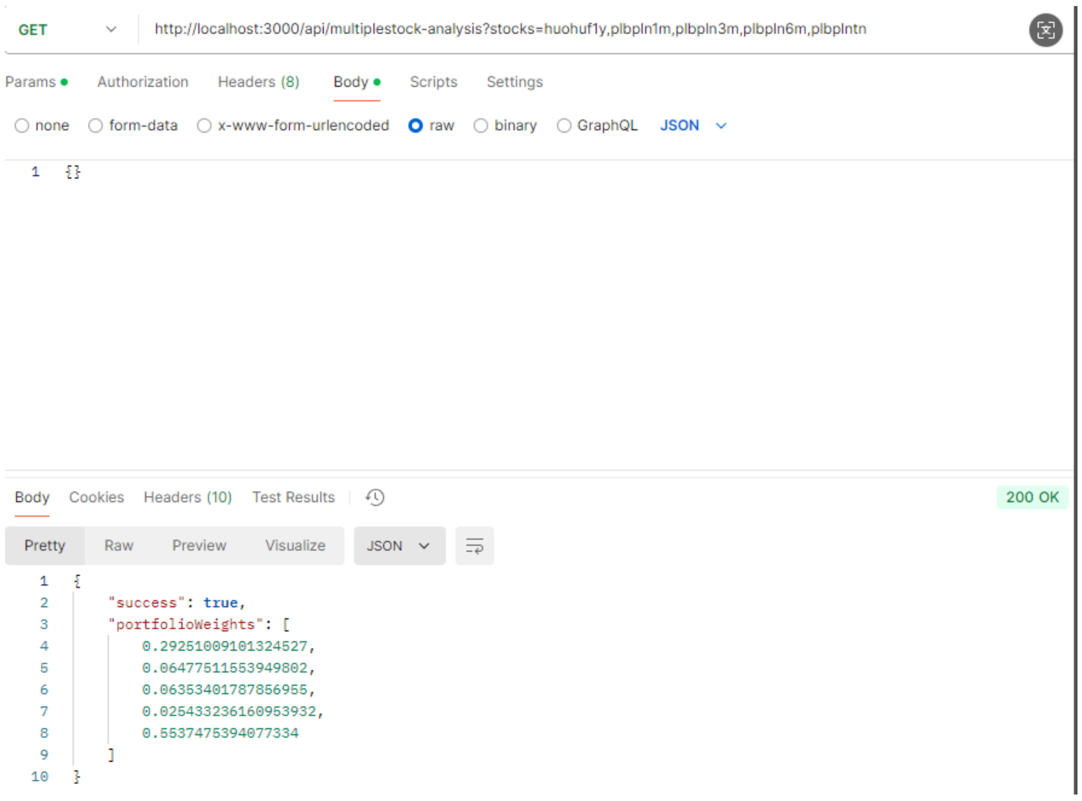
```
{
    "success": true,
    "selectedStocks": [
        "huohuf1y",
        "plbpln1m",
        "plbpln3m",
        "plbpln6m",
        "plbplntn"
    ]
}
```

4. Analyze Multiple Stocks

GET `/multiplestock-analysis`

- Parameters
    - `stocks` (comma-separated stock tickers, e.g., huohuf1y,huohuf2m)
- Logic
    - return portfolilo weights for each stocks.

- **postman test(input and return format):.**



```
http://localhost:3000/api/multiplestock-analysis?stocks=huohuf1y,plbpln1m,plbpln3m,plbpln6m,plbplntn
```

```
{}
```

```
{
    "success": true,
    "portfolioWeights": [
        0.29251009101324527,
        0.06477511553949802,
        0.06353401787856955,
        0.025433236160953932,
        0.5537475394077334
    ]
}
```