

# Data Integrity & Authentication Task

## Description

This project implements a secure RESTful API using Flask. It includes user authentication, two-factor authentication (2FA) using QR codes, and CRUD operations for managing products.

## Features

- **User Registration** (/signup)
- **User Login** (/login & QR Code generation for 2FA)
- **Two-Factor Authentication (2FA) Verification** (/verify-2fa)
- **JWT Authentication for Secured Endpoints**
- **Product Management (CRUD operations)**

## Installation & Setup

### 1. Install Dependencies

```
# For Windows PowerShell, allow script execution
Set-ExecutionPolicy -Scope Process -ExecutionPolicy Bypass
```

```
# Create and activate a virtual environment
```

```
python -m venv venv
```

```
venv\Scripts\activate # Windows
```

```
# source venv/bin/activate # Linux/macOS
```

```
# Install required packages
```

```
pip install flask flask-sqlalchemy flask-bcrypt flask-jwt-extended
pyotp qrcode pillow pymysql
```

## 2. Database Setup

- Ensure you have **MySQL** running.
- Create a database:

```
CREATE DATABASE data_integrity_task;
```

## 3. Run the Application

```
python data_app.py
```

## API Endpoints

### 1 User Authentication

*Sign Up (POST /signup)*

```
{  
  "username": "Hager666",  
  "password": "mypassword"  
}
```

*Login & Generate QR Code (POST /Login)*

```
{  
  "username": "Hager666",  
  "password": "mypassword"  
}
```

- **Response:** PNG image (QR Code for 2FA setup)

*Verify 2FA & Get JWT Token (POST /verify-2fa)*

```
{  
  "username": "Hager666",
```

```
"code": "123456"
}
```

- **Response:** JWT token (valid for **1 hour**)

## **2 Secured Product Management (JWT Required)**

- ◆ **Include JWT in headers:**

Authorization: Bearer <your\_token>

### ***Create a New Product (POST /products)***

```
{
  "name": "Laptop",
  "description": "Gaming laptop",
  "price": 1200.99,
  "quantity": 10
}
```

### ***Read All Products (GET /products)***

- **Response:** List of products

```
[
  {
    "id": 1,
    "name": "Laptop",
    "description": "Gaming laptop",
    "price": 1200.99,
    "quantity": 10
  }
]
```

### ***Update Product Information (PUT /products/{product\_id})***

```
{
  "price": 1100.50,
  "quantity": 5
}
```

### ***Delete a Product (DELETE /products/{product\_id})***

```
DELETE /products/{product_id}
```

#### **Headers:**

```
{
  "Authorization": "Bearer <your_token>"
}
```

#### **Response:**

```
{
  "message": "Product deleted successfully"
}
```

## **Notes**

- JWT Token expires after 1 hour.
- QR Code must be scanned with a 2FA app (Google Authenticator, Authy, etc.).
- Test API using Postman or cURL.

**Enjoy Secure Authentication & Product Management!**