Python: RESTful API application

ITFROVN - Python 2

Python Flask

03

1. Flask environment prepare

1. Install virtual environment và libpq-dev:

   apt install python3-venv libpq-dev

2. Download Flask boilerplate:

   git clone -b db https://github.com/abpabab/flask-boilerplate

3. Tạo mới virtual environment:

   cd flask-boilerplate

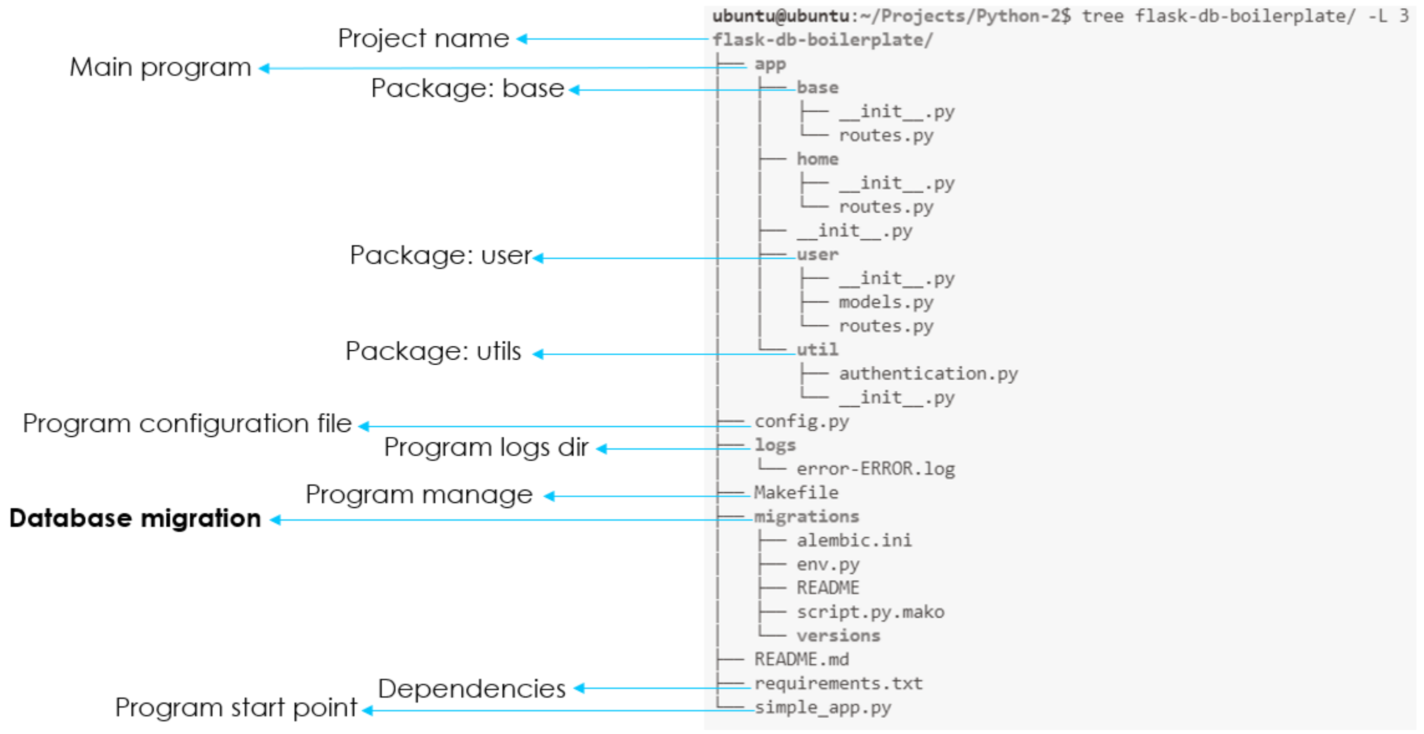
   python3 -m venv .venv

4. Kích hoạt virtual environment:

   source .venv/bin/activate

5. Cài đặt project dependency modules:

   pip3 install -r requirements.txt



```
ubuntu@ubuntu:~/Projects/Python-2$ tree flask-db-boilerplate/ -L 3
flask-db-boilerplate/
├── app
│   ├── base
│   │   ├── __init__.py
│   │   └── routes.py
│   ├── home
│   │   ├── __init__.py
│   │   └── routes.py
│   ├── __init__.py
│   ├── user
│   │   ├── __init__.py
│   │   ├── models.py
│   │   └── routes.py
│   └── util
│       ├── authentication.py
│       └── __init__.py
├── config.py
├── logs
│   └── error-ERROR.log
├── Makefile
├── migrations
│   ├── alembic.ini
│   ├── env.py
│   ├── README
│   ├── script.py.mako
│   └── versions
├── README.md
├── requirements.txt
└── simple_app.py
```

2. Database prepare - MySQL

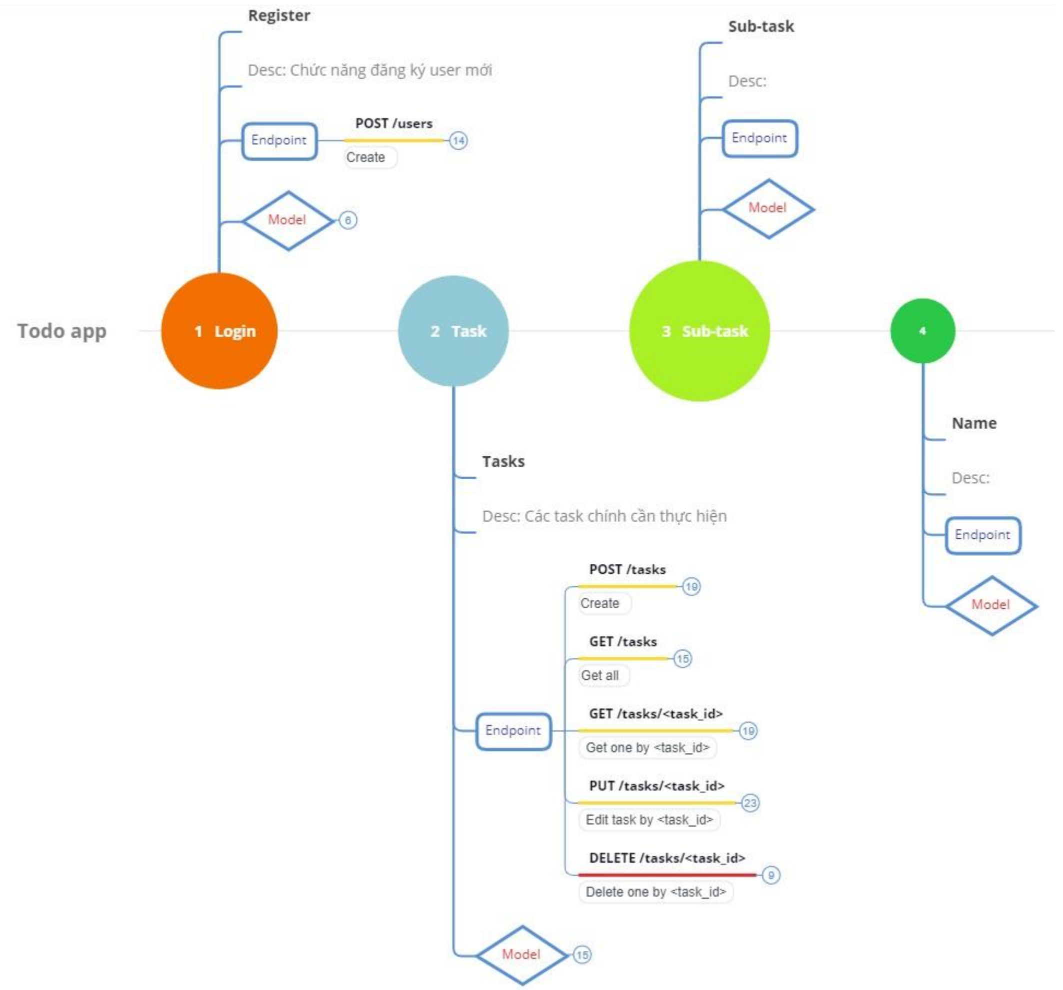
- MySQL 8.0 on Ubuntu 20.04:
  - Install MySQL server: apt install mysql-server
  - Create Database and User:

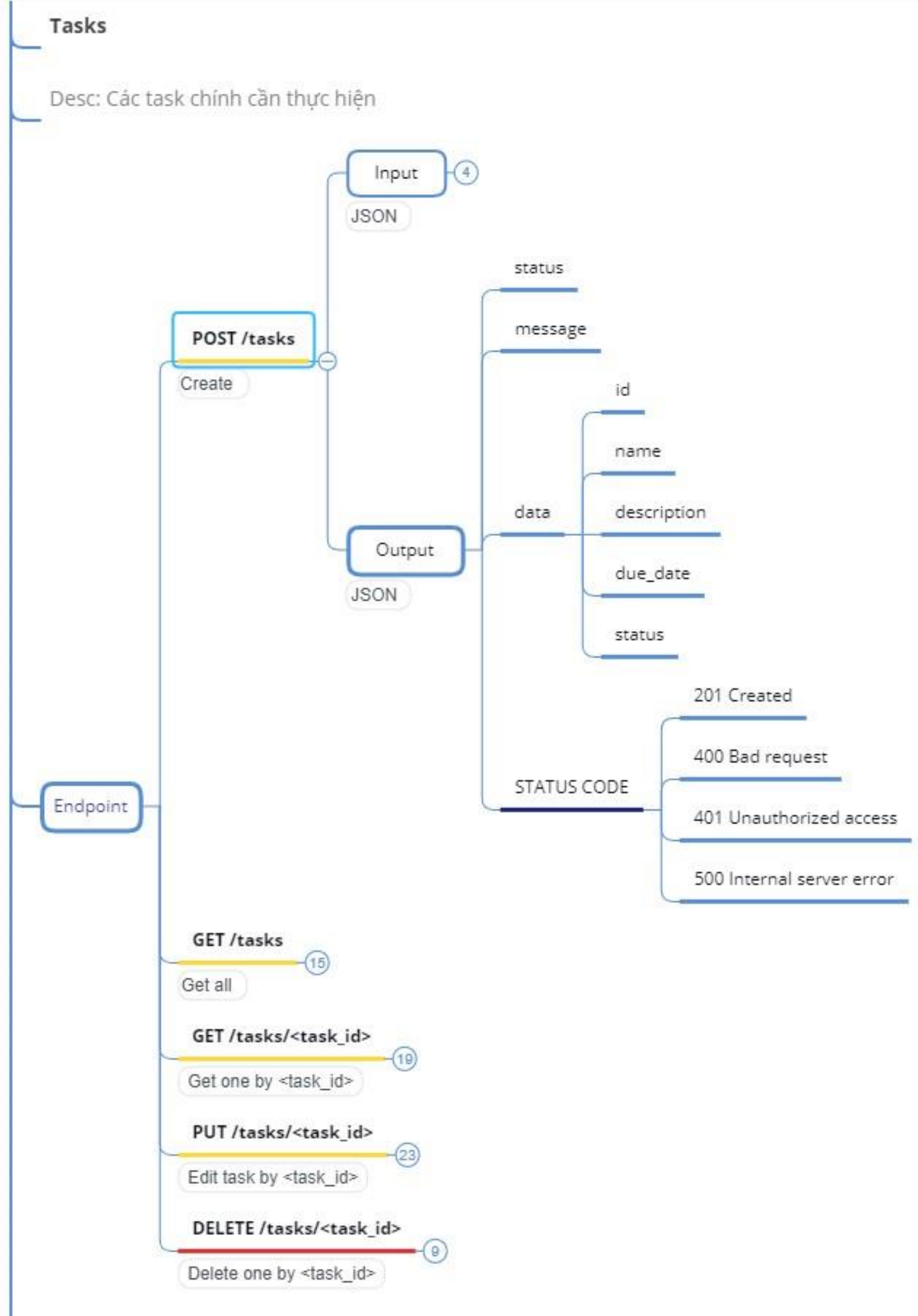
```
(root) # mysql

mysql> CREATE DATABASE tasks_db;
mysql> CREATE USER 'tasks_user'@'localhost' \
    -> IDENTIFIED WITH mysql_native_password \
    -> BY 'MyStrongPassword';
mysql> GRANT SELECT, INSERT, UPDATE, DELETE, CREATE, INDEX, DROP, ALTER, CREATE TEMPORARY TABLES, LOCK TABLES \
    -> ON tasks_db.* \
    -> TO 'tasks_user'@'localhost';
```

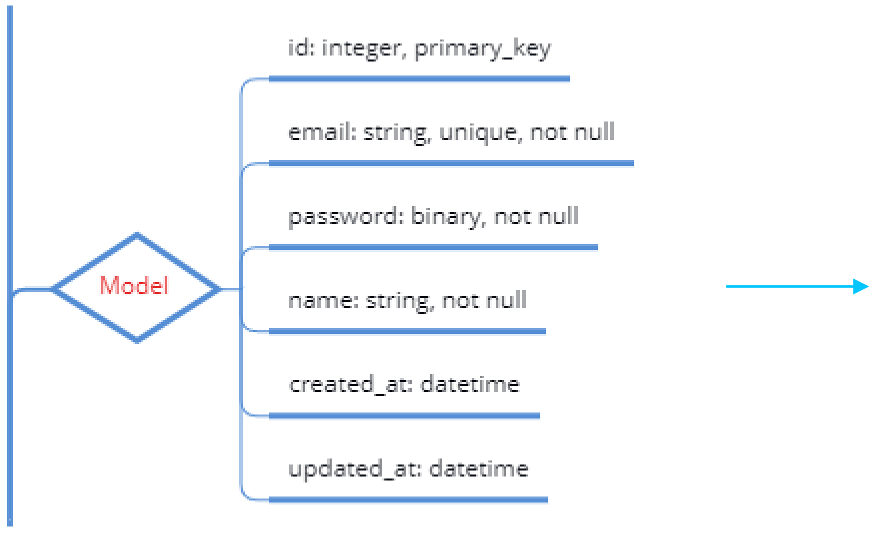
Database nên phân quyền **đúng** và **đủ** cho user, tránh dùng “GRANT ALL”

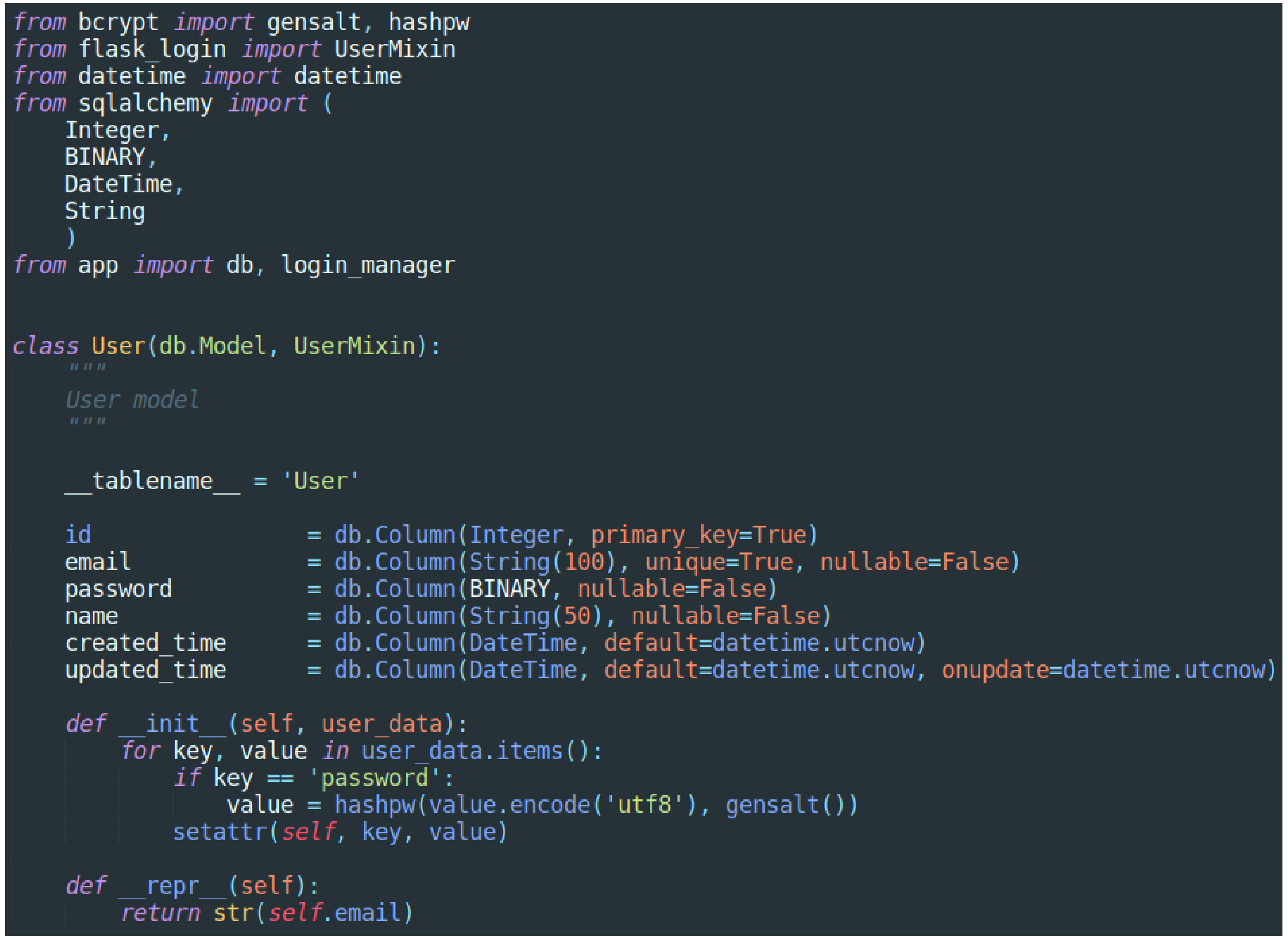
3. Functional design
4. Endpoint design





5. Model design





```python
from bcrypt import gensalt, hashpw
from flask_login import UserMixin
from datetime import datetime
from sqlalchemy import (
    Integer,
    BINARY,
    DateTime,
    String
    )
from app import db, login_manager


class User(db.Model, UserMixin):
    """
    User model
    """

    __tablename__ = 'User'

    id                  = db.Column(Integer, primary_key=True)
    email               = db.Column(String(100), unique=True, nullable=False)
    password            = db.Column(BINARY, nullable=False)
    name                = db.Column(String(50), nullable=False)
    created_time        = db.Column(DateTime, default=datetime.utcnow)
    updated_time        = db.Column(DateTime, default=datetime.utcnow, onupdate=datetime.utcnow)

    def __init__(self, user_data):
        for key, value in user_data.items():
            if key == 'password':
                value = hashpw(value.encode('utf8'), gensalt())
            setattr(self, key, value)

    def __repr__(self):
        return str(self.email)
```

6. Coding ...

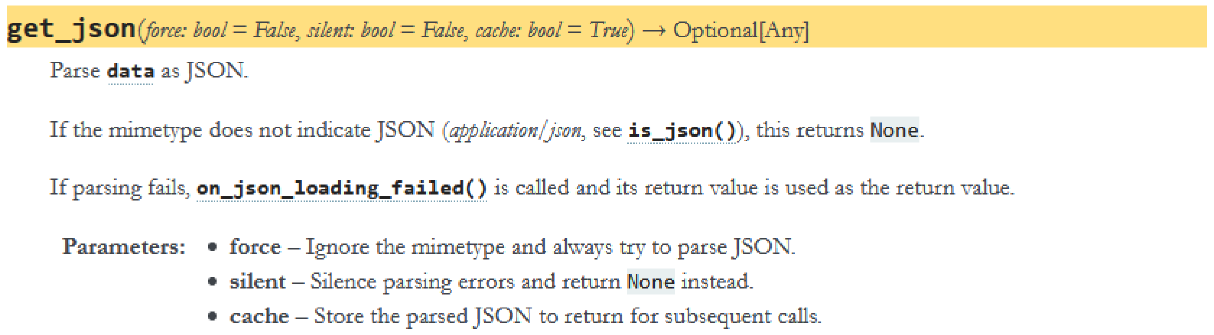
1. Edit config.py
2. Create all app/<package> structure:
    a. __init__.py
    b. routes.py
    c. models.py
3. Create models
4. Database migration: make db_upgrade

    Phải thực hiện import model vào routes.py trước khi thực hiện migration

5. Coding routing logic

6.1 Get posted JSON

- Get posted JSON:



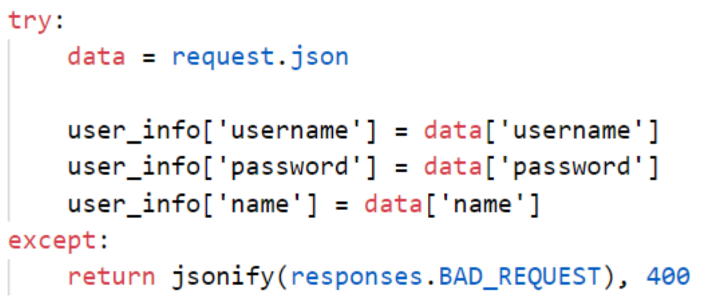
get_json(*force: bool = False, silent: bool = False, cache: bool = True*) → Optional[Any]

Parse **data** as JSON.

If the mimetype does not indicate JSON (*application/json*, see **is_json()**), this returns None.

If parsing fails, **on_json_loading_failed()** is called and its return value is used as the return value.

Parameters:
- **force** – Ignore the mimetype and always try to parse JSON.
- **silent** – Silence parsing errors and return None instead.
- **cache** – Store the parsed JSON to return for subsequent calls.



```
try:
    data = request.json

    user_info['username'] = data['username']
    user_info['password'] = data['password']
    user_info['name'] = data['name']
except:
    return jsonify(responses.BAD_REQUEST), 400
```

- Lưu ý:
  - request header Content-Type: application/json
  - request.get_json(force = True): sẽ bỏ qua bước check header Content-Type

6.2 Database: sqlalchemy

- SQLAlchemy is the Python SQL toolkit and Object Relational Mapper that gives application developers the full power and flexibility of SQL: https://flask-sqlalchemy.palletsprojects.com/en/2.x/
- Insert:

```
from app import db
from app.user.models import User

user = User({'email':'admin@gmail.com', 'name': 'Johny Deep'})
db.session.add(user)
db.session.commit()

user.id # returned inserted id
```

- Delete:

```
from app import db
from app.user.models import User

User.query.filter_by(id=123).delete()
## --- or --- ##
User.query.filter(User.id == 123).delete()

db.session.commit()
```

6.2 Database: sqlalchemy

- Get:

```
### ---Get user có username='admin@gmail.com'---
user = User.query.filter_by(username='admin@gmail.com').first()

### ---Get all user---
users = User.query.all()

### ---Get all user in limit---
users = User.query.limit(10).all()

### ---Get user có id=1---
user = User.query.get(1)
```

- Update:

```
### ---Update by selected first---
admin = User.query.filter_by(username='admin@gmail.com').first()
admin.email = 'new_email@gmail.com'
db.session.commit()

### ---Update directly---
user_updated = User.query.filter_by(username='admin@gmail.com').update(dict(username='new_email@gmail.com'))
db.session.commit()
```