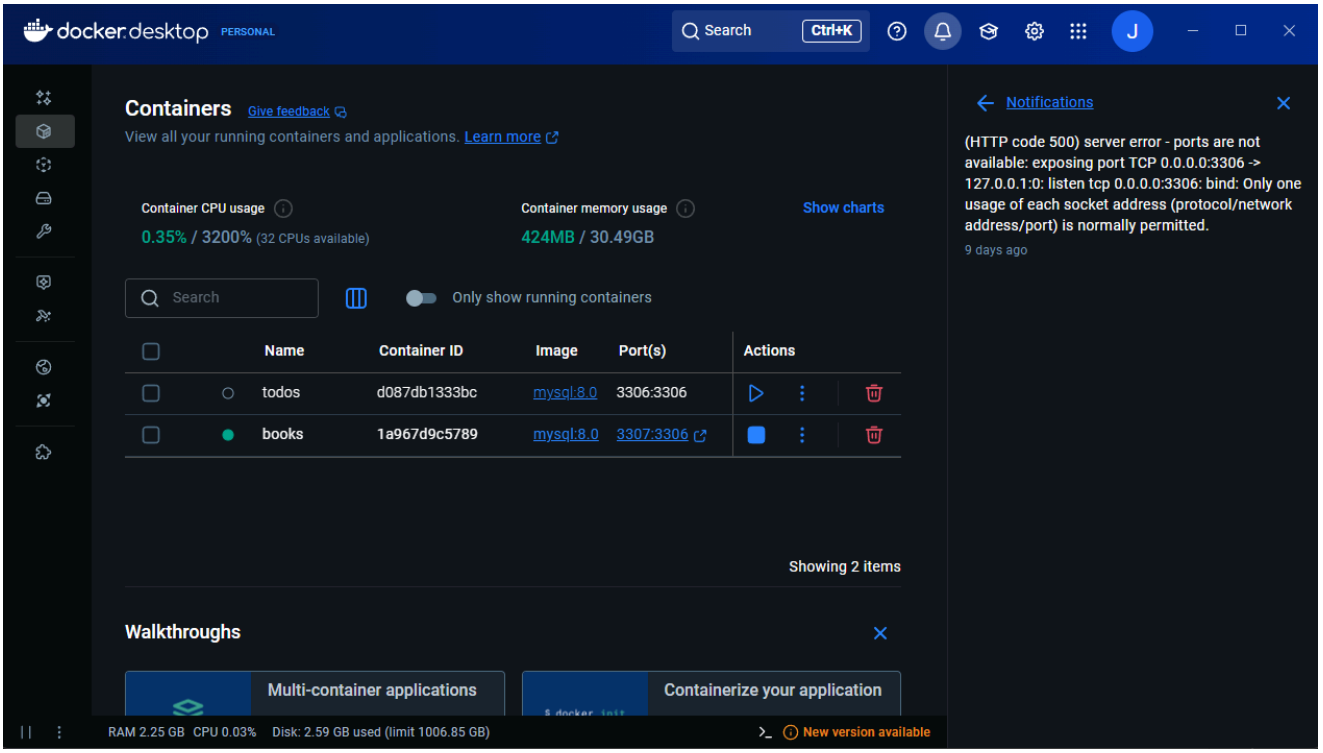
FastAPI + SQLAlchemy 실습 과제. 도서 관리 시스템 API 구축

```
C:\backend>docker run -p 3307:3306 -e MYSQL_ROOT_PASSWORD=books -e MYSQL_DATABASE=books -d -v books:/db --name books mysql:8.0
```




```
C:\backend>docker exec -it books bash
bash-5.1# mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.42 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> SHOW databases;
+--------------------+
| Database           |
+--------------------+
| books              |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.00 sec)
```

```
mysql> USE books;
Database changed
mysql> CREATE TABLE book(
    ->  id INT NOT NULL AUTO_INCREMENT,
    ->  title VARCHAR(200) NOT NULL,
    ->  author VARCHAR(100) NOT NULL,
    ->  isbn CHAR(13) UNIQUE NULL,
    ->  price INT NOT NULL,
    ->  stock_quantity INT NULL DEFAULT 0,
    ->  published_date DATE NULL,
    ->  created_at TIMESTAMP NULL DEFAULT CURRENT_TIMESTAMP,
    ->  updated_at TIMESTAMP NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
    ->  , PRIMARY KEY (id)
    -> );
Query OK, 0 rows affected (0.06 sec)
```

```
mysql> CREATE TABLE category(
    ->  id INT NOT NULL AUTO_INCREMENT,
    ->  name VARCHAR(50) UNIQUE NOT NULL,
    ->  description TEXT NULL,
    ->  created_at TIMESTAMP NULL DEFAULT CURRENT_TIMESTAMP,
    ->  PRIMARY KEY (id)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

```
mysql> DESC book;
+----------------+--------------+------+-----+-------------------+-----------------------------------------------+
| Field          | Type         | Null | Key | Default           | Extra                                         |
+----------------+--------------+------+-----+-------------------+-----------------------------------------------+
| id             | int          | NO   | PRI | NULL              | auto_increment                                |
| title          | varchar(200) | NO   |     | NULL              |                                               |
| author         | varchar(100) | NO   |     | NULL              |                                               |
| isbn           | char(13)     | YES  | UNI | NULL              |                                               |
| price          | int          | NO   |     | NULL              |                                               |
| stock_quantity | int          | YES  |     | 0                 |                                               |
| published_date | date         | YES  |     | NULL              |                                               |
| created_at     | timestamp    | YES  |     | CURRENT_TIMESTAMP | DEFAULT_GENERATED                             |
| updated_at     | timestamp    | YES  |     | CURRENT_TIMESTAMP | DEFAULT_GENERATED on update CURRENT_TIMESTAMP |
+----------------+--------------+------+-----+-------------------+-----------------------------------------------+
9 rows in set (0.00 sec)

mysql> DESC category;
+-------------+-------------+------+-----+-------------------+-------------------+
| Field       | Type        | Null | Key | Default           | Extra             |
+-------------+-------------+------+-----+-------------------+-------------------+
| id          | int         | NO   | PRI | NULL              | auto_increment    |
| name        | varchar(50) | NO   | UNI | NULL              |                   |
| description | text        | YES  |     | NULL              |                   |
| created_at  | timestamp   | YES  |     | CURRENT_TIMESTAMP | DEFAULT_GENERATED |
+-------------+-------------+------+-----+-------------------+-------------------+
4 rows in set (0.00 sec)
```

```
INSERT INTO book (title, author, isbn, price, stock_quantity,
published_date) VALUES
('Attention Is All You Need', 'Ashish Vaswani et al.', '9780123456786',
22000, 5, '2017-06-12'),
('Deep Residual Learning for Image Recognition', 'Kaiming He et al.',
'9780123456787', 18000, 3, '2015-12-10'),
('Layer Normalization', 'Jimmy Lei Ba et al.', '9780123456788', 15000, 4,
'2016-07-21'),
('BERT: Pre-training of Deep Bidirectional Transformers for Language
Understanding', 'Jacob Devlin et al.', '9780123456789', 25000, 7, '2018-10-
11'),
('Language Models are Unsupervised Multitask Learners (GPT-2)', 'Alec
Radford et al.', '9780123456790', 28000, 6, '2019-02-14'),
```

```
('Improving Language Understanding by Generative Pre-Training (GPT-1)',
'Alec Radford et al.', '9780123456791', 19000, 2, '2018-06-11'),
('Scaling Laws for Neural Language Models', 'Jared Kaplan et al.',
'9780123456792', 21000, 3, '2020-01-23'),
('Language Models are Few-Shot Learners (GPT-3)', 'Tom B. Brown et al.',
'9780123456793', 35000, 8, '2020-05-28'),
('Training language models to follow instructions with human feedback
(InstructGPT)', 'Long Ouyang et al.', '9780123456794', 32000, 7, '2022-03-
04'),
('LoRA: Low-Rank Adaptation of Large Language Models', 'Edward J. Hu et
al.', '9780123456795', 26000, 9, '2021-06-17'),
('RoFormer: Enhanced Transformer with Rotary Position Embedding', 'Jianlin
Su et al.', '9780123456796', 23000, 4, '2021-04-21'),
('Root Mean Square Layer Normalization', 'Biao Zhang and Rico Sennrich',
'9780123456797', 17000, 6, '2019-10-09'),
('On Layer Normalization in the Transformer Architecture', 'Ruibin Xiong et
al.', '9780123456798', 16000, 5, '2020-02-13'),
('Peri-LN: Revisiting Normalization Layer in the Transformer Architecture',
'Seongmin Lee et al.', '9780123456799', 20000, 1, '2023-11-20'),
('Qwen2: A Family of Strong and Scalable Language Models', 'Qwen Team',
'9780123456800', 40000, 0, '2024-06-06');
```

```
INSERT INTO category (name, description) VALUES
('LLM', 'Large Language Model'),
('CV', 'Computer Vision'),
('Normalization', 'Normalization techniques in neural networks'),
('RLHF', 'Reinforcement Learning from Human Feedback'),
('Finetuning', 'Finetuning techniques for pre-trained models'),
('Embedding', 'Vector representations of words or entities');
```

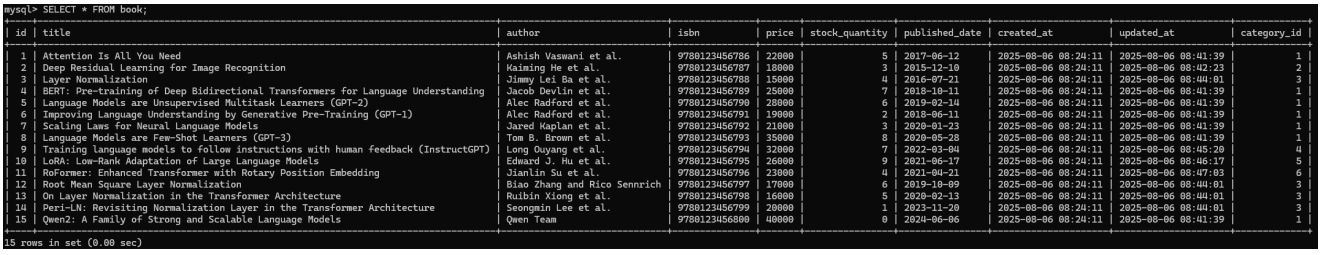
```
mysql> INSERT INTO book (title, author, isbn, price, stock_quantity, published_date) VALUES ('Attention Is All You Need', 'Ash
ish Vaswani et al.', '9780123456786', 22000, 5, '2017-06-12'), ('Deep Residual Learning for Image Recognition', 'Kaiming He et
 al.', '9780123456787', 18000, 3, '2015-12-10'), ('Layer Normalization', 'Jimmy Lei Ba et al.', '9780123456788', 15000, 4, '20
16-07-21'), ('BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding', 'Jacob Devlin et al.', '97801
23456789', 25000, 7, '2018-10-11'), ('Language Models are Unsupervised Multitask Learners (GPT-2)', 'Alec Radford et al.', '97
80123456790', 28000, 6, '2019-02-14'), ('Improving Language Understanding by Generative Pre-Training (GPT-1)', 'Alec Radford e
t al.', '9780123456791', 19000, 2, '2018-06-11'), ('Scaling Laws for Neural Language Models', 'Jared Kaplan et al.', '97801234
56792', 21000, 3, '2020-01-23'), ('Language Models are Few-Shot Learners (GPT-3)', 'Tom B. Brown et al.', '9780123456793', 350
00, 8, '2020-05-28'), ('Training language models to follow instructions with human feedback (InstructGPT)', 'Long Ouyang et al
.', '9780123456794', 32000, 7, '2022-03-04'), ('LoRA: Low-Rank Adaptation of Large Language Models', 'Edward J. Hu et al.', '9
780123456795', 26000, 9, '2021-06-17'), ('RoFormer: Enhanced Transformer with Rotary Position Embedding', 'Jianlin Su et al.',
 '9780123456796', 23000, 4, '2021-04-21'), ('Root Mean Square Layer Normalization', 'Biao Zhang and Rico Sennrich', '978012345
6797', 17000, 6, '2019-10-09'), ('On Layer Normalization in the Transformer Architecture', 'Ruibin Xiong et al.', '97801234567
98', 16000, 5, '2020-02-13'), ('Peri-LN: Revisiting Normalization Layer in the Transformer Architecture', 'Seongmin Lee et al.
', '9780123456799', 20000, 1, '2023-11-20'), ('Qwen2: A Family of Strong and Scalable Language Models', 'Qwen Team', '97801234
56800', 40000, 0, '2024-06-06');
Query OK, 15 rows affected (0.03 sec)
Records: 15  Duplicates: 0  Warnings: 0

mysql> INSERT INTO category (name, description) VALUES
    -> ('LLM', 'Large Language Model'),
    -> ('CV', 'Computer Vision'),
    -> ('Normalization', 'Normalization techniques in neural networks'),
    -> ('RLHF', 'Reinforcement Learning from Human Feedback'),
    -> ('Finetuning', 'Finetuning techniques for pre-trained models'),
    -> ('Embedding', 'Vector representations of words or entities');
Query OK, 6 rows affected (0.02 sec)
Records: 6  Duplicates: 0  Warnings: 0
```

```
mysql> SELECT * FROM book;
+----+-----------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+
| id | title                                                                 | author                      | isbn          | price | stock_quantity | published_date | created_at          | updated_at          |
+----+-----------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+
|  1 | Attention Is All You Need                                             | Ashish Vaswani et al.       | 9780123456786 | 22000 |              5 | 2017-06-12     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  2 | Deep Residual Learning for Image Recognition                          | Kaiming He et al.           | 9780123456787 | 18000 |              3 | 2015-12-10     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  3 | Layer Normalization                                                   | Jimmy Lei Ba et al.         | 9780123456788 | 15000 |              4 | 2016-07-21     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  4 | BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding | Jacob Devlin et al.  | 9780123456789 | 25000 |              7 | 2018-10-11     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  5 | Language Models are Unsupervised Multitask Learners (GPT-2)           | Alec Radford et al.         | 9780123456790 | 28000 |              6 | 2019-02-14     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  6 | Improving Language Understanding by Generative Pre-Training (GPT-1)   | Alec Radford et al.         | 9780123456791 | 19000 |              2 | 2018-06-11     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  7 | Scaling Laws for Neural Language Models                               | Jared Kaplan et al.         | 9780123456792 | 21000 |              3 | 2020-01-23     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  8 | Language Models are Few-Shot Learners (GPT-3)                         | Tom B. Brown et al.         | 9780123456793 | 35000 |              8 | 2020-05-28     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
|  9 | Training language models to follow instructions with human feedback (InstructGPT) | Long Ouyang et al.  | 9780123456794 | 32000 |              7 | 2022-03-04     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 10 | LoRA: Low-Rank Adaptation of Large Language Models                    | Edward J. Hu et al.         | 9780123456795 | 26000 |              9 | 2021-06-17     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 11 | RoFormer: Enhanced Transformer with Rotary Position Embedding         | Jianlin Su et al.           | 9780123456796 | 23000 |              4 | 2021-04-21     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 12 | Root Mean Square Layer Normalization                                  | Biao Zhang and Rico Sennrich | 9780123456797 | 17000 |              6 | 2019-10-09     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 13 | On Layer Normalization in the Transformer Architecture                | Ruibin Xiong et al.         | 9780123456798 | 16000 |              5 | 2020-02-13     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 14 | Peri-LN: Revisiting Normalization Layer in the Transformer Architecture | Seongmin Lee et al.       | 9780123456799 | 20000 |              1 | 2023-11-20     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
| 15 | Qwen2: A Family of Strong and Scalable Language Models                | Qwen Team                   | 9780123456800 | 40000 |              0 | 2024-06-06     | 2025-08-06 08:24:11 | 2025-08-06 08:24:11 |
+----+-----------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+
15 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM category;
+----+---------------+-----------------------------------------------+---------------------+
| id | name          | description                                   | created_at          |
+----+---------------+-----------------------------------------------+---------------------+
|  1 | LLM           | Large Language Model                          | 2025-08-06 08:27:16 |
|  2 | CV            | Computer Vision                               | 2025-08-06 08:27:16 |
|  3 | Normalization | Normalization techniques in neural networks   | 2025-08-06 08:27:16 |
|  4 | RLHF          | Reinforcement Learning from Human Feedback    | 2025-08-06 08:27:16 |
|  5 | Finetuning    | Finetuning techniques for pre-trained models  | 2025-08-06 08:27:16 |
|  6 | Embedding     | Vector representations of words or entities   | 2025-08-06 08:27:16 |
+----+---------------+-----------------------------------------------+---------------------+
6 rows in set (0.00 sec)
```

다대일 관계 추가

```
mysql> ALTER TABLE book
    -> ADD COLUMN category_id INT,
    -> ADD CONSTRAINT fk_category
    -> FOREIGN KEY (category_id) REFERENCES category(id);
Query OK, 15 rows affected (0.14 sec)
Records: 15  Duplicates: 0  Warnings: 0

mysql> UPDATE book SET category_id = 1 WHERE id IN (1, 4, 5, 6, 7, 8, 15);
Query OK, 7 rows affected (0.02 sec)
Rows matched: 7  Changed: 7  Warnings: 0

mysql> UPDATE book SET category_id = 2 WHERE id IN (2);
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> UPDATE book SET category_id = 3 WHERE id IN (3, 12, 13, 14);
Query OK, 4 rows affected (0.00 sec)
Rows matched: 4  Changed: 4  Warnings: 0

mysql> UPDATE book SET category_id = 4 WHERE id IN (9);
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> UPDATE book SET category_id = 5 WHERE id IN (10);
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> UPDATE book SET category_id = 6 WHERE id IN (11);
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```



```
mysql> SELECT * FROM book;
+----+-----------------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+-------------+
| id | title                                                                       | author                      | isbn          | price | stock_quantity | published_date | created_at          | updated_at          | category_id |
+----+-----------------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+-------------+
|  1 | Attention Is All You Need                                                   | Ashish Vaswani et al.       | 9780123456786 | 22000 |              5 | 2017-06-12     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  2 | Deep Residual Learning for Image Recognition                                | Kaiming He et al.           | 9780123456787 | 18000 |              3 | 2015-12-10     | 2025-08-06 08:24:11 | 2025-08-06 08:42:23 |           2 |
|  3 | Layer Normalization                                                         | Jimmy Lei Ba et al.         | 9780123456788 | 15000 |              4 | 2016-07-21     | 2025-08-06 08:24:11 | 2025-08-06 08:44:01 |           3 |
|  4 | BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding | Jacob Devlin et al.    | 9780123456789 | 25000 |              7 | 2018-10-11     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  5 | Language Models are Unsupervised Multitask Learners (GPT-2)                 | Alec Radford et al.         | 9780123456790 | 28000 |              6 | 2019-02-14     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  6 | Improving Language Understanding by Generative Pre-Training (GPT-1)         | Alec Radford et al.         | 9780123456791 | 19000 |              2 | 2018-06-11     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  7 | Scaling Laws for Neural Language Models                                     | Jared Kaplan et al.         | 9780123456792 | 21000 |              3 | 2020-01-23     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  8 | Language Models are Few-Shot Learners (GPT-3)                               | Tom B. Brown et al.         | 9780123456793 | 35000 |              8 | 2020-05-28     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
|  9 | Training language models to follow instructions with human feedback (InstructGPT) | Long Ouyang et al.     | 9780123456794 | 32000 |              7 | 2022-03-04     | 2025-08-06 08:24:11 | 2025-08-06 08:45:20 |           4 |
| 10 | LoRA: Low-Rank Adaptation of Large Language Models                          | Edward J. Hu et al.         | 9780123456795 | 26000 |              9 | 2021-06-17     | 2025-08-06 08:24:11 | 2025-08-06 08:46:17 |           5 |
| 11 | RoFormer: Enhanced Transformer with Rotary Position Embedding               | Jianlin Su et al.           | 9780123456796 | 23000 |              4 | 2021-04-21     | 2025-08-06 08:24:11 | 2025-08-06 08:47:03 |           6 |
| 12 | Root Mean Square Layer Normalization                                        | Biao Zhang and Rico Sennrich | 9780123456797 | 17000 |              6 | 2019-10-09     | 2025-08-06 08:24:11 | 2025-08-06 08:44:01 |           3 |
| 13 | On Layer Normalization in the Transformer Architecture                      | Ruibin Xiong et al.         | 9780123456798 | 16000 |              5 | 2020-02-13     | 2025-08-06 08:24:11 | 2025-08-06 08:44:01 |           3 |
| 14 | Peri-LN: Revisiting Normalization Layer in the Transformer Architecture     | Seongmin Lee et al.         | 9780123456799 | 20000 |              1 | 2023-11-20     | 2025-08-06 08:24:11 | 2025-08-06 08:44:01 |           3 |
| 15 | Qwen2: A Family of Strong and Scalable Language Models                      | Qwen Team                   | 9780123456800 | 40000 |              0 | 2024-06-06     | 2025-08-06 08:24:11 | 2025-08-06 08:41:39 |           1 |
+----+-----------------------------------------------------------------------------+-----------------------------+---------------+-------+----------------+----------------+---------------------+---------------------+-------------+
15 rows in set (0.00 sec)
```

...

Pydantic의 `BaseModel` 은 타입 힌트를 사용하여 데이터 유효성 검사 및 변환을 수행하는 강력한 도구입니다. 사용자는 `BaseModel` 을 상속받아 데이터 모델을 정의하고, 각 필드에 타입 힌트를 명시하여 데이터의 유효성을 검증하고 필요한 경우 자동으로 변환할 수 있습니다. 이를 통해 런타임 오류를 줄이고, 코드의 가독성과 유지보수성을 높일 수 있습니다.

Pydantic `BaseModel` 과 타입 힌트:

- **데이터 유효성 검사:** Pydantic은 타입 힌트를 사용하여 데이터의 유효성을 검증합니다. 예를 들어, 정수형 필드에 문자열이 입력되면 오류를 발생시킵니다.
- **데이터 변환:** Pydantic은 타입 힌트에 따라 입력 데이터를 지정된 타입으로 변환합니다. 예를 들어, 문자열로 된 숫자 입력을 정수형으로 변환할 수 있습니다.
- **명확한 데이터 모델 정의:** 타입 힌트를 사용하면 데이터 모델의 구조와 각 필드의 데이터 타입을 명확하게 정의할 수 있습니다.

- **자동 코드 생성:** Pydantic은 타입 힌트를 기반으로 자동으로 코드 생성 및 문서화를 지원합니다.
- **다양한 타입 지원:** Pydantic은 기본 데이터 타입 외에도 리스트, 딕셔너리, 커스텀 클래스 등 다양한 타입에 대한 유효성 검사를 지원합니다.

예시:

```
from pydantic import BaseModel, validator
from typing import Optional

class User(BaseModel):
    id: int
    name: str
    age: Optional[int] = None  # Optional 타입 힌트 사용 예시

    @validator('age')
    def validate_age(cls, value):
        if value is not None and value < 0:
            raise ValueError('Age must be a positive integer')
            return value
    # 유효한 데이터
    user_data_valid = {"id": 123, "name": "John Doe", "age": 30}
    user_valid = User(**user_data_valid)
    print(user_valid)
    # 유효하지 않은 데이터 (age가 음수)
    user_data_invalid = {"id": 456, "name": "Jane Doe", "age": -5}
    try:
        user_invalid = User(**user_data_invalid)
    except Exception as e:
        print(e)
    # 유효하지 않은 데이터 (age 타입 불일치)
    user_data_invalid2 = {"id": 789, "name": "Peter Pan", "age": "thirty"}
    try:
        user_invalid2 = User(**user_data_invalid2)
    except Exception as e:
        print(e)
```

장점:

- **가독성 향상:** 타입 힌트를 사용하면 코드의 의도를 명확하게 전달하여 가독성을 높일 수 있습니다.
- **유지보수성 향상:** 타입 힌트를 통해 데이터의 유효성을 검증하므로, 예상치 못한 에러를 방지하고 유지보수를 용이하게 합니다.
- **자동화된 테스트:** 타입 힌트를 사용하면 테스트 코드를 작성할 때 데이터의 유효성을 쉽게 검증할 수 있습니다.

결론:

Pydantic의 `BaseModel`과 타입 힌트를 함께 사용하면 데이터 유효성 검증 및 변환을 효율적으로 처리할 수 있습니다. 이를 통해 더욱 견고하고 유지보수하기 쉬운 코드를 작성할 수 있습니다.

서버 기본값은 어떻게 되나요? (`id`, `created_at` 등)

`id`, `created_at`, `updated_at`처럼 **서버나 데이터베이스가 직접 관리하는 필드는 `cls(...)` 호출 시 포함하지 않습니다.**

- `id`: `primary_key=True`이므로 데이터베이스에 행이 추가될 때 자동으로 생성됩니다.
- `created_at`: `server_default=func.now()`이므로 데이터베이스가 행을 생성하는 시점의 시간을 자동으로 기록합니다.

요약하자면, **클라이언트로부터 받는 값은 모두 명시적으로 전달**하고, **서버/DB가 생성하는 값은 건드리지 않는 것**이 가장 명확하고 안정적인 방법입니다.

`updated_at`은 **ORM 모델의 `onupdate=func.now()` 설정 덕분에 데이터베이스에서 자동으로 업데이트됩니다.** 따라서 파이썬 코드에서는 이 값을 직접 건드릴 필요가 전혀 없습니다.

ORM 객체의 다른 값(`price`, `stock_quantity` 등)을 변경하고 `session.commit()`을 실행하면, SQLAlchemy가 `UPDATE` SQL 구문을 생성합니다. 이때 데이터베이스는 `onupdate` 트리거를 감지하고 `updated_at` 컬럼을 현재 시간으로 자동 갱신합니다.

섹션 4. 리팩터링

Repository Pattern

Repository Pattern

데이터를 다루는 부분을 추상화하는 기술로 비지니스 로직과 데이터 관리의 강한 결합 없애준다.

데이터를 불러오고 저장하는 것과 같은 구체적인 구현은 감춘다.

Schemas

- BookListSchema
- BookSchema
- CategoryListSchema
- CategorySchema
- CreateBookRequest
- CreateCategoryRequest
- HTTPValidationError
- UpdateBookRequest
- UpdateStockRequest
- ValidationError

default

GET `/books` Get Books Handler

Parameters | Cancel

Name	Description
order string *(query)*	order
search string *(query)*	제목 또는 저자명 검색 search
category_id integer *(query)*	카테고리 ID 필터링 1
min_price integer *(query)*	최소 가격 필터링 min_price
max_price integer *(query)*	최대 가격 필터링 max_price
page integer *(query)* *minimum: 1*	페이지 번호 1
size integer *(query)* *maximum: 100* *minimum: 1*	페이지 당 항목 수 10

Execute | Clear

Responses

Curl

```
curl -X 'GET' \
  'http://127.0.0.1:8080/books?category_id=1&page=1&size=10' \
  -H 'accept: application/json'
```

Request URL

```
http://127.0.0.1:8080/books?category_id=1&page=1&size=10
```

Server response

Code	Details
200	Response body


```
{
  "books": [
    {
      "id": 1,
      "title": "Attention Is All You Need",
      "author": "Ashish Vaswani et al.",
      "isbn": "9780123456786",
      "price": 22000,
      "stock_quantity": 5,
      "published_date": "2017-06-12",
      "created_at": "2025-08-06T08:24:11",
      "updated_at": "2025-08-06T08:41:39",
      "category_id": 1
    },
    {
      "id": 4,
      "title": "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding",
      "author": "Jacob Devlin et al.",
      "isbn": "9780123456789",
      "price": 25000,
      "stock_quantity": 7,
      "published_date": "2018-10-11",
      "created_at": "2025-08-06T08:24:11",
      "updated_at": "2025-08-06T08:41:39",
      "category_id": 1
    },
    {
      "id": 5,
```


Download

Response headers

```
content-length: 1934
content-type: application/json
date: Fri,08 Aug 2025 03:14:36 GMT
server: uvicorn
```

Responses

Code	Description	Links
200	Successful Response	*No links*

Media type

application/json

Controls Accept header.

Example Value | Schema


```
{
  "books": [
    {
      "id": 0,
      "title": "string",
```