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Abstract

This report presents the design and implementation of a homestay recommendation system. The system targets the information overload in short-term rental platforms and uses a hybrid recommendation strategy combining collaborative filtering and content similarity. The frontend is implemented with Vue 3 and Element Plus, while the backend uses Spring Boot, MyBatis-Plus, JWT authentication, and MySQL storage. The report follows the database course project template, covering requirement analysis, conceptual and logical database design, physical implementation, and database operations, and further describes the overall architecture and recommender logic. The project provides a practical reference for similar personalized recommendation systems.

Keywords: Homestay recommendation; Collaborative filtering; Content-based similarity; Spring Boot; MySQL

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- [illegible]JWT [illegible]
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[illegible]DAU/MAU[illegible]

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1.11 [illegible]

[illegible]A/B [illegible]

1.12 [illegible]

[illegible]A/B [illegible]

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[illegible]A/B [illegible]

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[illegible]A/B [illegible]

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1.19 □□□□□□□□

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2.1 □□□□□□

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2.2 □□□ E-R □

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2.3 □□□ E-R □

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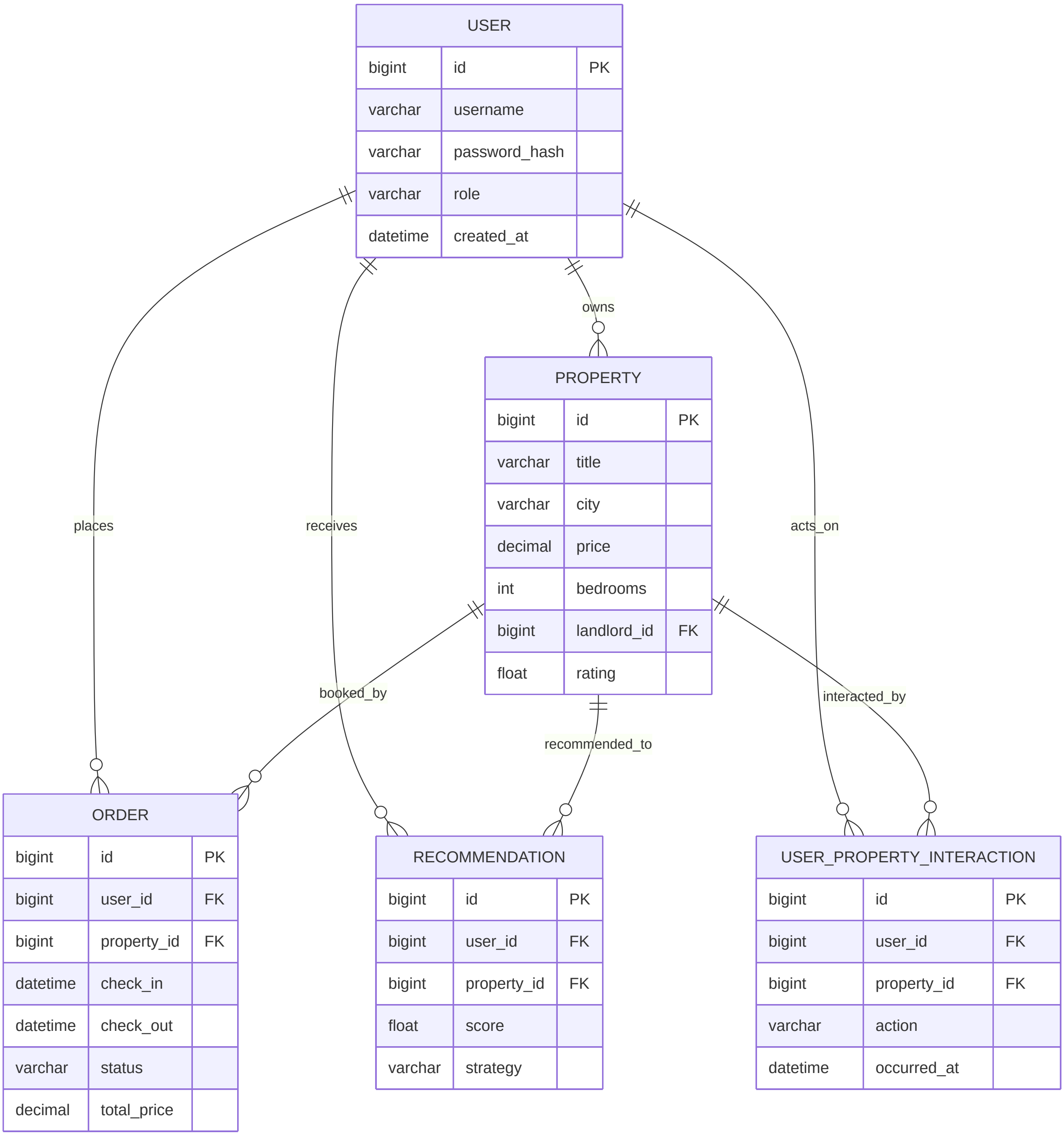
2.4 □□□□ E-R □



USER		
bigint	id	PK
varchar	username	
varchar	password_hash	
varchar	role	
datetime	created_at	

PROPERTY		
bigint	id	PK
varchar	title	
varchar	city	
decimal	price	
int	bedrooms	
bigint	landlord_id	FK
float	rating	

ORDER		
bigint	id	PK
bigint	user_id	FK
bigint	property_id	FK
datetime	check_in	
datetime	check_out	
varchar	status	
decimal	total_price	

RECOMMENDATION		
bigint	id	PK
bigint	user_id	FK
bigint	property_id	FK
float	score	
varchar	strategy	

USER_PROPERTY_INTERACTION		
bigint	id	PK
bigint	user_id	FK
bigint	property_id	FK
varchar	action	
datetime	occurred_at	

E-R □□-□□□□□□□□□□□□□□□□□□□□□□□□□□□

2.5 □□□□□□□□

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3.1 E-R □□□□□□□□

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3.2 □□□□□□

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3.3 □□□□□□□□

□□□□**user**□□□□□□

□□	□□	□□
id	BIGINT	□□□□□□□□□□□□□□□□
username	VARCHAR(50)	□□□□□□□□□□
password_hash	VARCHAR(255)	□□□□□□□□□□□
phone	VARCHAR(20)	□□□□□□□□□□□□□
email	VARCHAR(100)	□□□□□□□□□□□□
role	VARCHAR(20)	□□□□□USER/LANDLORD/ADMIN□
status	VARCHAR(20)	□□□□□□□□□□□□□□
created_at	DATETIME	□□□□
updated_at	DATETIME	□□□□□□

□□□□**property**□□□□□□

□□	□□	□□
id	BIGINT	□□□□
title	VARCHAR(200)	□□□□
city	VARCHAR(50)	□□□□□□
address	VARCHAR(200)	□□□□

price	DECIMAL(10,2)	□□□□
bedrooms	INT	□□□□
max_guests	INT	□□□□
rating	DECIMAL(3,2)	□□□□
landlord_id	BIGINT	□□□□ ID
status	VARCHAR(20)	□□□□
created_at	DATETIME	□□□□

□□□□order□□□□□□

□□	□□	□□
id	BIGINT	□□□□
user_id	BIGINT	□□□□
property_id	BIGINT	□□□□
check_in	DATE	□□□□
check_out	DATE	□□□□
total_price	DECIMAL(10,2)	□□□□
status	VARCHAR(20)	□□□□
created_at	DATETIME	□□□□

□□□□interaction□□□□□□

□□	□□	□□
id	BIGINT	□□□□□□
user_id	BIGINT	□□□□
property_id	BIGINT	□□□□
action	VARCHAR(20)	□□□□□VIEW/FAVOR/BOOK□
weight	INT	□□□□□□□□□□□
occurred_at	DATETIME	□□□□

□□□□recommendation□□□□□□

□□	□□	□□

id	BIGINT	□□□□□□
user_id	BIGINT	□□□□
property_id	BIGINT	□□□□
score	DECIMAL(6,4)	□□□□
strategy	VARCHAR(50)	□□□□□□
created_at	DATETIME	□□□□

□□□□**facility**□□□□□□

□□	□□	□□
id	BIGINT	□□□□
name	VARCHAR(50)	□□□□
category	VARCHAR(50)	□□□□
description	VARCHAR(200)	□□□□

□□□□□□□□**property_facility**□□□□□□

□□	□□	□□
id	BIGINT	□□□□
property_id	BIGINT	□□ ID
facility_id	BIGINT	□□ ID
created_at	DATETIME	□□□□

□□□□□□**property_image**□□□□□□

□□	□□	□□
id	BIGINT	□□□□
property_id	BIGINT	□□ ID
url	VARCHAR(255)	□□□□
sort_order	INT	□□□□
created_at	DATETIME	□□□□

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3.4 □□□□□□

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□PENDING/CONFIRMED/CANCELLED/COMPLETED□□□□□□□□□
□DRAFT/REVIEWING/ACTIVE/INACTIVE□□□□□□□□□□VIEW/FAVOR/BOOK□□□□□□□□□□□□□□□□
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3.5 □□□□□□□

□□ (user_id, created_at) □□□□□□□□□□□□□□□□□□□□□□□ (property_id, occurred_at) □□□□□□□□□□□□□□□□□□ user.username □ user.phone □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

4 □□□□□□□□□□

4.1 □□□□□

□ MySQL □□□□□□

```
CREATE DATABASE homestay_recommendation DEFAULT CHARACTER SET utf8mb4;
```

□□□□□□□ utf8mb4□□□

4.2 □□□□□

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```
CREATE TABLE property (
  id BIGINT PRIMARY KEY AUTO_INCREMENT,
  title VARCHAR(200) NOT NULL,
  city VARCHAR(50) NOT NULL,
  address VARCHAR(200) NOT NULL,
  price DECIMAL(10,2) NOT NULL,
  bedrooms INT NOT NULL,
  max_guests INT NOT NULL,
  landlord_id BIGINT NOT NULL,
  rating DECIMAL(3,2) DEFAULT 0,
  status VARCHAR(20) DEFAULT 'ACTIVE',
  created_at DATETIME DEFAULT CURRENT_TIMESTAMP
);
```

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4.3 □□□□

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```
CREATE VIEW view_hot_property AS
SELECT property_id, COUNT(*) AS order_count
FROM `order`
GROUP BY property_id;
```

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4.4 □□□□

□□□□□ city□price□rating □□□□□□□□□□□□□□□□□□□

```
CREATE INDEX idx_property_city ON property(city);
CREATE INDEX idx_property_price ON property(price);
CREATE INDEX idx_property_rating ON property(rating);
```

□□□□□□□□□ user_id □ property_id □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ (property_id, check_in)□

4.5 □□□□□

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```
CREATE TRIGGER trg_update_rating AFTER INSERT ON review
FOR EACH ROW
BEGIN
  UPDATE property
  SET rating = (SELECT AVG(score) FROM review WHERE property_id = NEW.property_id)
  WHERE id = NEW.property_id;
END;
```

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4.6 □□□□□□

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```
CREATE PROCEDURE sp_get_recommendations(IN uid BIGINT)
BEGIN
  SELECT property_id, score
  FROM recommendation
  WHERE user_id = uid
```

```
    ORDER BY score DESC
    LIMIT 20;
  END;
```

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4.7 □□□□□□□

□□ InnoDB□□

4.8 □□□□□□□□□

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5 □□□□

5.1 □□□□

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```
  SELECT * FROM property
  WHERE city = '□□'
  ORDER BY rating DESC
  LIMIT 10;
```

2□□□□□□□□□

```
  SELECT * FROM `order`
  WHERE user_id = 1001
  ORDER BY created_at DESC;
```

3□□□□□□□□□□□

```
  SELECT * FROM interaction
  WHERE property_id = 2001 AND action = 'VIEW'
  ORDER BY occurred_at DESC;
```

4□□□□□□□□□□□□□

```
SELECT p.*, r.score
FROM recommendation r
JOIN property p ON r.property_id = p.id
WHERE r.user_id = 1001
ORDER BY r.score DESC
LIMIT 20;
```

5.2 □□□□

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```
INSERT INTO `order` (user_id, property_id, check_in, check_out, total_price, statu
VALUES (1001, 2001, '2026-03-01', '2026-03-05', 1200.00, 'PENDING');
```

- □□□□□□□

```
UPDATE property
SET price = 499.00
WHERE id = 2001;
```

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```
INSERT INTO interaction (user_id, property_id, action, occurred_at)
VALUES (1001, 2001, 'BOOK', NOW());
```

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```
UPDATE `order`
SET status = 'CANCELLED'
WHERE id = 3001;
```

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5.3 □□□□□□□□

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```
START TRANSACTION;
UPDATE property_calendar
SET available = 0
WHERE property_id = 2001 AND date BETWEEN '2026-03-01' AND '2026-03-05';
INSERT INTO `order` (user_id, property_id, check_in, check_out, total_price, statu
VALUES (1001, 2001, '2026-03-01', '2026-03-05', 1200.00, 'PENDING');
COMMIT;
```

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5.4 □□□□□□□

□□□is_deleted□□

6 □□□□□

6.1 □□□□□

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6.2 □□□□□□□

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6.4 □□□□□□□

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7 □□□□□□□□□

7.1 □□□□□□

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7.2 □□□□□□

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□□ 1□□□ 2□□□ 3□□□□□□□□ recommendation □□□□□□□□□□□□□□□□□□□□□□□□□□

7.4 API □□□□□□

□□□□ API □□ `/api/auth`□`/api/property`□`/api/order`□`/api/recommendation` □□□□□□□□□□□□□ □□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

7.5 □□□□□□□

□□□□ Maven □□□□□□ `mvn spring-boot:run` □□□□□□□ Vite □□□`npm run build` □□□□□□□□□□□□ MySQL 8.x□□□□□□□□ Redis □□□□□□□□□□□□□□□ Linux + Docker□□□□□□□□□□□□□□□ JWT □□□□□ □□□□□□□□ ELK □ Prometheus + Grafana □□□□□□□

7.6 □□□□□□□□□

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7.7 □□□□□□□

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8 □□□□□

8.1 □□□□

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□□□□□□ Postman □ Rest Client□□□□ API □□□□□□□□□□□□□□□□□□□□□□□ Token □□□□□□□ 401□□□□□□□ 403□□□□□□□ 400□□□□□□□□ 500□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

8.3 □□□□□□□

□□ JMeter □□□□□□□□□□□□□□□□□□□□□□□□□□□ 95% □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□SQL □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

8.4 □□□□□□

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8.5 □□□□□□□

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TC-01	□□□□	□□□□□□	□□ Token□□□□□
TC-02	□□□□	□□=□□□□□<500	□□□□□□□□□□
TC-03	□□□□	□□□□□□□□□	□□□□□□□□□□□
TC-04	□□□□	□□□□□□□□□	□□□□□□□□□
TC-05	□□□□	□□□□□□□□□	□□ 401

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11 □□□□□□□□□□□□□

11.1 □□□□□□

□□ 200+ □□□□□1000+ □□□□□□□□ 300+ □□

11.2 □□□□□□

□□□

11.3 □□□□□□□□□

□□□□□□□□□□□ `npm run build` □□□□□□□□□□□ `mvn spring-boot:run` □□□□□□□□□□□□ `sql/schema.sql` □ `sql/sample_data.sql` □□

11.4 □□□□□□□□

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11.5 □□□□□□□□□

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11.6 □□□□□□□□□

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[illegible]

11.8 A/B [illegible]

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