1. (a) Relational Algebra

1. **Find the titles of the Novel books which use Chinese as the language.**

$$\pi_{title}\left(\sigma_{genre=\text{"Novel"}\wedge language=\text{"Chinese"}}(Book)\right)$$

2. **Retrieve the names of female customers who have borrowed Novel books and are due for return on 01-01-2025.**

$$\pi_{name}\left(\sigma_{gender=\text{"Ms."}}(Customer)\ \bowtie_{Customer.cID=Borrow.cID}\ \sigma_{dueDate=\text{"01-01-2025"}}(Borrow)\ \bowtie_{Borrow.bID=Book.bID}\ \sigma_{genre=\text{"Novel"}}(Book)\right)$$

1. (b) SQL Queries

1. **Display the distinct genres of books borrowed by Mr. customers whose ages are between 40 and 60.**

```sql
SELECT DISTINCT B.genre
FROM Customer AS C
JOIN Borrow AS BR ON C.cID = BR.cID
JOIN Book AS B ON BR.bID = B.bID
WHERE C.gender = 'Mr.'
  AND C.age BETWEEN 40 AND 60;
```

2. **For each genre of books, display the genre and the average age of customers.**

```sql
SELECT B.genre, AVG(C.age) AS avg_age
FROM Customer AS C
JOIN Borrow AS BR ON C.cID = BR.cID
JOIN Book AS B ON BR.bID = B.bID
GROUP BY B.genre;
```

2

Table 1: please fill your steps of finding your desired building into this table

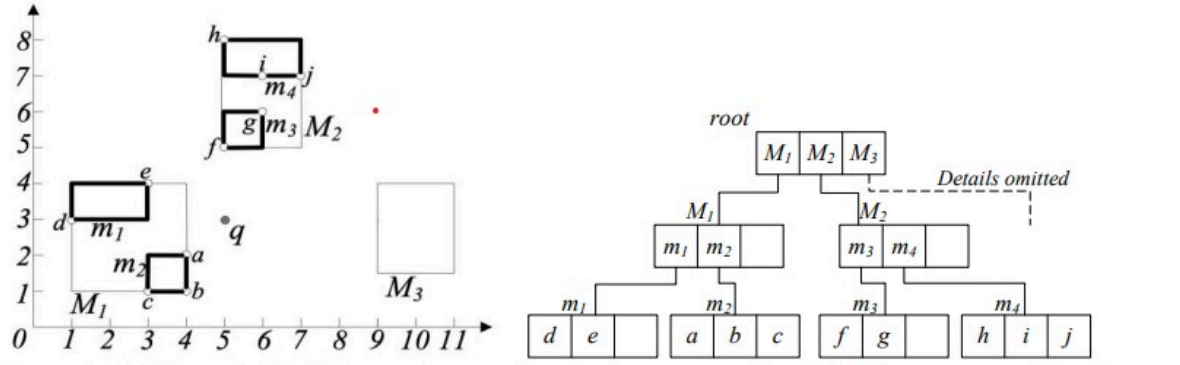

Figure 1: (left) spatial building points and enclosing rectangles; (right) corresponding R-tree

Building	a	b	c	d	e	f	g	h	i	j
Rating	6	7	7	5	5	7	8	6	4	7

Table 2: ratings of the ten buildings

Node	Q	oNN	dist(q, oNN)
Root	M1(1), M2(2), M3(4)	null	inf
M1	m2($\sqrt{2}$), m1(2), M2(2), M3(4)	null	inf
m2	m1(2), M2(2), M3(4)	b	$\sqrt{5}$
m1	M2(2), M3(4)	b	$\sqrt{5}$
M2	m3(2), m4(4), M3(4)	b	$\sqrt{5}$
m3	m4(4), M3(4)	f	2

Result

oNN = f

dist(q, oNN) = 2