Database R&D Exercise

Midterm

I confirm that this is my own work and that use of material from other sources, including the Internet, has been properly and fully acknowledged and referenced.

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Total in points (100 points total): _____

Professor's Comments:

NYU

1. a. False

   b. False

   c. False

   d. True

2. a. Data structure is simple and the whole system is not expected to change.

   b. It is very expansive and hard to maintain because of the complexity and it is difficult to provide a unified view

   c. It will be of benifit for the encryption for keeping the data security and good for the concurrency.

3. a. D

   b. D

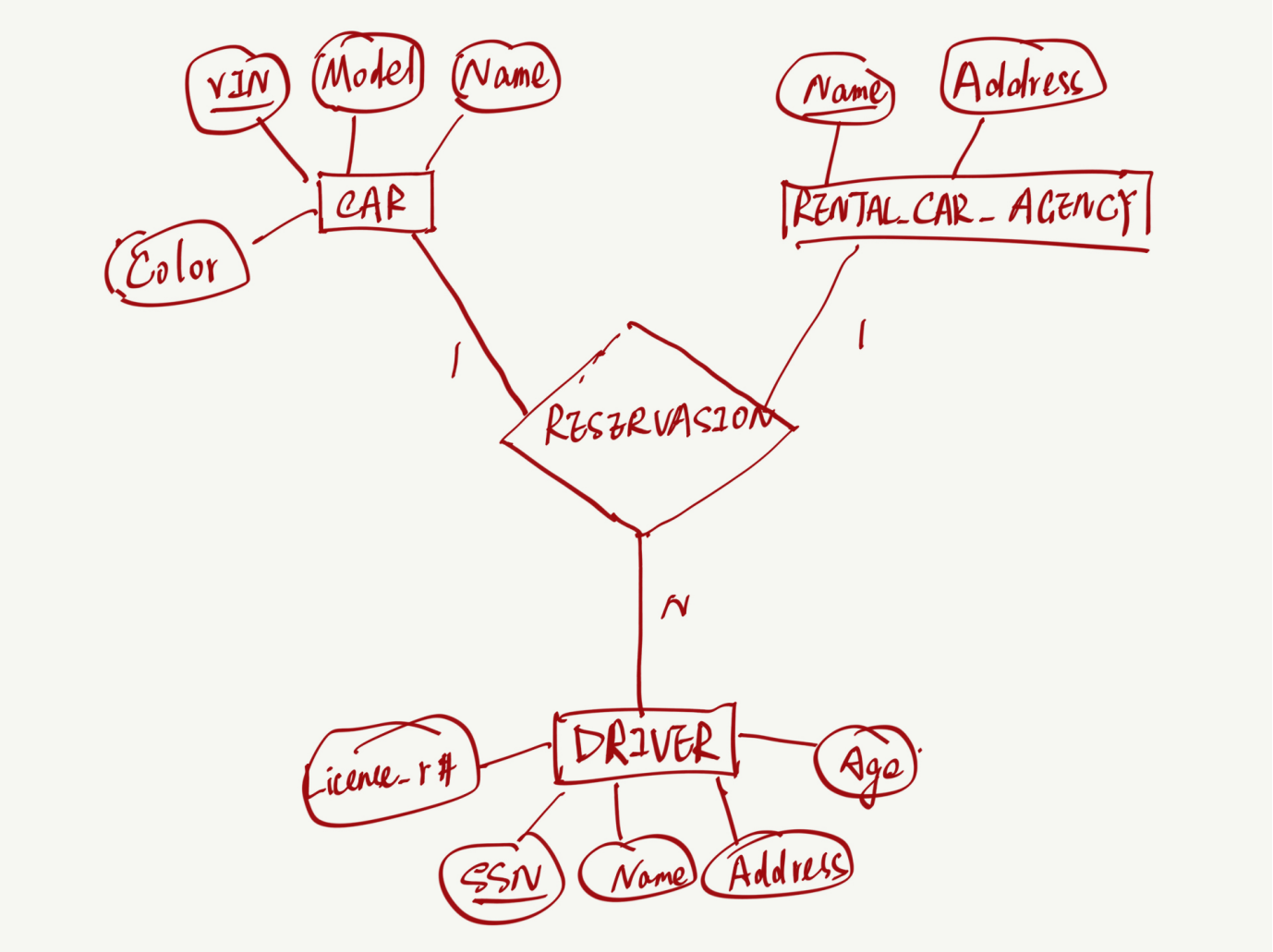
   c. A

   d. D

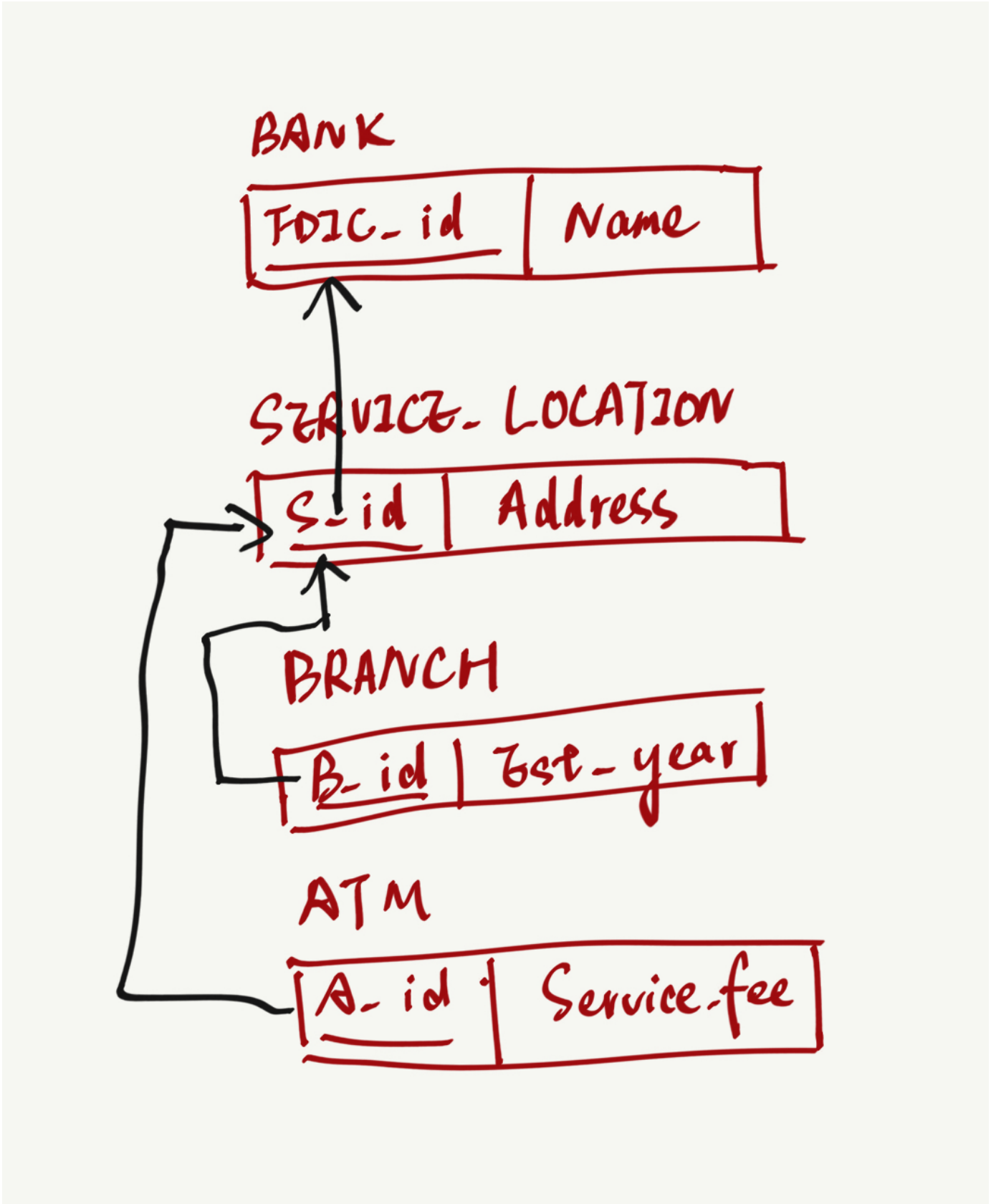
4. a.

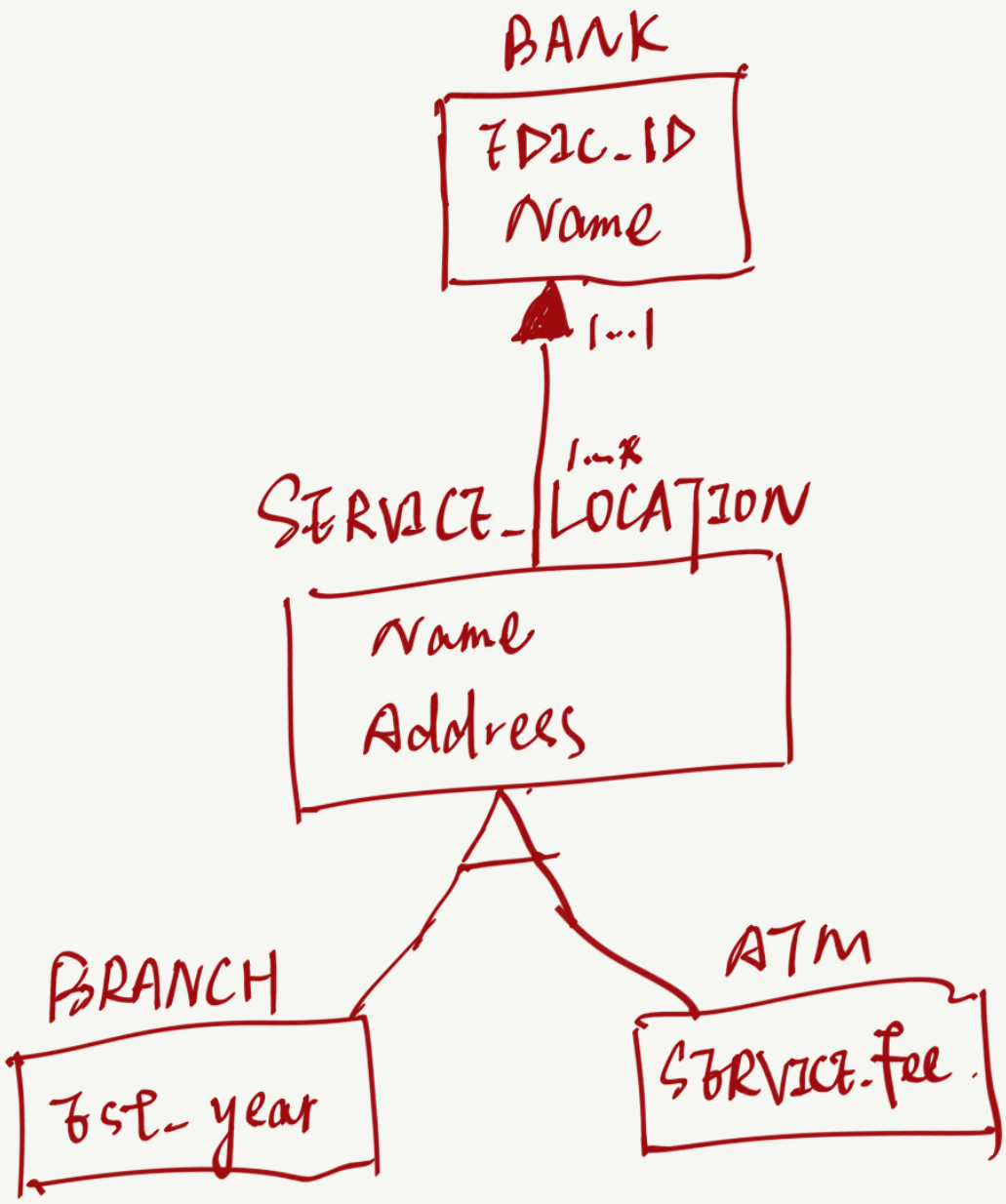
   b. Minimum number 1; Maximum number n. Because E1 to En is entity sets, which means there is no duplicates in the sets.

5. A

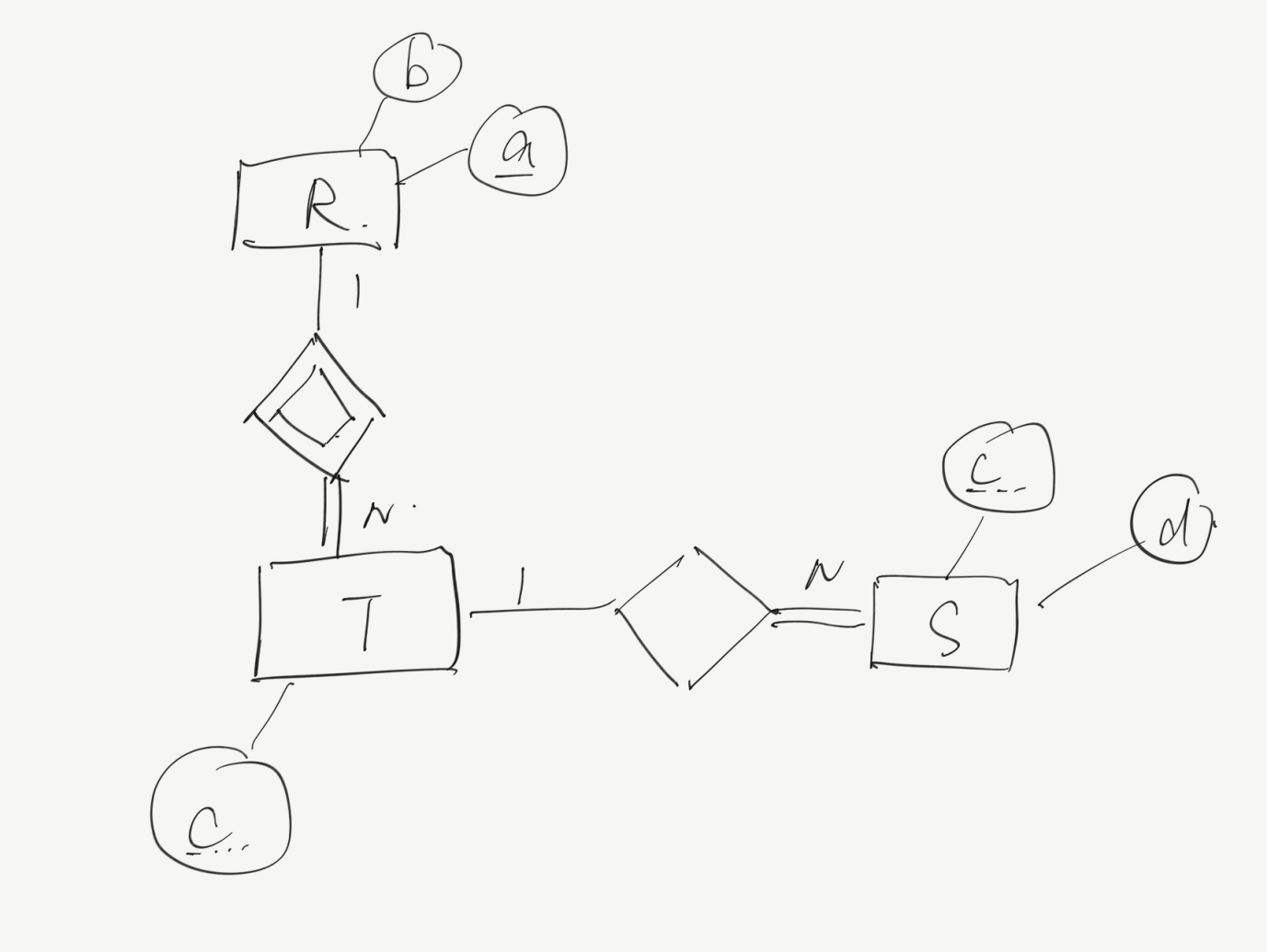
6. 

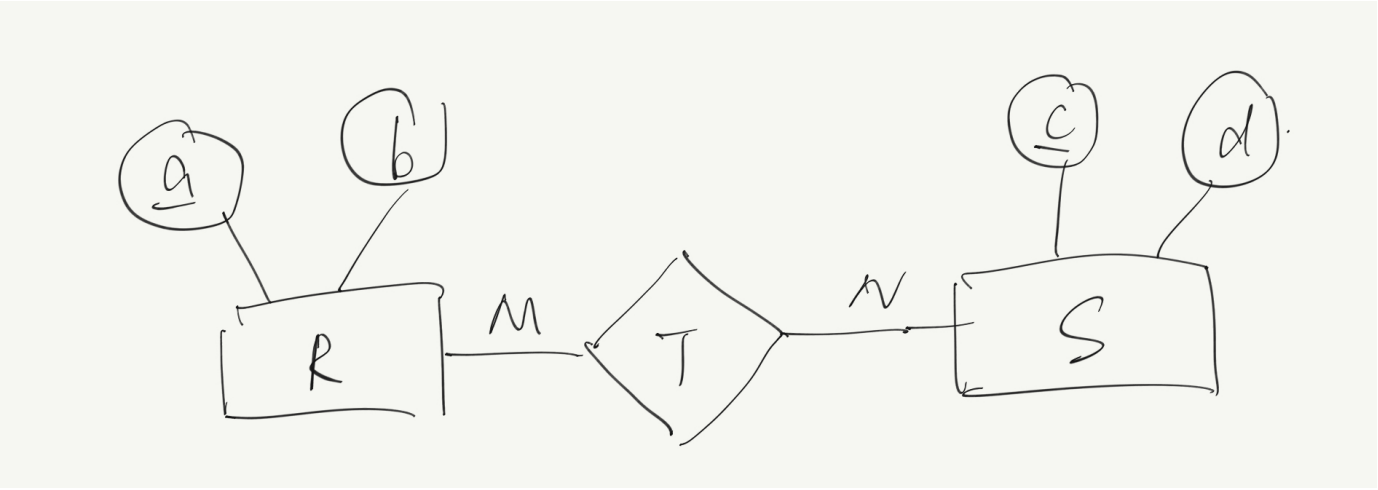
7.


BANK
FDIC_id
Name
SERVICE_LOCATION
S_id
Address
BRANCH
B_id
Est_year
ATM
A_id
Service_fee


BANK
FDIC_ID
Name
1..1
1..*
SERVICE_LOCATION
Name
Address
BRANCH
Est_year
ATM
Service_fee

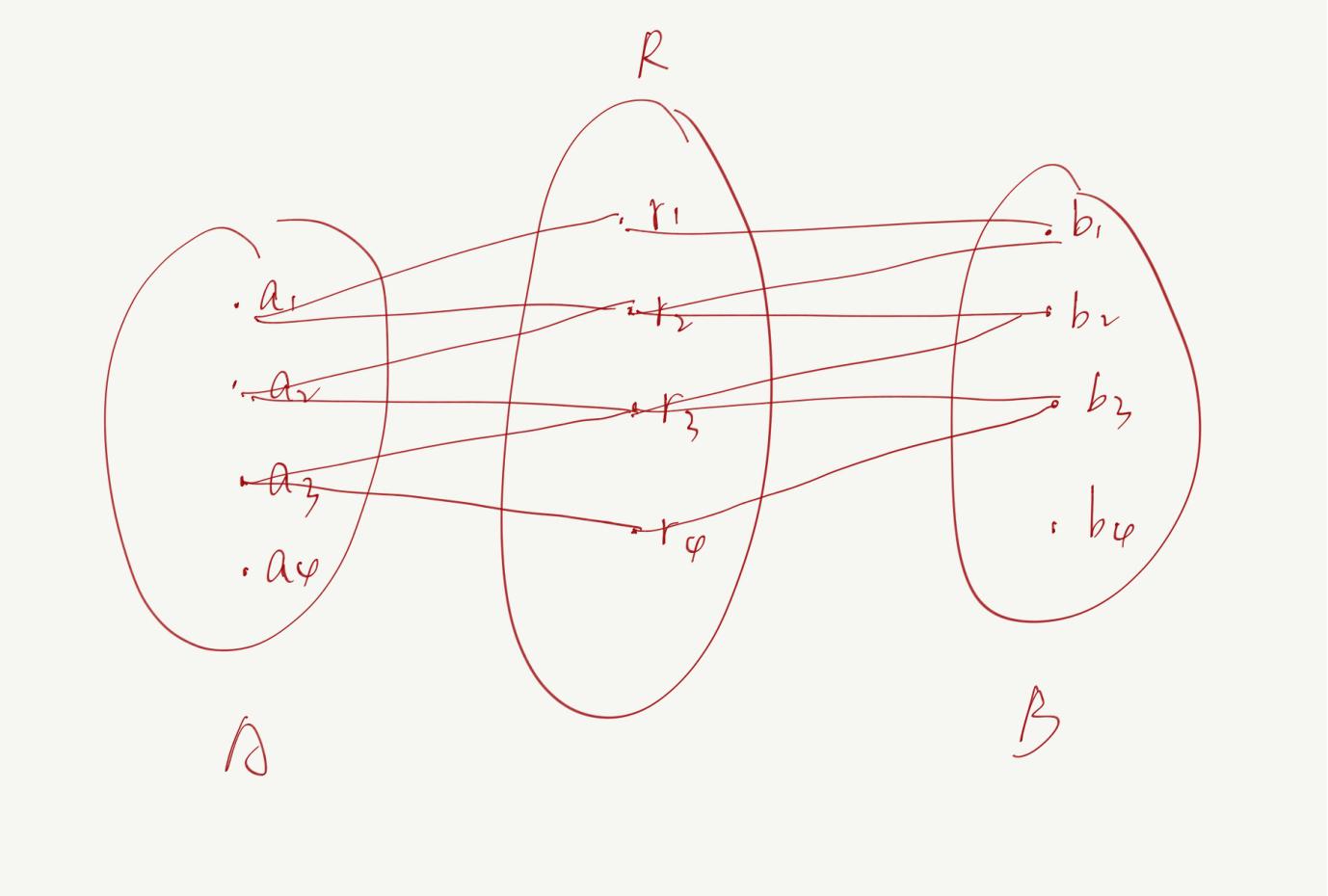
8. a.





b.

It is not possible. As shown in the figure, if storing the mapping information, a_4 and b_4 will be lost. Hence, information will be lost if not creating a new relation.



9. a. $\pi_{barName}(Bar *_{Bar.barName=Frequent.barName} Frequent)$

   b. $\pi_{drinkerName}(Drinker *_{Drinker.street=Bar.street} (Bar *_{Bar.barName=Frequent.barName} Frequent))$

   c.
   $\pi_{barName}(\sigma_{age<37}(Drinker *_{Drinker.drinkerName=Frequent.drinkerName} (Bar *_{Bar.barName=Frequent.barName} Frequent)))$

10. a.
    $\{t.name | Student(t)\ AND\ (\exists s)(\exists c)(\exists r)(Student(s)\ AND\ Course(c)\ AND\ Registered(r)\ AND$
    $r.Code = c.Code\ AND\ r.SSN = s.SSN\ AND\ c.Title = \text{"Database System"}\}$

    b.

```
Select c.title, count(s.Name)
From Course c, student s, registered r
Where r.code =c.code AND
    r.SSN=s.SSN
Group by c.code desc
```

    c.

```
Select c.title, max(s.gpa)
From Course c, student s, registered r
Where r.code =c.code AND
    r.SSN=s.SSN
Group by c.Dept
Having count(c.code)>30)
```

d. Retrieve the title of the course who have more registered students than the maximum number of student who participates in the course in other departments