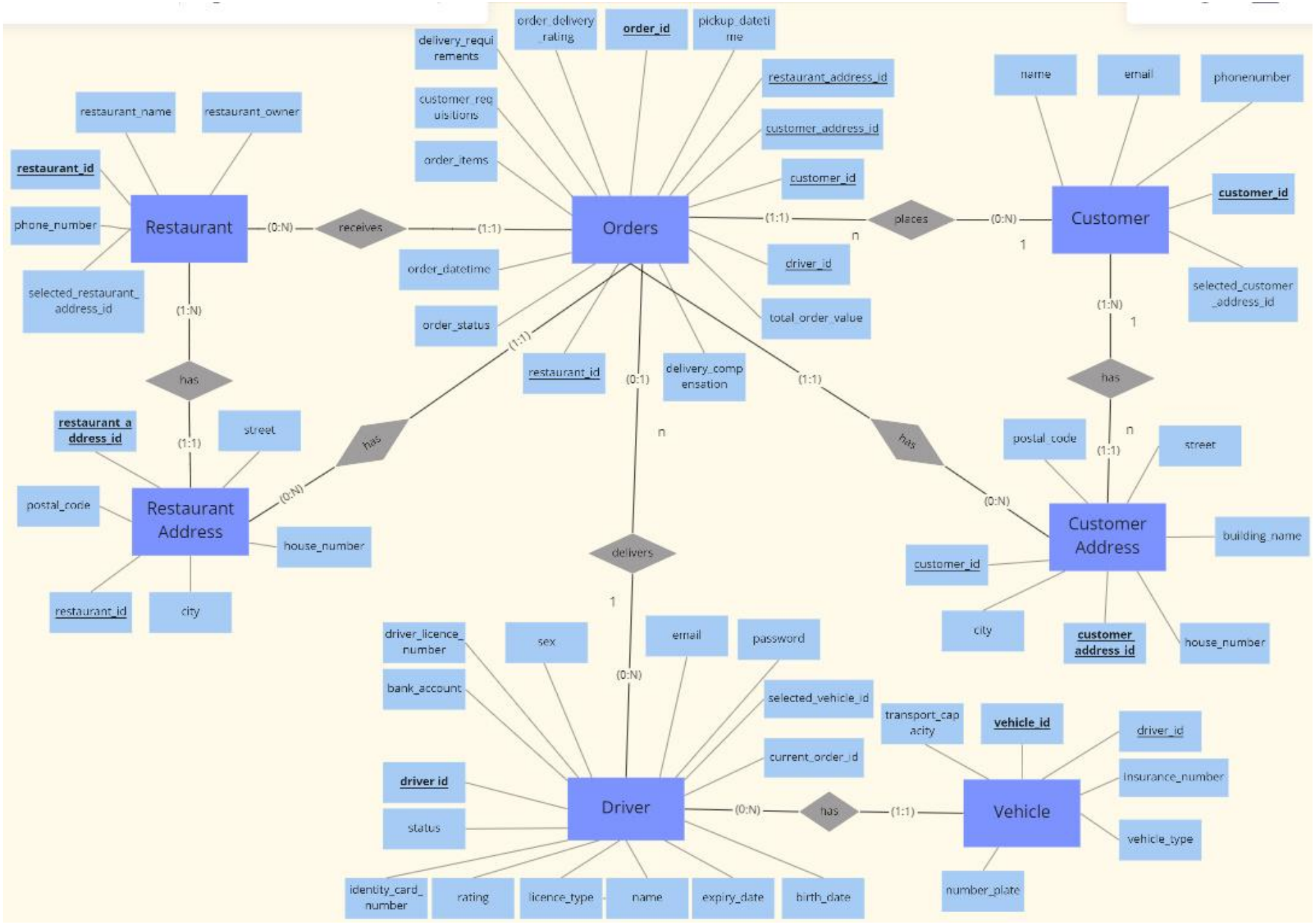
Team Violet Document 2

ERD MAPPING

DATABASE

ERD Diagram (midterm -> final modification)



ERD mapping (logical schema)

- ER Diagram to relational schema : Mapping by using 7 steps

Out of seven Mapping steps we used step one and step four in our final project. Before the Mapping we exchange the way of our expression of relationship between the entities. We changed the expression min,max to chardinarity so we can do it more easily than before. In our ERD we didn't use the weak entity and another type of cardinality such as like 1:1 ,m:n so that's why just used 1,4 steps in our final project

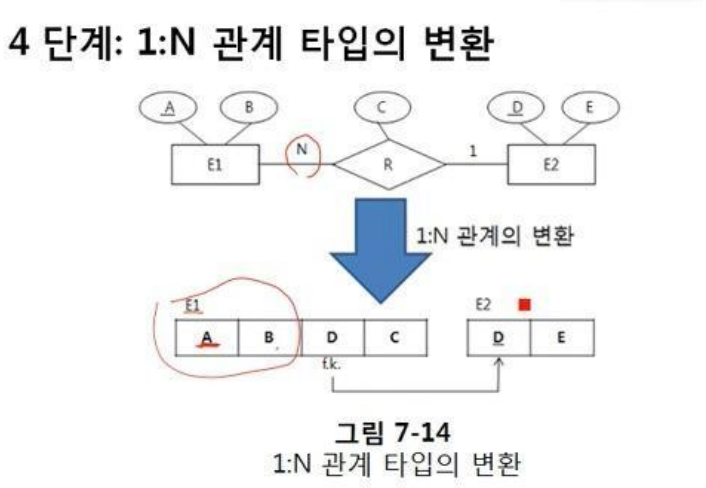


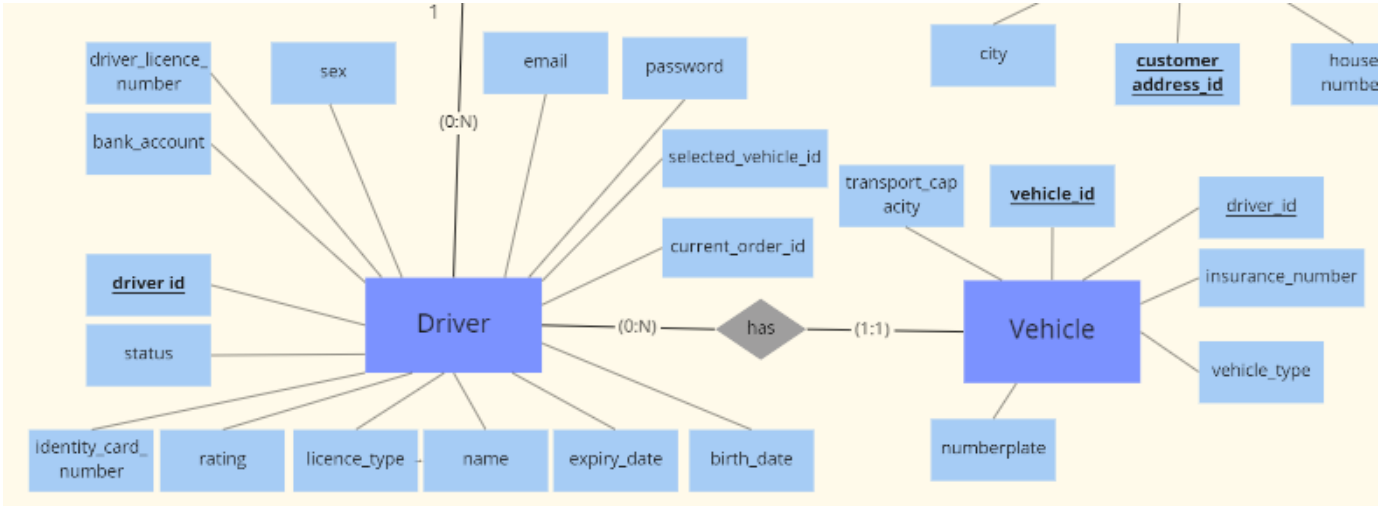
그림 7-14
1:N 관계 타입의 변환

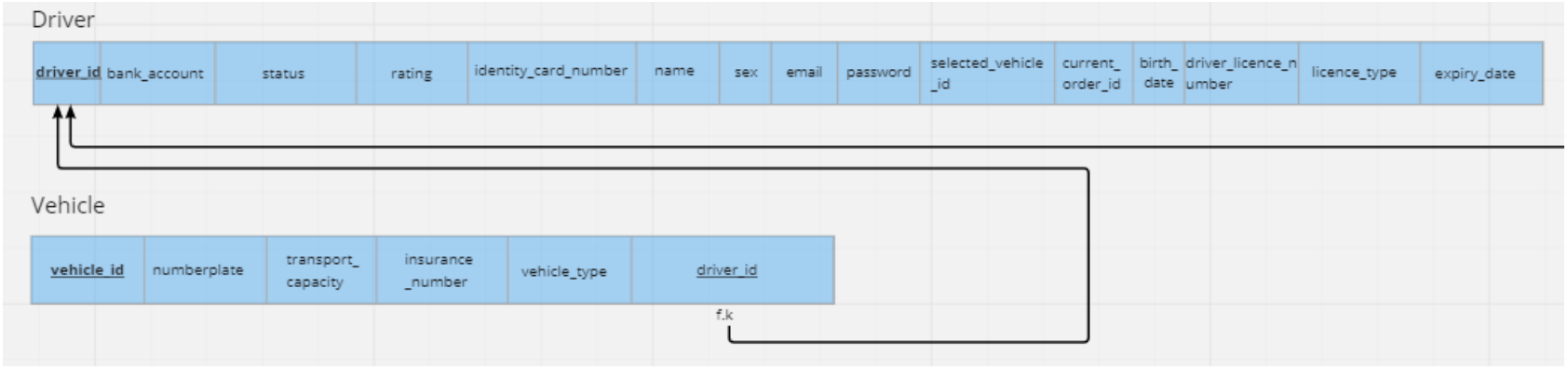
Reference: https://valuefactory.tistory.com/108

1. Conversion of Entity type
   A. Convert entities to tables(Order, Driver, Restaurant, Restaurant address, Customer, Customer address and Vehicle) in the ERD Diagram.
2. Conversion of 1:N relational type

A. Driver and Vehicle

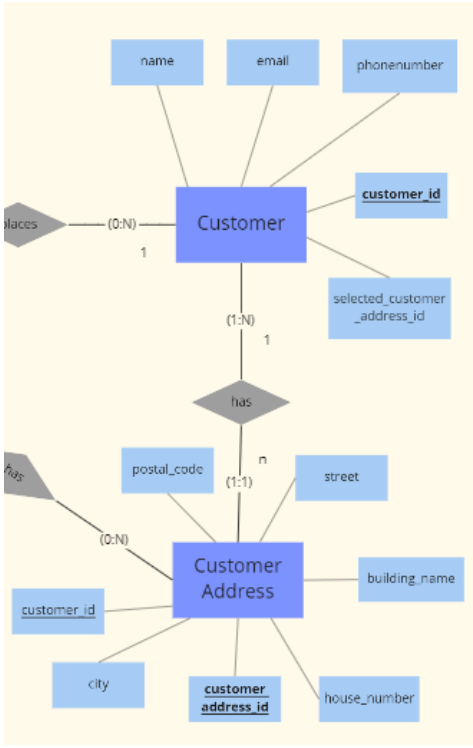
- Driver : Vehicle = 1 : N relation
- Vehicle table takes FK(driver_id) which is Driver table's PK(driver_id)

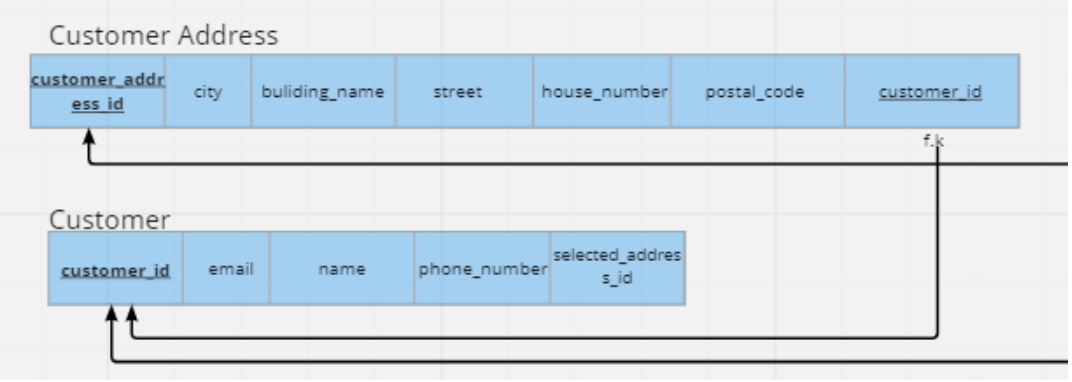




B. Customer & Customer Address

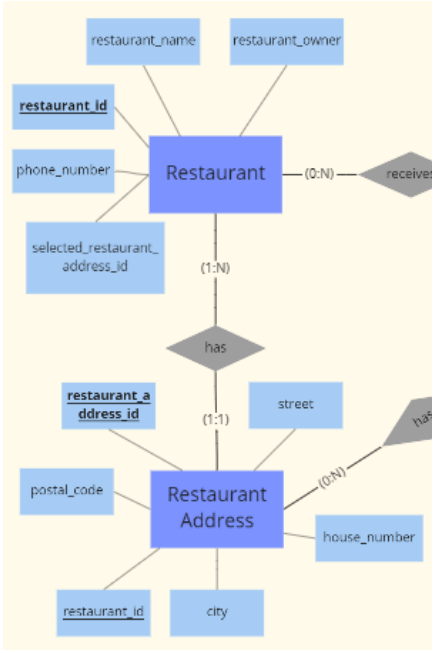
- Customer : Customer address = 1 : N relation
- Customer address table takes FK(customer_id) which is Customer table's PK(customer_id)

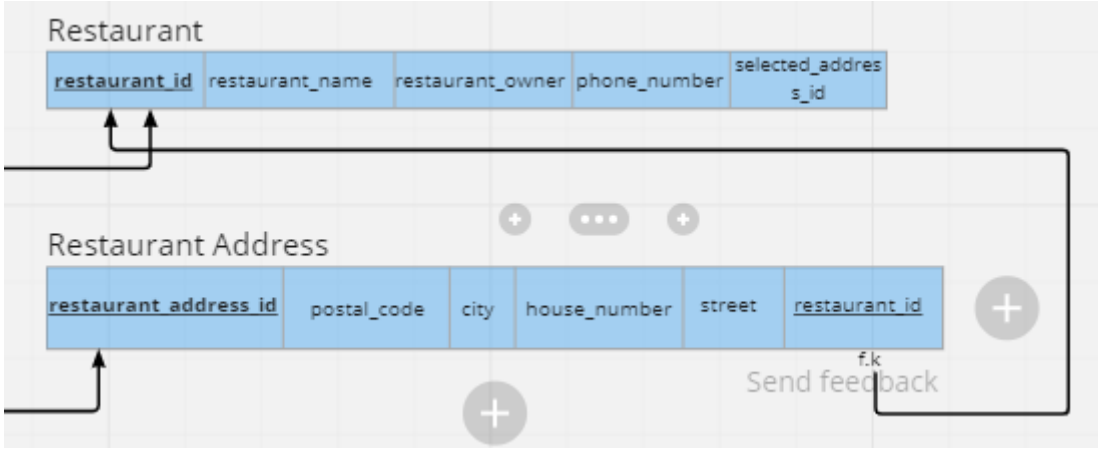




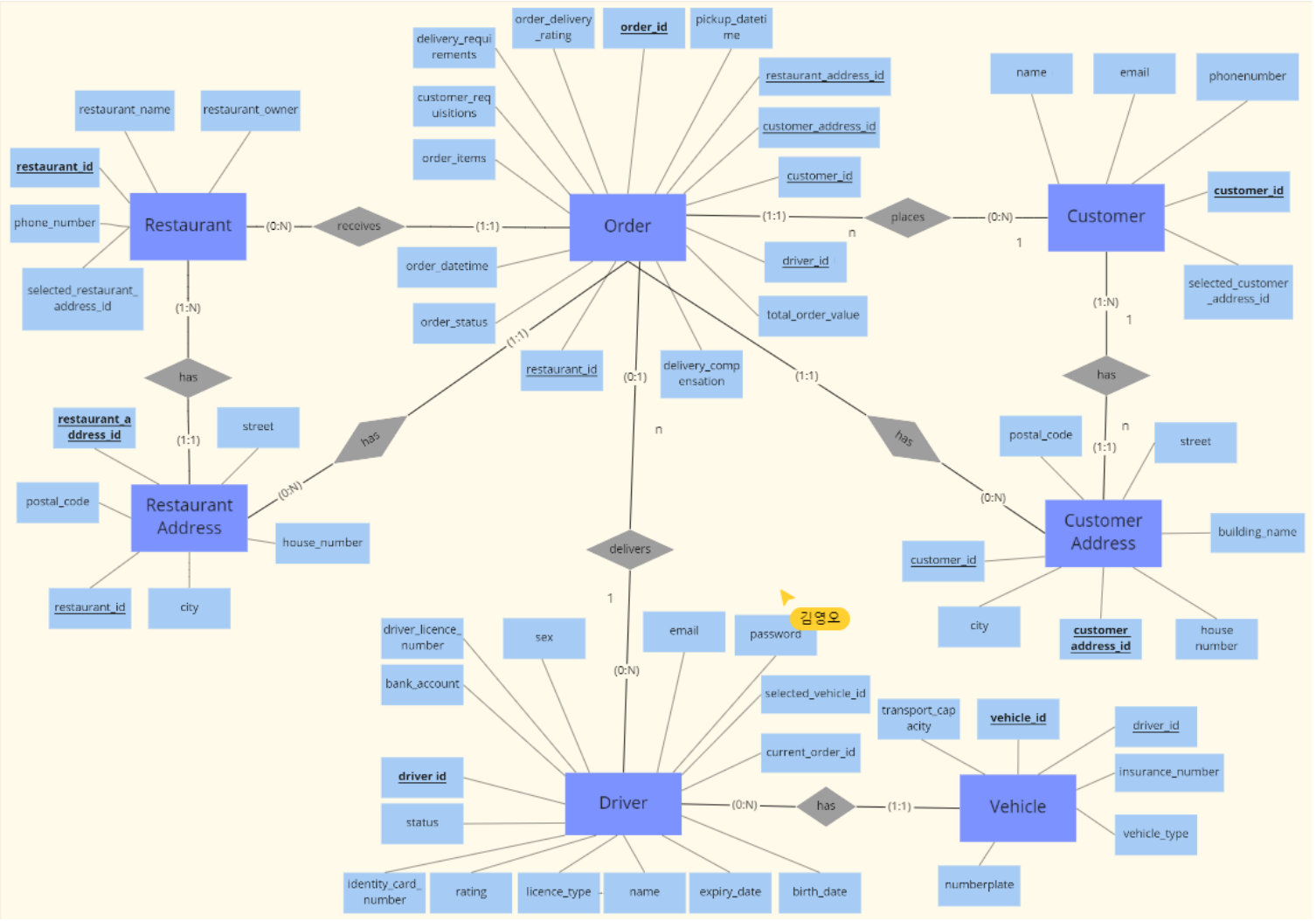
C. Restaurant & Restaurant address

- Restaurant : Restaurant address = 1 : N relation
- Restaurant address table takes FK(restaurant_id) which is Restaurant table's PK(restaurant_id)



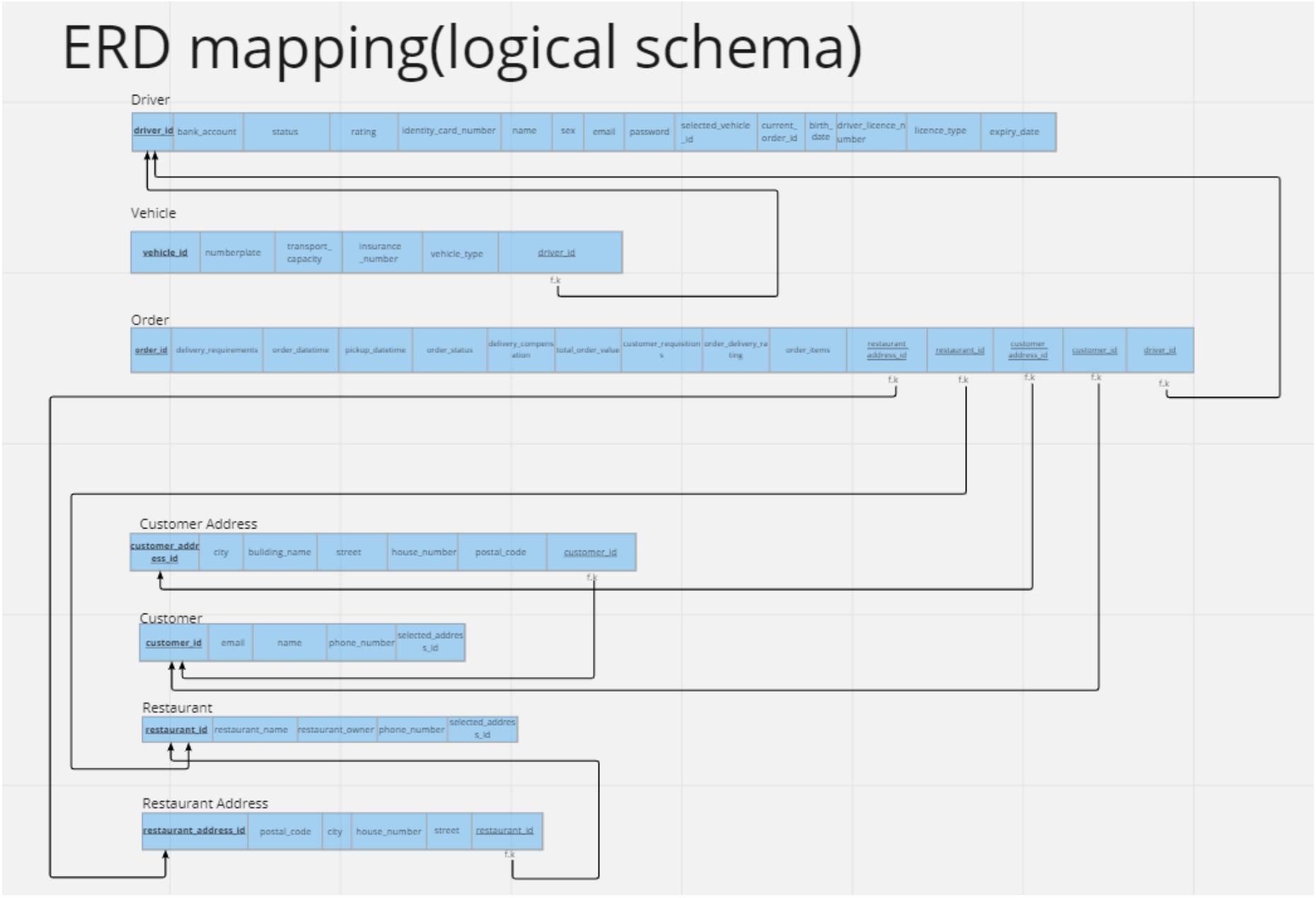


D. Order & Others



- Order : other entities = N : 1 relation (Except Vehicle)
- Order table takes FK which is other entities' each PK(customer_id, customer_address_id, restaurant_id, restaurant_address_id, drive_id)

entire mapping figure



ERD Mapping + data (logical schema + @) and Normalization (1NF, 2NF, 3NF)

1NF : It must satisfy the atomic value, which must have only one column value for each row.

-> When we input arbitrary data, it can do automatic normalization. So we thought we didn't need to proceed.

2NF: In the set of candidate keys, the key value of one of the two candidate keys violates the function dependency while pointing to the other attribute.These are the target of the 2NF. Before the 2NF, the table has to satisfy the 1NF.

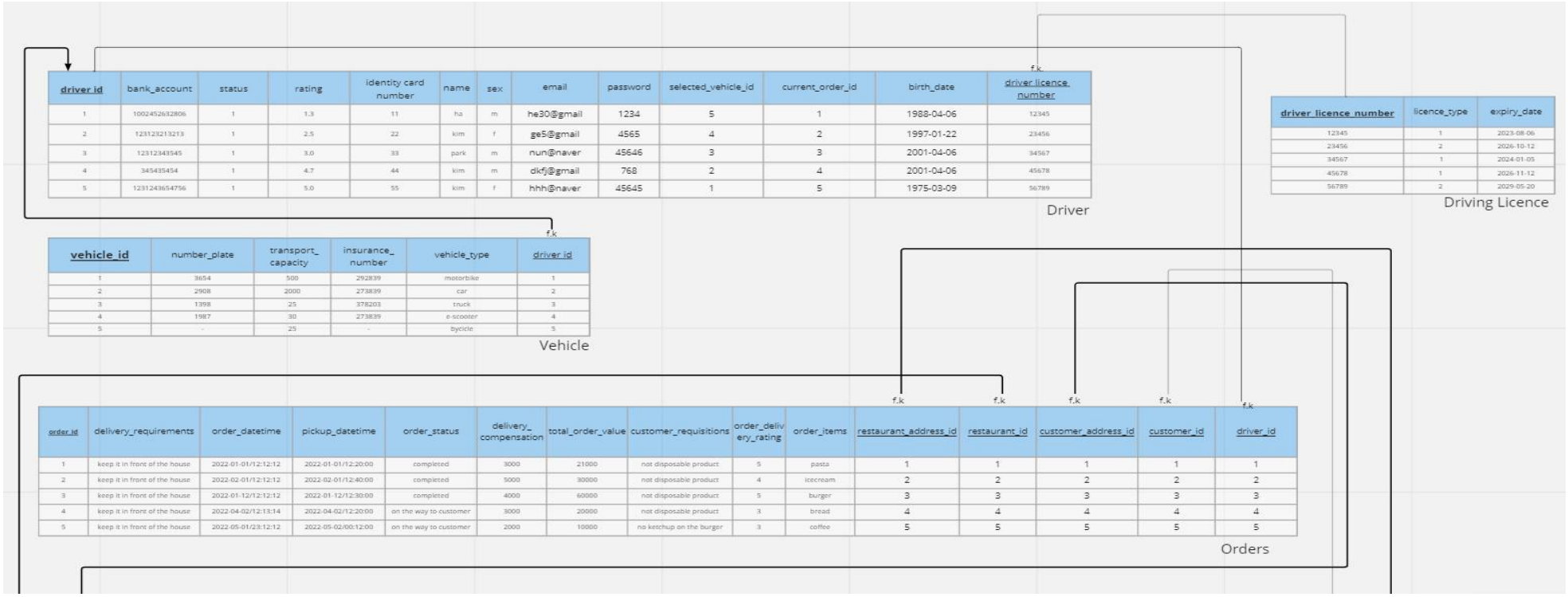
-> When we designed erd, we already designated the primary key and foreign key. So, it is already satisfied 2NF : Remove function dependencies for candidate keys then we didn’t proceed.

3NF: 3NF must be executed when it has the characteristics of Transitive functional dependency. And all of the normalization of the previous steps must be satisfied. (Properties other than the primary key should not defined other attribute)

-> ex) [PK -> attribute1 -> attribute2] (X)

[PK -> attribute1] , [attribute1 -> attribute2] (O)

-> It frequently occurred in this project. We proceed normalization using standardization carried out through the requirement list.



driver id	bank_account	status	rating	identity card number	name	sex	email	password	selected_vehicle_id	current_order_id	birth_date	driver licence number
1	1002452632806	1	1.3	11	ha	m	he30@gmail	1234	5	1	1988-04-06	12345
2	123123213213	1	2.5	22	kim	f	ge5@gmail	4565	4	2	1997-01-22	23456
3	12312343545	1	3.0	33	park	m	nun@naver	45646	3	3	2001-04-06	34567
4	345435454	1	4.7	44	kim	m	dkfj@gmail	768	2	4	2001-04-06	45678
5	1231243654756	1	5.0	55	kim	f	hhh@naver	45645	1	5	1975-03-09	56789

Driver

driver licence number	licence_type	expiry_date
12345	1	2023-08-06
23456	2	2026-10-12
34567	1	2024-01-05
45678	1	2026-11-12
56789	2	2029-05-20

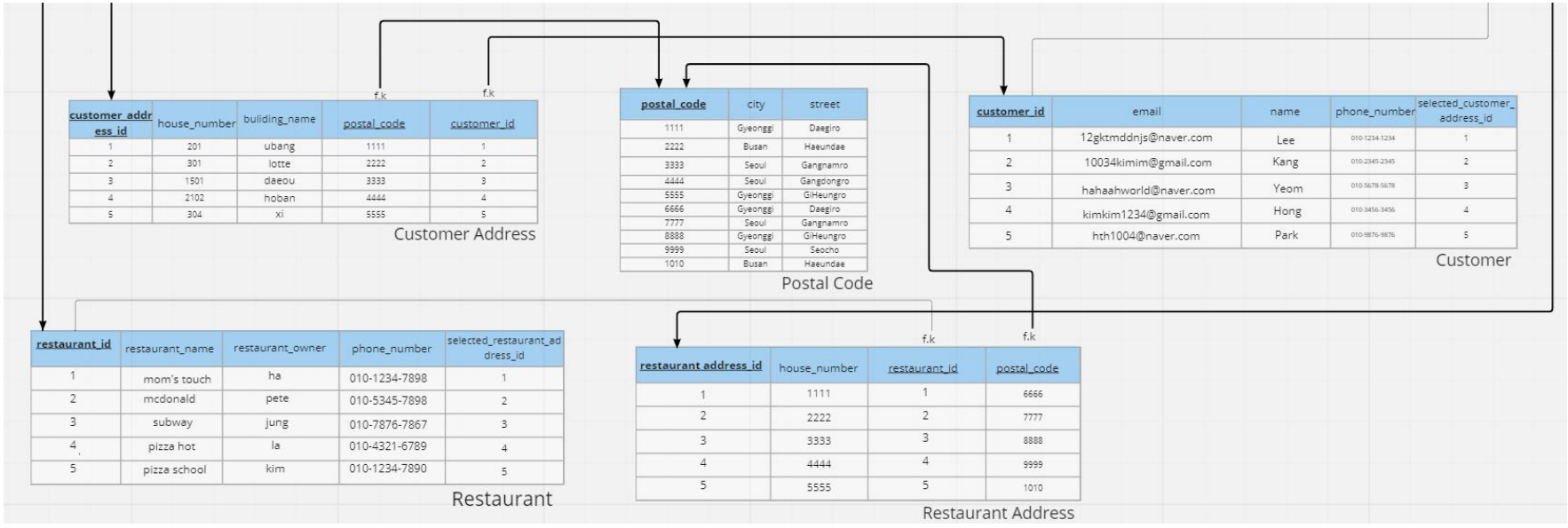
Driving Licence

vehicle_id	number_plate	transport_ capacity	insurance_ number	vehicle_type	driver id
1	3654	500	292839	motorbike	1
2	2908	2000	273839	car	2
3	1398	25	378203	truck	3
4	1987	30	273839	e-scooter	4
5	-	25	-	bycicle	5

Vehicle

order id	delivery_requirements	order_datetime	pickup_datetime	order_status	delivery_ compensation	total_order_value	customer_requisitions	order_deliv ery_rating	order_items	restaurant_address_id	restaurant_id	customer_address_id	customer_id	driver_id
1	keep it in front of the house	2022-01-01/12:12:12	2022-01-01/12:20:00	completed	3000	21000	not disposable product	5	pasta	1	1	1	1	1
2	keep it in front of the house	2022-02-01/12:12:12	2022-02-01/12:40:00	completed	5000	30000	not disposable product	4	icecream	2	2	2	2	2
3	keep it in front of the house	2022-01-12/12:12:12	2022-01-12/12:30:00	completed	4000	60000	not disposable product	5	burger	3	3	3	3	3
4	keep it in front of the house	2022-04-02/12:13:14	2022-04-02/12:20:00	on the way to customer	3000	20000	not disposable product	3	bread	4	4	4	4	4
5	keep it in front of the house	2022-05-01/23:12:12	2022-05-02/00:12:00	on the way to customer	2000	10000	no ketchup on the burger	3	coffee	5	5	5	5	5

Orders



customer addr ess id	house_number	buliding_name	postal_code	customer_id
1	201	ubang	1111	1
2	301	lotte	2222	2
3	1501	daeou	3333	3
4	2102	hoban	4444	4
5	304	xi	5555	5

Customer Address

postal_code	city	street
1111	Gyeonggi	Daegiro
2222	Busan	Haeundae
3333	Seoul	Gangnamro
4444	Seoul	Gangdongro
5555	Gyeonggi	GIHeungro
6666	Gyeonggi	Daegiro
7777	Seoul	Gangnamro
8888	Gyeonggi	GIHeungro
9999	Seoul	Seocho
1010	Busan	Haeundae

Postal Code

customer_id	email	name	phone_number	selected_customer_ address_id
1	12gktmddnjs@naver.com	Lee	010-1234-1234	1
2	10034kimim@gmail.com	Kang	010-2345-2345	2
3	hahaahworld@naver.com	Yeom	010-5678-5678	3
4	kimkim1234@gmail.com	Hong	010-3456-3456	4
5	hth1004@naver.com	Park	010-9876-9876	5

Customer

restaurant_id	restaurant_name	restaurant_owner	phone_number	selected_restaurant_ad dress_id
1	mom's touch	ha	010-1234-7898	1
2	mcdonald	pete	010-5345-7898	2
3	subway	jung	010-7876-7867	3
4	pizza hot	la	010-4321-6789	4
5	pizza school	kim	010-1234-7890	5

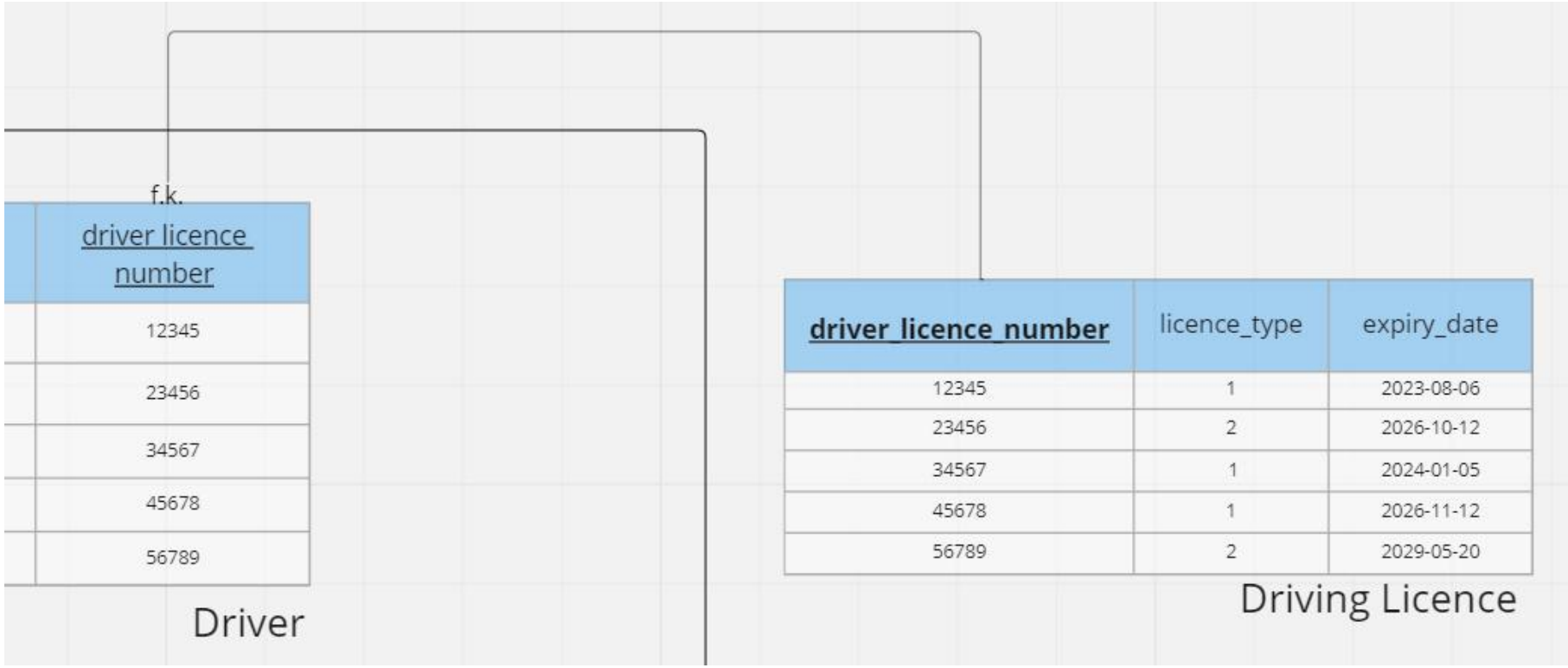
Restaurant

restaurant address id	house_number	restaurant_id	postal_code
1	1111	1	6666
2	2222	2	7777
3	3333	3	8888
4	4444	4	9999
5	5555	5	1010

Restaurant Address

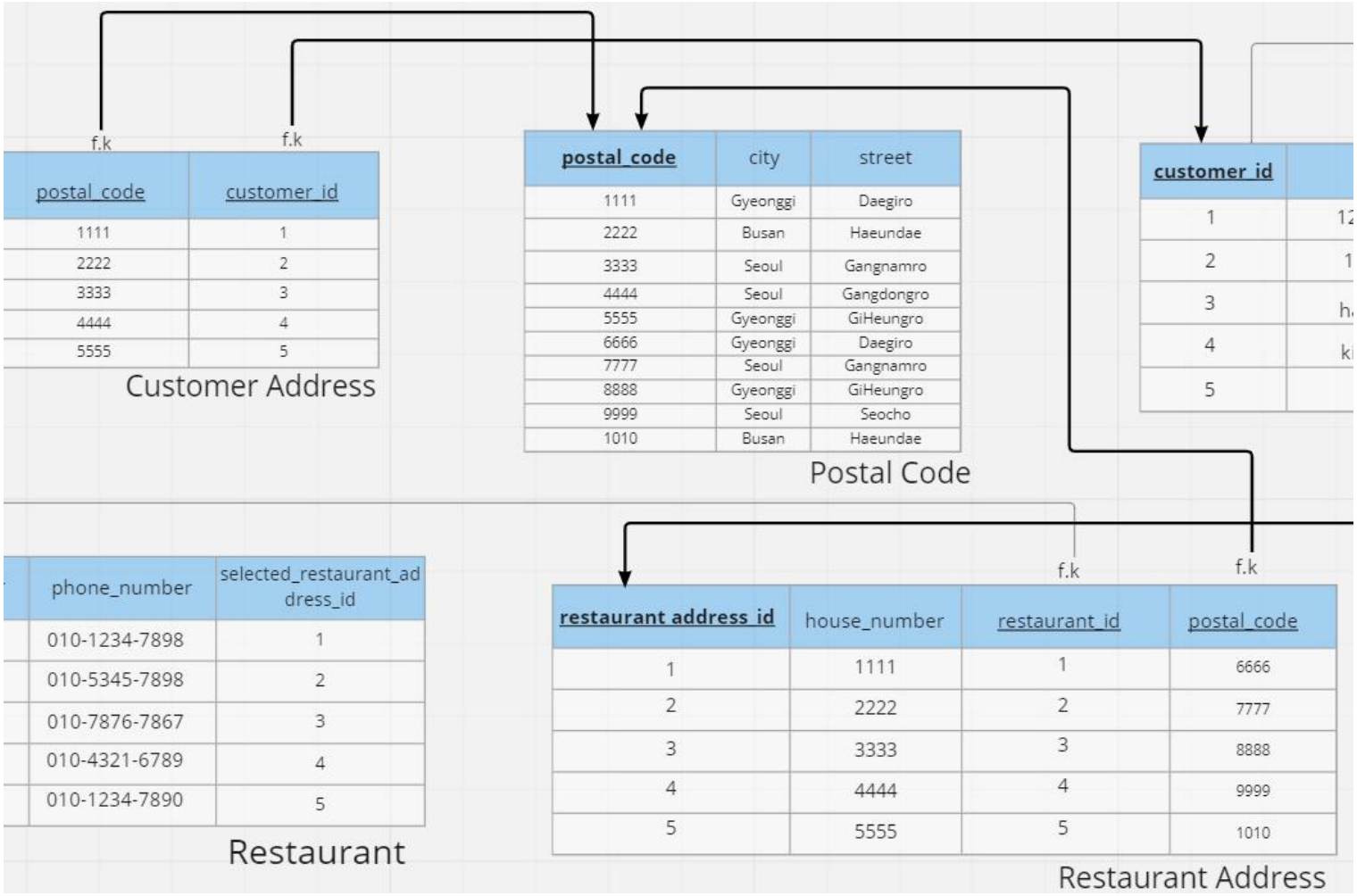
https://miro.com/app/board/uXjVOAuee-A=/?share_link_id=409329957913

Normalization of Driver Table



- In the Driver table, driving_licence_number can define licence_type and expiry_date. So, it does not satisfy 3NF because another key which is not the driver's primary key defines another attribute. So we divided it.

Normalization of Customer Address and Restaurant Address Tables



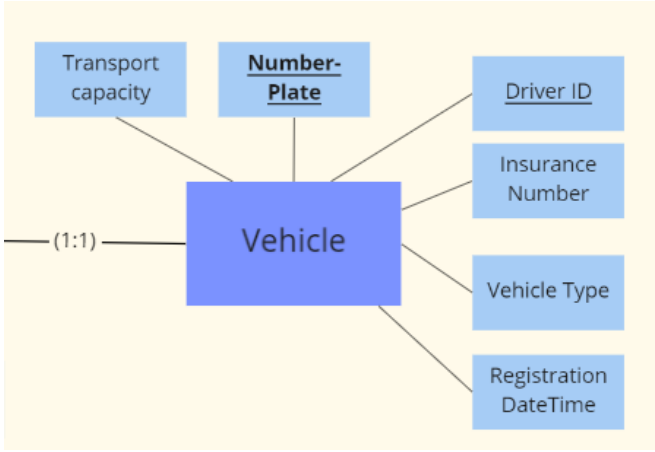
- Case of Customer Address and Restaurant Address tables, postal_code can define city and street. Namely, it does not satisfy 3NF. So we divided the table. And Customer Address and Restaurant Address have the same name attribute so we combined them.

Modifying tables after Normalization

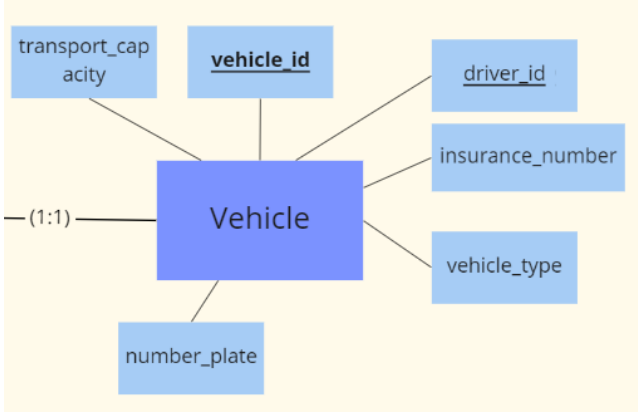
According to the requirement analysis, there was a type of bicycle in the vehicle, and after discussion, there was no number_plate for the bicycle.

In conclusion, we determined that the number_plate, which is the primary key, could not designate a bicycle, so the vehicle_id was made separately as the primary key, and the number_plate was converted into an attribute.

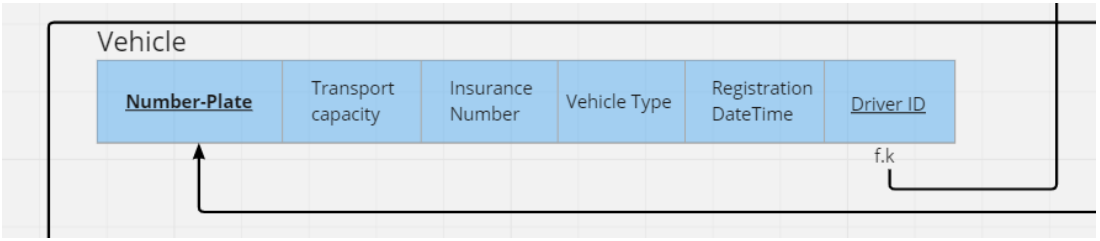
Before ERD modification



After ERD modification



Before Mapping modification



After Mapping modification