Project Phase-3

Team- too_much_data

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Some improvements in ER Model

1. Medical department id has been added to medical department as it was becoming tedious to use the location as a primary key for medical department.
2. Lab department id has been added to the lab department as it was becoming tedious to use the location as a primary key for the lab department.
3. Medicine name has been added as an attribute for entity medicine.

ER model to relational model:

1. Mapping of Regular Entity Types- For each regular (strong) entity type in the ER schema, we created a relation that includes all the simple attributes of E. For Composite Attributes, only the simple attributes were included. For example: Name was converted to Simple Attributes First Name, Middle Name and Last Name, Address was converted to house, city and zip code,location was converted to floor and number and payment details was converted to mode of payment, time and date.
2. Mapping of Weak Entity Types- For each weak entity type W in the ER schema with owner entity type E, relation R is created which includes all simple attributes (or simple components of composite attributes) of W as attributes of R. Each Relation includes the primary key of owner Entity as a foreign key

We have included patient id in the table visitor and emergency_contact

3. Mapping of Binary 1:1 Relationship Types- Foreign Key Approach
   For relationship between driver and ambulance we have added vehicle number in the relation driver.
4. Mapping of Binary 1:N Relationship Types Foreign Key Approach
   For relationship between i) doctor and medical department ii) lab technician and lab department we have added the medical department id in doctor table and similarly we have added lab department id in lab technician table
5. Mapping of Binary M:N Relationship Types -
   We have created a new table for them for example dis_pat table is created with attributes disease id and patient id
6. Mapping of Multivalued Attributes-For attributes like visiting hours of a doctor and shift of nurse we have created 2 new tables visiting hours and shift respectively.
7. Mapping of N-ary Relationship Types. A new relation is created with attributes as the primary key of the participating entities. The tables created are stay, advice, schedule and prescription.
8. Mapping Specialization or Generalization
   A new relation is created for all the subclasses

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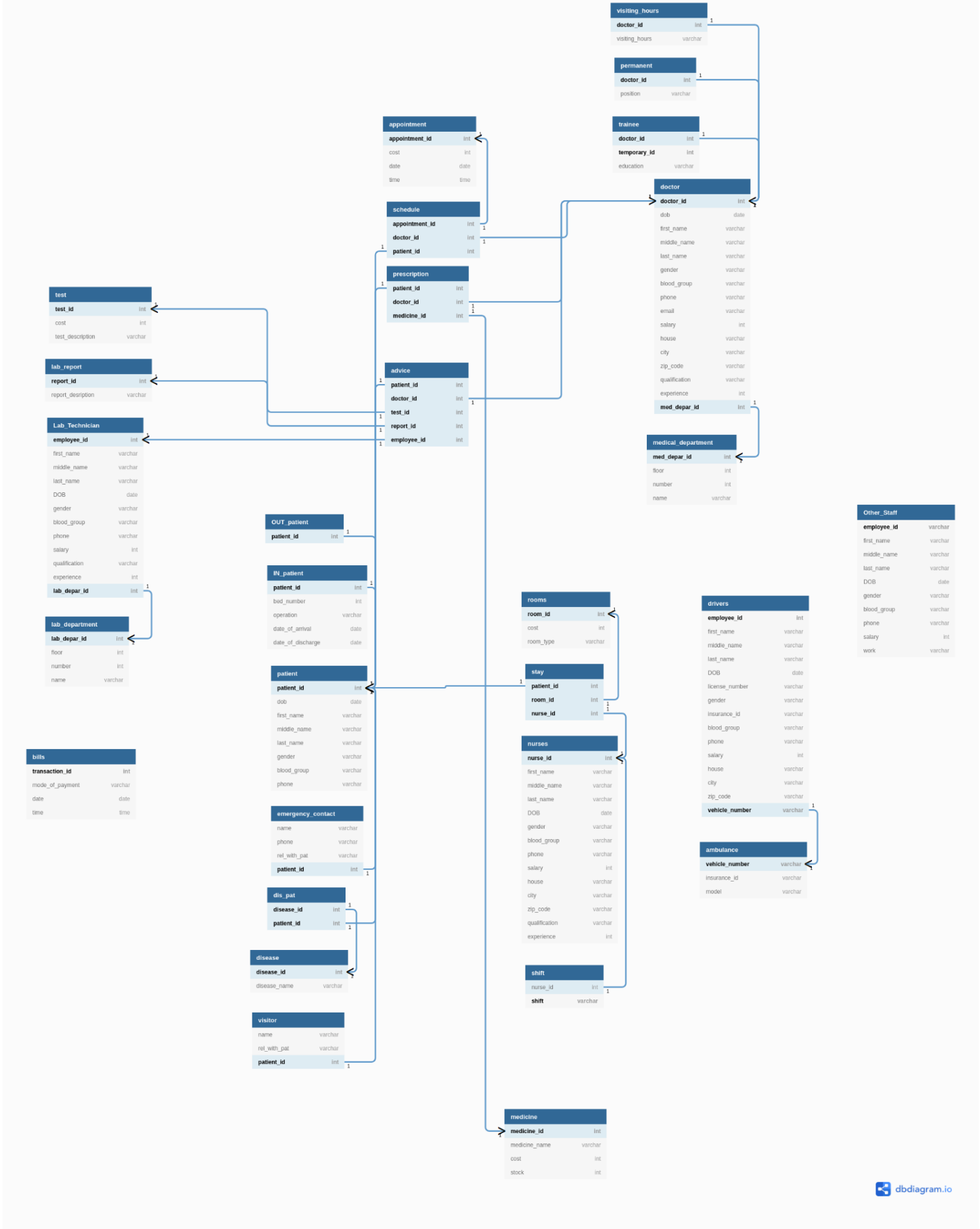
Relational Model:



Normalization:

1NF: A Relation schema is in 1NF if the values in the domain of each attribute are atomic. The relational model is already in 1NF as new relations for multivalued attributes were created in Step 6 and Composite attributes were converted to atomic attributes in Step 1.

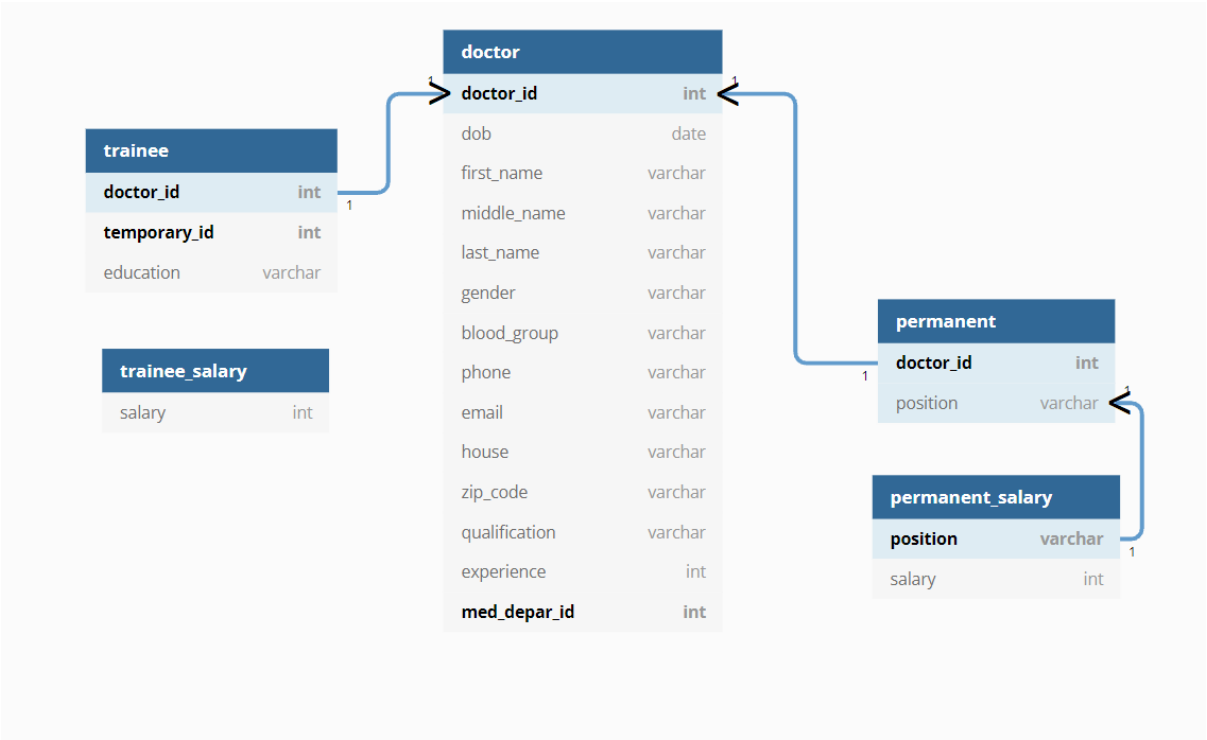
2NF:A relation schema is in 2NF if every non prime attribute A in R is fully functionally dependent on every key of R.

The relational model is already in 2NF as it does not have any non-prime attribute that is functionally dependent on any proper subset of any candidate key of the relation.

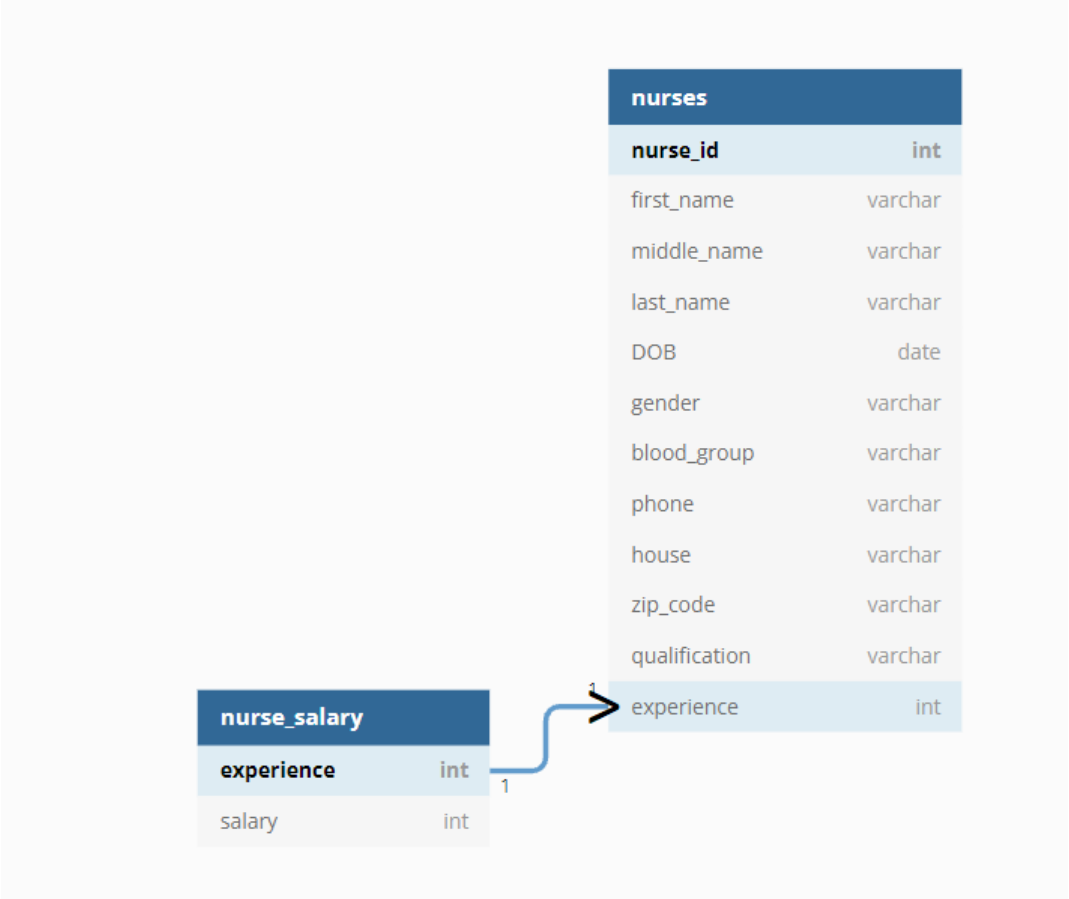
3NF: A relation schema is in 3NF if all non trivial dependencies in F+ are of the form X→ A with either: a). X is a superkey b). A is a prime attribute.

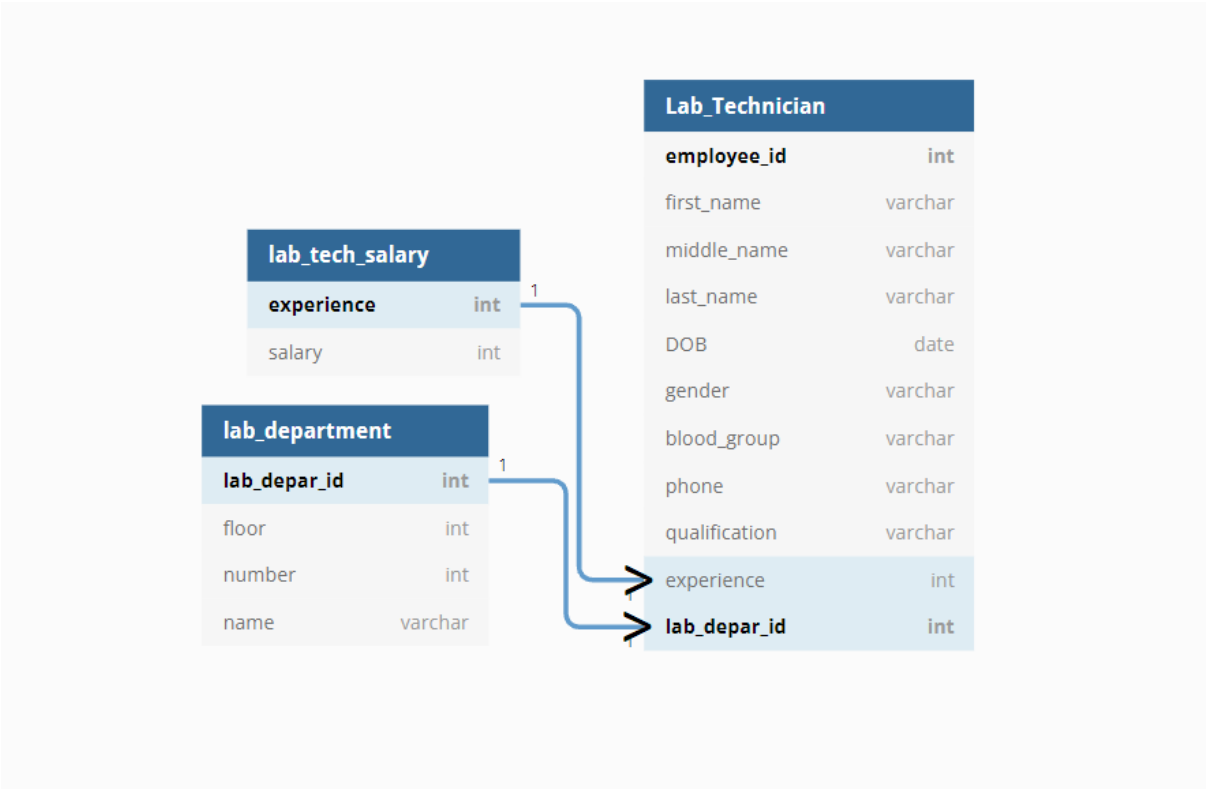
Here the city depends on zip_code and zip_code depends on doctor/nurse/employee id so this violated the rule of non transitive dependency. To correct that we made a separate relation zip_country for zip_code and city.

Here the salary of trainee doctors is fixed which created redundancy so we have created a new relation of trainee_salary. Salary of permanent doctors depended on position which in turn depends on doctor_id creating a transitive dependency so a new relation called permanent salary has been created.



Nurse and lab technician's salary depends on experience which inturn depends on nurse_id so again a transitive dependency arises and we create a relation for nurse salary.
Salary of other staff depends on work employee id so a separate relation of other_staff salary has been created.

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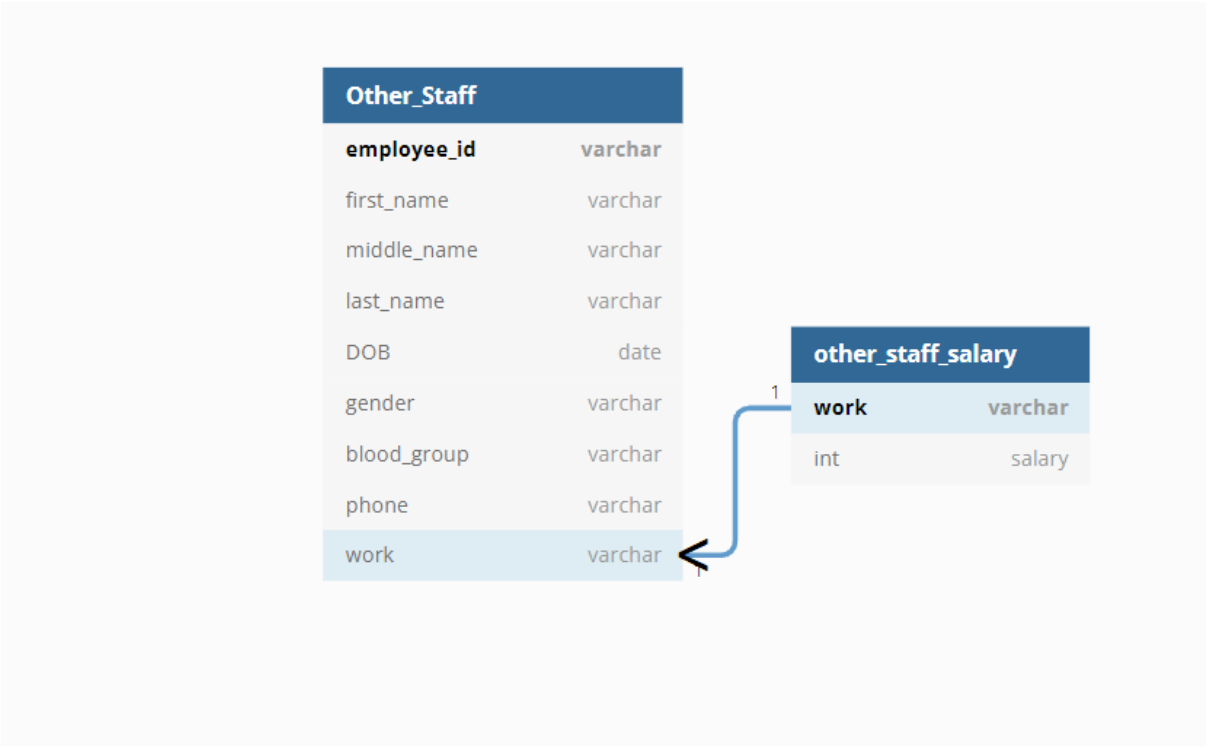
middle_name varchar
last_name varchar
DOB date
gender varchar
blood_group varchar
phone varchar
qualification varchar
experience int
lab_depar_id int
lab_tech_salary
experience int
salary int
lab_department
lab_depar_id int
floor int
number int
name varchar
1
1
1
1


Other_Staff
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middle_name varchar
last_name varchar
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gender varchar
blood_group varchar
phone varchar
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work varchar
int salary
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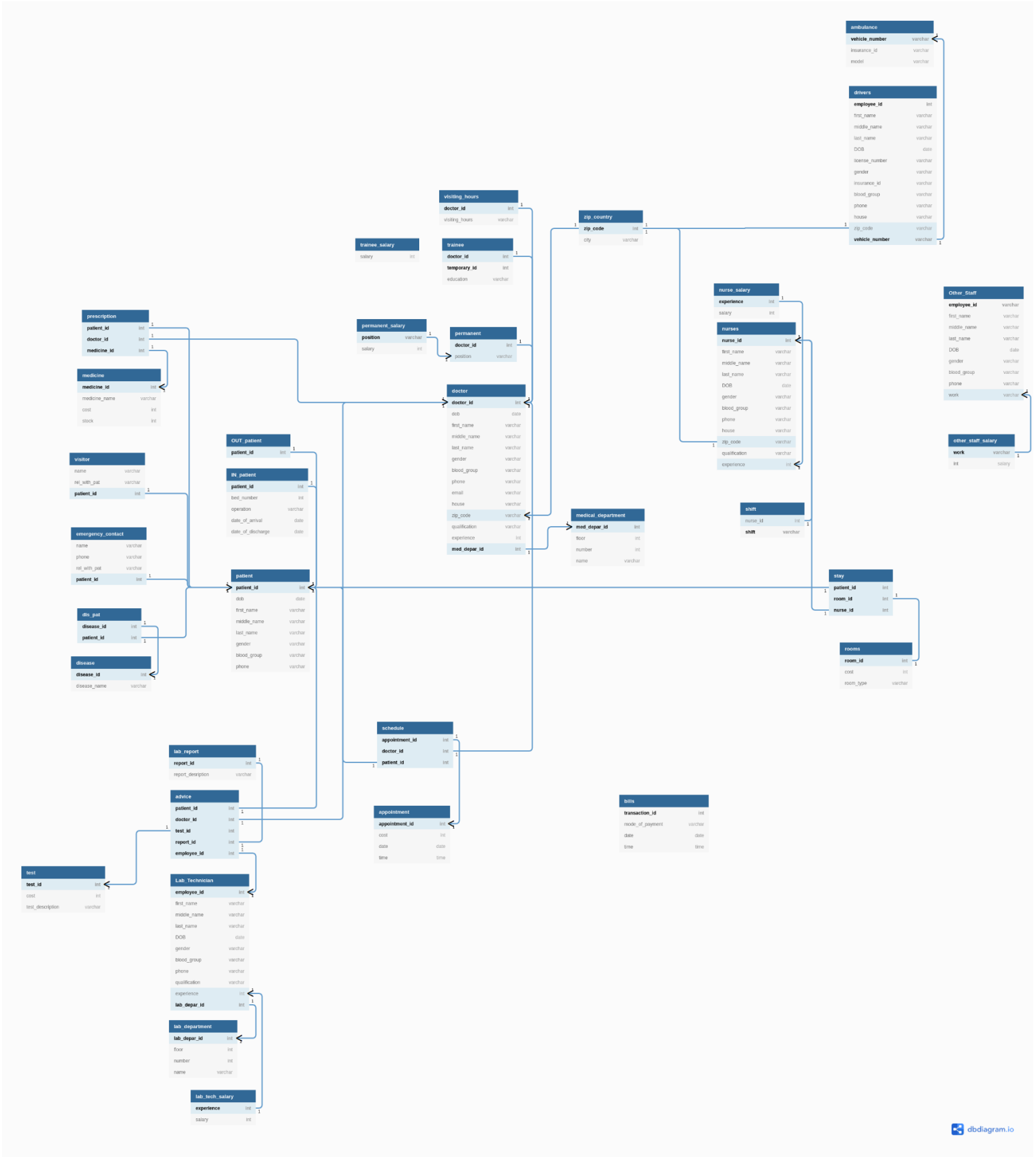
1

Final 3NF:



Note: Since the snapshots of ER to relational model and relational model converted to 3NF are difficult to read, they are given in the following link:
[dna_project_phase3_pics]