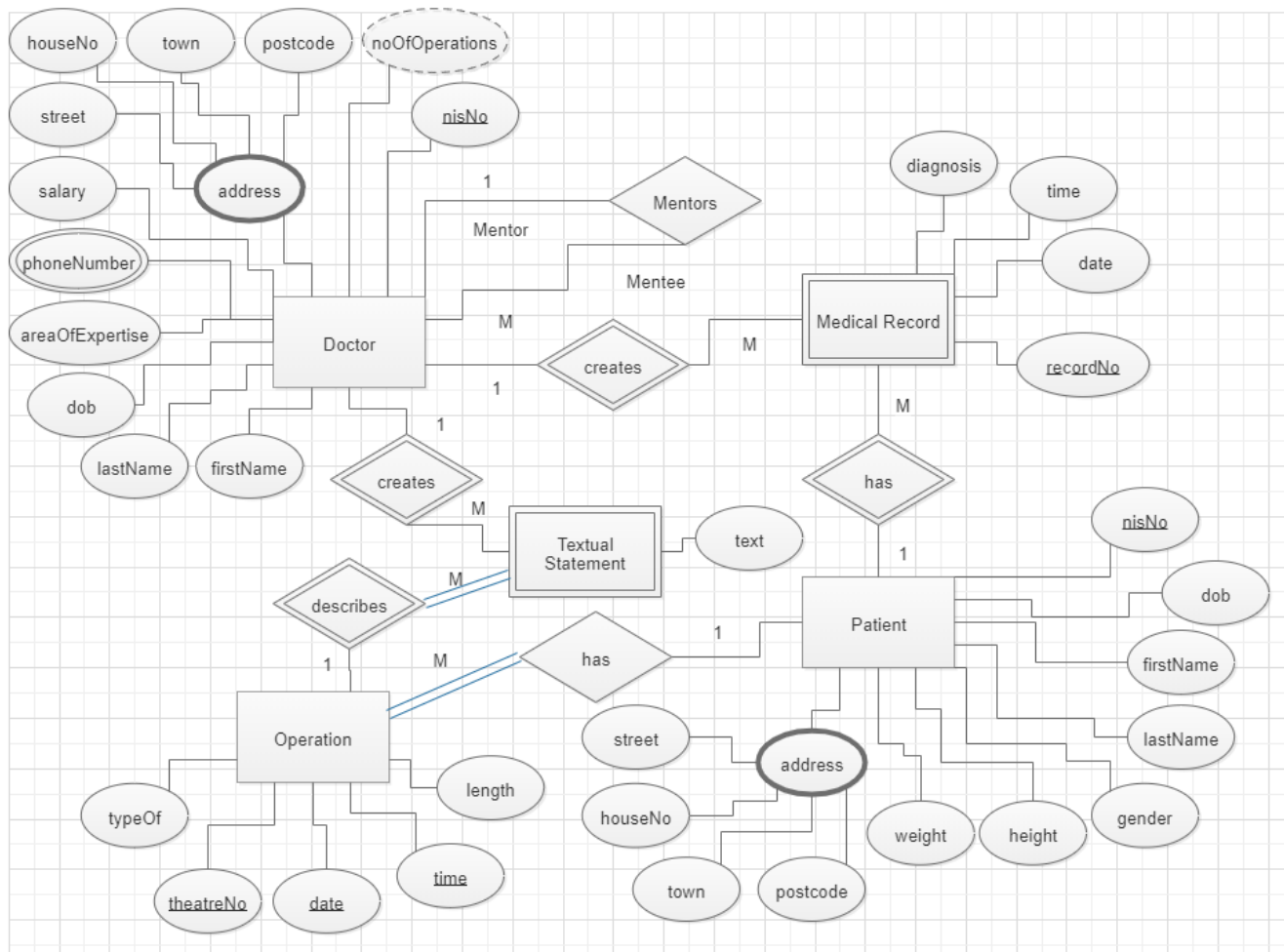


Databases Assignment 1

1.

a. My Enhanced Entity Relationship Diagram:



- b. The doctor entity has a recursive relationship with itself, which it can have, as not all doctors will be mentors or mentees, meaning a partial participation constraint. For cardinality constraints one mentor mentors many mentees, and a mentee is mentored by one mentor. The doctor entity and medical record entity have a weak relationship due to the medical record depending on the patient entity for its creation. The doctor entity has a partial participation constraint with the medical record entity as a doctor entity could be a junior doctor as stated in the brief, and therefore cannot create medical records. The cardinality constraints are that a doctor creates many medical records and a medical record is created by only one doctor. The relationship between the doctor and operation entities is a cardinality relationship of many to many. To avoid this the brief has helpfully given us a solution, if we use the fact that each doctor that performed the operation must write a textual statement about the operation, then we can split the many to many relationships into two one to many relationships. The doctor entity can create many textual statements about the operations they have performed. The textual statement is written by one doctor. This is a partial participation type as the doctor could be a trainee and therefore not be involved in the operation.

The textual statement, using its key as the keys of both doctor and operation, can then link the operation to the doctor or doctors who performed it. The operation must have a textual statement and one operation can have many statements due to operations allowing multiple doctors. A textual statement is linked to one operation.

The patient entity, which is linked to the operation entity, must have an operation in this case and one patient can have many operations, an operation can only have one patient. It must have an operation as the brief states this entity can be created without medical records not without an operation. The patient entity also has a relationship with the medical record entity, which is weak due to the medical record's dependency on the patient. It is a partial participation as the patient entity can be created without medical records. One patient can have many records, but a record can only have one patient relating to it.

2. phone_numbers(phone_number, nis_no)

Foreign key nis_no **references** Employee(nis_no)

is_Married_to(m_date, nis_no, person)

Foreign key nis_no **references** Employee(nis_no)

Foreign key person **references** Employee(nis_no)

Employee(nis_no, street_name, postcode, house_no)

Primary key nis_no

Participates(contract_no, nis_no, proj_no, name, state)

Foreign key nis_no **references** Employee(nis_no)

Foreign key name **references** City(name)

Foreign key state **references** City(state)

Foreign key proj_no **references** Project(proj_no)

City(name, state, population)

Primary keys name, state

Project(proj_no, estimated_cost, supplier_no)

Primary key proj_no

Foreign key supplier_no **references** Supplier(supplier_no)

supplier_no **not null**

Supplier(supplier_no, supplier_name)

Primary key supplier_no

3. If the employee is married to a person outside the company then the employee cannot be married to an employee in the company, this can happen with this schema. Therefore, the schema needs a way in order to ensure that this cannot happen for example the relationship could be recursive or a new entity which can be related to employee or just the national insurance number of the person that the employee is married to.

The employee can't be married to someone in the company that is a family member, as this is illegal let's be honest, and therefore as the schema doesn't include at the very least a last name under the employee entity, there is no way to check for this constraint at this moment in time.