CIS 340 Project E-R Model (50 Points) Due Sunday, Oct 31, by 11:59 PM

**Name1: Jeremy Fischer Name2: Alexander Berg Name3: Emmanuella Shokare**

You MUST do it in groups with both students in the same section. Download the document from D2L and change the file name using your MNSU usernames. Keep the following instructions and type your work below. You must follow the given style. You could lose up to five points on the style. Upload your document to D2L by the due time. Everyone is required to create GitHub repository for this course, but I need only one GitHub submission for this project. Add the link of GitHub in the D2L Dropbox description box. Each group is required to use Microsoft Teams for communication while working on the project. You must the following style to do Phase I of the project.

1. Identify entity types with brief description Example Property: Properties for rent

Alex 2-5 tables. Jeremy 6-9 tables. Emmanuella 10-13 tables

1. Wards: Group of beds in hospital
2. Staff: Employees that have different roles and responsibilities. (Like Medical Director)
3. Patient: Person admitted to the hospital
4. Patient Next of Kin: Document of information of who to contact on behalf of patients.
5. Local Doctors: The Doctor that refers the patient to the hospital
6. Patient Appointments: Time patient needs to be at hospital
7. Outpatient: A patient who receives care without being admitted
8. Inpatient: A patient who is receiving care while admitted to the hospital
9. Patient Medication: List of medications that patient needs
10. Surgical and Nonsurgical Supplies: The hospital’s supply of items, not medication.
11. Pharmacy: The hospital's way of tracking and distributing drugs to patients.
12. Ward Requisitions: Orders by a nurse to transfer patients to a ward.
13. Suppliers: Company that supplies medical equipment, both drugs and items.

2. Identify relationship types with brief description. You must include the multiplicity and attributes if any. Example Renter (0..\*) Rents (0..\*) Property Attribute: SatrtDate, EndDate, Rent One property is rented by one renter at one time. One renter can rent multiple properties at one time. All renting data, including in the past and in the future, are stored.

1. Patient (M) Has (M) PatientNextOfKin
   1. Attribute: UniquePatientNumber
   2. A Patient can have multiple NextOfKin
   3. NextOfKin can describe multiple patients
2. Patient (1) IsA (M) InPatient
   1. Attribute: PatientNumber
   2. A Patient can describe can be an InPatient multiple times, at different wards at different times.
   3. An InPatient must be a Patient and can only describe 1 patient
3. PatientMedication(M) IsSuppliedBy (1) PharamaceuticalSupplies
   1. Attribute: DrugNumber
   2. PatientMedication must have DrugNumber from PharamaceuticalSupplies and can at most only have 1.
   3. PharmaceuticalSupplies can supply 0 or many drugs to PatientMedication.
4. Ward(1) Houses (M)InPatient
   1. Attribute: WardNumber
   2. A ward can house many InPatients or none at all
   3. An Inpatient by definition must have 1 ward and is assigned at most 1 ward.
5. Ward(1) Receives (M)WardRequisition
   1. Attribute: WardNumber
   2. A ward can have many requisitions
   3. A requisition belongs to only one ward
6. Patient(1) Takes (M)PatientMedication
   1. Attribute: PatientNumber
   2. A patient can have many medications
   3. A medication order belongs to one and at most one patient
7. Patient(1) IsA (M)OutPatient
   1. Attribute: PatientNumber
   2. A patient can be an OutPatient many times at different times.
   3. An OutPatient must be a Patient and can describe at most only one OutPatient.
8. OutPatient(1) Has (M)PatientAppointment
   1. Attribute: AppointmentNumber
   2. An OutPatient can have many appointments
   3. A PatientAppointment describes at most 1 patient
9. Staff(1) Attends (M)PatientAppointment
   1. Attribute: StaffNumber
   2. A staff member can attend multiple appointments
   3. A PatientAppointment has only 1 main staff member. (Like the doctor)
10. PharmacuticalSupply(1) Supplies (M)PatientMedication
    1. Attribute: DrugNumber
    2. The supply can supply multiple patient medications.
    3. The patient medication is only supplied by the supply
11. Patient(M) Has (1)LocalDoctor
    1. Attribute: ClinicNumber
    2. A patient has only one local doctor
    3. A local doctor can practice on multiple patients.
12. Staff(1) Approves (M)WardRequisition
    1. Attribute: StaffNumber
    2. A staff member can approve many WardRequisitions
    3. A WardRequisition is approved by only one staff member
13. PharmaceuticalSupply (1) Supplies (M)WardRequisition
    1. Attribute: DrugNumber
    2. Pharmacy supplies many requisitions
    3. A single requisition is supplied by at most one Pharmaceutical Supply.
14. SurgicalAndNonSurgicalSupply(1) Supplies (M)WardRequisitions
    1. Attribute: ItemNumber
    2. The supply can supply multiple WardRequistions (Items, not drugs)
    3. WardRequistions only get their items from one supply.
15. Supplier(1) Supplies (M)SurgicalAndNonSurgicalSupply
    1. Attribute: SupplierNumber
    2. A supply of an item comes from only one supplier
    3. A Supplier can supply multiple items.
16. Supplier(1) Supplies (M) PharmaceuticalSupply
    1. Attribute: SupplierNumber
    2. A supplier can supply many Pharmaceutical Supplies
    3. The supply of a drug comes from only one supplier

3. Describe each entity type in detail Example Staff Sno Name: Composite (firstName, lastName) DOB Age: Derived Phone: Multi-Value Advisor: Optional Primary Key: Sno Alternate Key: SSN 4. Draw the E-R diagram Show the primary key for each table. You must specify the multiplicity on the E-R diagram.

* Wards
  + WardNumber : Unique
  + WardName : Unique Not Null
  + Location : Not Null
  + NumberOfBeds : Not Null
  + Telephone : Not Null
  + Primary Key: WardNumber
  + Alternate Key: WardName

* Staff
  + Staff Number : Autoincremented
  + Position : Not Null (Ex. Medical Doctor, Personal Officer)
  + Name : Not Null
  + FullAddress : Optional
  + DOB : Optional
  + AGE : Optional
  + PhoneNumber : Not Null, Unique
  + Sex : Optional
  + NationalInsuranceNumber : Not Null, Unique
  + CurrentSalary : Not Null
  + SalaryScale : Not Null
  + DateOfQualification : Optional (Could have no qualifications)
  + QualificationType : Optional
  + NameOfInstitution : Optional
  + Work Experience : Optional (Varchar of name organization, potion, dates, etc.)
  + NumberOfHours : Not Null
  + isTemporary : Not Null
  + PayPeriod : Not Null (Ex. Weekly or Monthly)

Primary Key: Staff Number

Alternative Keys: Phone Number, NationalInsuranceNumber (However potentially unstable)

* Patient
  + FirstName : Not Null
  + LastName : Not Null
  + Address : Optional
  + PhoneNumber : Optional Unique
  + DOB : Not Null
  + Sex : Not Null
  + Marital Status : Optional
  + DateRegistered : Not Null
  + ClinicNumber : Optional

Primary Key: PatientNumber

Foreign Key: ClinicNumber from LocalDoctor table

* PatientNextOfKin
  + PatientNumber : Not Null
  + NextOfKinFullName : Not Null
  + RelationshipToPatient : Not Null
  + Address : Optional
  + PhoneNumber : Not Null Unique

Primary Key: PhoneNumber

Foreign Key: PatientNumber from Patient Table

* Local Doctors
  + ClinicNumber
  + PatientNumber : Not Null
  + DrFirstName : Not Null
  + DrSecondName : Not Null
  + ClinicAddress : Not Null
  + ClinicPhoneNumber : Not Null Unique

Primary Key: ClinicNumber

Jeremy Fischer’s Tables 6-9

Notes: Maybe delete NextOfKin in patient, and add a foreign key in PatientNextOfKin of Patient

* PatientAppointment
  + AppointmentNumber : Autogenerated Unique
  + StaffNumber : Not Null
  + AppointmentDateTime : Not Null
  + AppointmentRoom : Optional
  + Result : Optional
  + Primary Key: Appointment Number
  + Foreign Key: StaffNumber from the Staff Table
* Outpatient
  + PatientNumber
  + AppointmentNumber
  + Foreign Key: PatientNumber from Patient Table
  + Foreign Key: AppointmentNumber from Appointment Table
  + Composite Primary Key of PatientNumber and AppointmentNumber
* Inpatient
  + PatientNumber
  + WaitingListDate : Not Null
  + WardNumber
  + ExpectedStay : Optional
  + DatePlacedInWard : Optional
  + DateLeftWard : Optional
  + BedNumber : Optional, Unique
  + Foreign Key: PatientNumber from Patient table
  + Foreign Key: WardNumber
  + PatientNumber and WaitingListDate are Composite Primary key (in case the patient comes back multiple times)
* PatientMedication
  + PatientNumber
  + DrugNumber
  + UnitsPerDay : Not Null
  + StartDate : Not Null
  + FinishDate : Not Null
  + Foreign Key: PatientNumber from Patient table
  + Foreign Key: DrugNumber from PharmacuticalSupplies
  + PatientNumber and DrugNumber are composite Primary Key
* SurgicalAndNonsurgicalSupply
  + ItemNumber
  + Name : Not Null
  + ItemDescription : Not Null
  + QuantityInStock : Not Null
  + ReorderLevel : Not Null
  + CostPerUnit : Not Null
  + SupplierNumber : Not Null

Primary Key: ItemNumber

Foreign Key: Supplier Number from the Supplier table

* PharmaceuticalSupply
  + DrugNumber
  + DrugName : Not Null
  + Description : Not Null
  + Dosage : Optional
  + MethodOfAdministration : Optional
  + QuantityInStock : Not Null
  + ReorderLevel : Not Null
  + CostPerUnit : Not Null
  + SupplierNumber : Not Null

Primary Key: DrugNumber

Foreign Key: Supplier Number from the Supplier table

* WardRequisition
  + RequisitionNumber
  + StaffNumber : Not Null
  + WardNumber : Not Null
  + DrugNumber : May be null (If only ordering Items)
  + ItemNumber : May be null (If only ordering Drugs)
  + QuantityOfDrug : May be null
  + QuantityOfItem : May be null
  + DateOrdered : Optional

Primary key: RequisitionNumber

Foreign Key: StaffNumber from Staff table

Foreign Key: WardNumber from Ward table

Foreign Key: DrugNumber from PharmaceuticalSupplies

Foreign Key: ItemNumber from SurgicalAndNonsurgicalSupplies

* Supplier
  + SupplierNumber
  + Name : Not Null
  + PhoneNumber : Not Null Unique
  + Address : Not Null Unique
  + FaxNumber : Not Null Unique

Primary Key: Supplier Number