# IT 340 Assignment2 E-R Model (50 Points)

Due Wednesday, April 21, by 11:59 PM

***Group 1:***

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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 use the following style to do Phase I of the project.

1. Identify entity types with brief description Example

Property: Properties for rent

1. 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. 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

1. Draw the E-R diagram

Show the primary key for each table.

# You must specify the multiplicity on the E-R diagram.

IT 340 – Project

Consider the following case study, you are to build a relational database for Wellmeadows Hospital.

This case study describes a small hospital called Wellmeadows, which is located in Edinburgh. The Wellmeadows Hospital specializes in the provision of healthcare for elderly people. Listed below is a description of the data recorded, maintained, and accessed by the hospital staff to support the management and day to day operations of the hospital.

## Wards

The Wellmeadows Hospital has 17 wards with a total of 240 beds available for short and long stay patients, and an outpatient clinic. Each ward is uniquely identified by a number (i.e. - ward 11) and also a ward name (i.e. - Orthopedic), location (i.e. - E block), total number of beds, and a telephone extension number (i.e. - Extn 7711).

## Staff

The Wellmeadows Hospital has a Medical Director, who has overall responsibility for the management of the hospital. The Medical Director maintains control over the use of the hospital resources (including staff, beds, and supplies) in the provision of cost-effective treatment for all patients.

The Wellmeadows Hospital has a Personnel Officer who is responsible for ensuring that the appropriate number and type of staff are allocated to each ward and the outpatient clinic. The information stored on each staff member includes a staff number, name (first and last), full address, telephone number, date of birth, sex, National Insurance Number (NIN), position held, current salary, and salary scale. It also includes each member’s qualifications (which includes date of qualification, type, and name of institution) and work experience details (which includes the name of the organization, position, and start and finish dates).

The type of employment contract for each member of staff is also recorded, including the number of hours worked per week, whether the staff member is on a temporary or permanent contract, and the type of salary payment (weekly/monthly).

Each ward and the outpatient clinic has a member of staff with the position of Charge Nurse. The Charge Nurse is responsible for overseeing the day to day operations of the ward/clinic. The Charge Nurse is allocated a budget to run the ward and must ensure that all resources are used effectively in the care of patients. The Medical Director works closely with the Charge Nurses to ensure the effective running of the hospital.

A Charge Nurse is responsible for setting up a weekly staff rotation, and must ensure that the ward/clinic has the correct number and type of staff on duty at any time during the day or night. In a given week, each staff member is assigned to work an early, late, or night shift.

As well as the Charge Nurse, each ward is allocated senior and junior nurses, doctors, and auxiliaries. Specialist staff (i.e. – consultants, physiotherapists) are allocated to several wards or the clinic.

## Patients

When a patient is first referred to the hospital, he or she is allocated a unique patient number. At this time, additional details of the patient are also recorded including the name (first and last), address, phone number, date of birth, sex, marital status, date registered with the hospital, and the details of the patient’s next of kin.

## Patient’s Next of Kin

The details of a patient’s next of kin are recorded, which includes the next of kin’s full name, relationship to the patient, address, and phone number.

## Local Doctors

Patients are normally referred to the hospital by their local doctor. The details of local doctors are held, including their full name, clinic number, clinic address, and clinic phone number. The clinic number is unique throughout the U.K.

## Patient Appointments

When a patient is referred to by his or her doctor, the patient is given an appointment for examination by a hospital consultant. Each appointment has a unique number. The details of each patient’s appointment are recorded and include the name and staff number of the consultant undertaking the examination, the date and time of the appointment, and the examination room.

As a result of the examination, the patient is either recommended to attend the outpatient clinic or is placed on a waiting list until a bed can be found in an appropriate ward.

## Outpatients

The details of outpatients are stored and include the patient number, name (first and last), address, phone number, date of birth, sex, and the date and time of the appointment at the outpatient clinic.

## Inpatients

The Charge Nurse and other senior medical staff are responsible for the allocation of beds to patients on the waiting list. The details of patients currently placed in a ward and those on the waiting list for a place on a ward are recorded. This includes the patient number, name (ﬁrst and last name), address, telephone number, date of birth, sex, marital status, the details of the patient’s next-of-kin, the date placed on the waiting list, the ward required, expected duration of stay (in days), date placed in the ward, date expected to leave the ward, and the actual date the patient left the ward, when known. When a patient enters the ward, he or she is allocated a bed with a unique bed number.

## Patient Medication

When a patient is prescribed medication, the details are recorded. This includes the patient’s name and number, drug number and name, units per day, method of administration (for example, oral, intravenous (IV)), start and ﬁnish date. The medication (pharmaceutical supplies) given to each patient is monitored.

## Surgical and Nonsurgical Supplies

The Wellmeadows Hospital maintains a central stock of surgical (for example, syringes, sterile dressings) and non-surgical (for example, plastic bags, and aprons) supplies. The details of surgical and non-surgical supplies include the item number and name, item description, quantity in stock, reorder level, and cost per unit. The item number uniquely identiﬁes each type of surgical or non-surgical supply. The supplies used by each ward are monitored.

## Pharmaceutical Supplies

The hospital also maintains a stock of pharmaceutical supplies (for example, antibiotics, and painkillers). The details of pharmaceutical supplies include drug number and name, description, dosage, method of administration, quantity in stock, reorder level, and cost per unit. The drug number uniquely identiﬁes each type of pharmaceutical supply. The pharmaceutical supplies used by each ward are monitored.

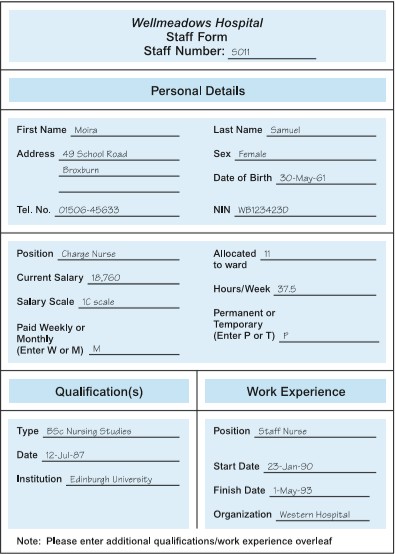
## Ward Requisitions

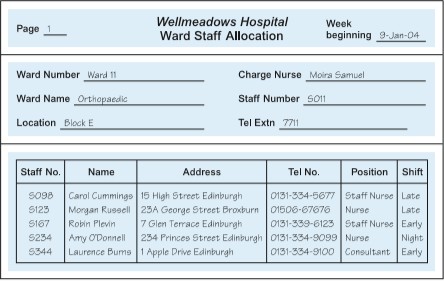
When required, the Charge Nurse may obtain surgical, non-surgical, and pharmaceutical supplies from the central stock of supplies held by the hospital. This is achieved by ordering supplies for the ward using a requisition form. The information detailed on a requisition form includes a unique requisition number, the name of the member of staff placing the requisition, and the number and name of the ward. Also included is the item or drug number, name, description, dosage and method of administration (for drugs only), cost per unit, quantity required, and date ordered. When the requisitioned supplies are delivered to the ward, the form must be signed and dated by the Charge Nurse who initiated the order.

## Suppliers

The details of the suppliers of the surgical, non-surgical, and pharmaceutical items are stored. This information includes the supplier’s name and number, address, telephone, and fax numbers. The supplier number is unique to each supplier.

Here are some helpful figures illustrating the tables:





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| We//meadows Hosgira/ Patient Registration Form Pa£ien\ Number: i .°!C“. | |
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|  | sex |
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| DOB | fl/I arilal S ta•us |
| Date Rep istered |  |
| Next- of-Kin Details | |
|  | |
| Local Doctor Details | |
|  | |





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| &P4&0 | la P!ar-Le | 12-Jan-04 | 4 | 14-gao-OF | 1@-Ja• -04 | 1g-Jan-Q4 | 79 |
| P10g6d | Dgyi‹4 Ngc£ | 1g-in-04 | 1e | 1/Jan-04 | Z7-Jan-d4 |  | 80 |
| P1P604 | |an 1Ticengo» | 14-Jan-04- | 10 | 1$-Jan-04 | ZS-Jan-04 |  | 87 |
| P1P7g7 | Pbtcr Smith | 17-lan-04 | 5 | 17-Jan-0< | 22-Jan-P4 |  | 8•+ |

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| 1OZ2Z  109Zt4  10Z2Z | Mc¥}4iIrIa Tatracycliz¥s Morphine | Fâlnklllar AntJblotJc Fblnklllar | M¥ng/ml Oln1g/ml  ¥0mg/ml | Oral IV  Oral | Bt7  *1O*  *1O* | Z4-Mar-04 Zd-M8nO4  Zg-Apr-0+ | Z4-'Apr-04 17-Apr-D'4 Z-M4y-P4 |

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| --- | --- | --- | --- | --- | --- | --- |
| ItamJDrug Nurrc›er | Name | Daaerg›tlon | Dosege (Drups Only) | Mathod of Admln | Coat par Ung | Quantity |
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## Entities

1. **Ward:**

Wards for Well meadows Hospital (wards for the patients). It contains the following attributes.

Ward (Ward\_Number, Ward\_Name, Location, Total\_No\_of\_Beds, Telephone\_Extension)

**Primary Key: ward\_number**

1. **Director:**

Director for Well Medows Hospital. It contains the following attributes.

Director(director\_id, director\_name, start\_date, address, city, contact\_number)

**Primary Key: director\_id**

1. **Personal Officer:**

Personal Officer for Well Meadows Hospital. It contain the following attributes.

Personal\_Officer(officer\_id, officer\_name, start\_date, address, city, contact\_number)

**Primary Key: officer\_id**

1. **Supplies:**

Super class for all types of medical supplies for Well Meadown Hospital. It contains the following attributes.

Supplies(supply\_id, supply\_name, quantity\_in\_stock, recorder\_level, cost\_per\_unit)

**Primary Key: supply\_id.**

1. **Surgical & non surgical:**

Sub class for supplies for Well Meadows Hospital. It contains the following attributes.

Surgical\_and\_non\_surgical(description)

1. **Pharmaceutical Supplies:**

Sub class for supplies for Well Meadows Hospital. It contains the following attributes.

Pharmaceutical\_supplies(dosage, method\_of\_administration)

1. **Supplier:**

Supplier for supplies for Well Meadows Hospital. It contains the following attributes.

Supplier(supplier\_id, supplier\_name, address, telephone, fax\_number)

**Primary Key: supplier\_id.**

1. **Staff:**

Records for the staff of the well meadow’s hospital. It has the following attributes

Staff (Staff\_Number, First\_Name, Last\_Name, Address, Sex, Tel\_No, DOB, NIN, position\_held, Ward\_Number, Current\_Salary,salary\_scale)

**Primary Key: staff\_number**

**Foreign Key: ward\_number**

1. **Contract:**

Details of contract of the staff of the Well Meadow’s Hospital. It has the following attributes.

Contract(contract\_id, staff\_number, number\_of\_hours, contract\_type, type\_of\_salary)

**Primary Key: contract\_id**

**Foreign Key: staff\_number**

1. **Qualification:**

Details of the qualification of the staff of the Well Meadow’s Hospital. It has the following attributes.

Qualification(qualification\_id, staff\_number, description, date\_of\_completion, type, institute\_name).

**Primary Key: qualification\_id**

**Foreign Key: staff\_number**

1. **Work Experience:**

Details of the Work Experiences of the staff of the Well Meadow’s Hospital. It has the following attributes.

Work\_Experience(experience\_id, staff\_number, name\_of\_organization, position, start\_date, end\_date)

**Primary Key: experience\_id**

**Foreign Key: staff\_number**

1. **Charge\_Nurse:**

Details of the Charge Nurse of the ward of Well Meadow’s Hospital. It has the following attributes.

Charge\_nurse(nurse\_id, staff\_number, ward\_number, budget)

**Primary Key: nurse\_id**

**Foreign Key: staff\_number, ward\_number**

1. **Ward Requisitions:**

Details of the ward requisitions ordered for the medical supplies by charge\_nurse of a ward in Well Meadow’s Hospital. It has the following attributes

Ward\_requisitions(requisition\_number, supply\_id, nurse\_id, staff\_number, quantity\_ordered, date\_ordered)

**Primary Key: requisition\_number, supply\_id, nurse\_id**

**Foreign Key: supply\_id, nurse\_id**

1. **Patient:**

Details of the patient in Well Meadow’s Hospital. It is a super class for inpatient and outpatient. It has the following attributes.

Patient(patient\_number, doctor\_id, fname, lname, address, phone, DOB, sex, marital\_status, date\_registered)

**Primary Key: patient\_number**

**Foreign Key: doctor\_id**

1. **Inpatient:**

Sub class for the patient which are admitted in Well Meadow’s Hospital. It has the following attributes

Inpatient(ward\_required, waiting\_list\_date, expected\_stay, date\_admitted, expected\_leave\_day, date\_left, bed\_number).

1. **Outpatient:**

Sub class for the patient which are not admitted in Well Meadow’s Hospital. It has the following attributes

Outpatient(appointment\_date, curr\_status)

1. **Appointment:**

Details for appointment and check up of all type of patients of Well Meadow’s Hospital. It has the following attribtues.

Appointment(appointment\_id, staff\_number, patient\_number, date\_of\_examination, examination\_room)

**Primary Key: appointment\_id**

**Foregin Key: staff\_number, patient\_number**

1. **Medication:**

Details for the medications of the patients of the Well Meadow’s hospital. It has the following attributes.

Medication(medication\_id, patient\_number, drug\_number, drug\_name, units\_per\_day, method\_of\_administration, start\_date, end\_date)

**Primary Key: medication\_id**

**Foreign Key: patient\_number**

1. **Next of kin:**

Details of the next of kin for the patient of Well Meadow’s Hospital. It has the following attributes.

Next\_of\_kin(fullname, patient\_id, relationship, address, phone, id)

**Primary Key: id**

**Foreign Key: patient\_id**

1. **Local Doctor:**

Details of the doctor who has referred a patient to the Well Meadow’s Hospital. It has the following attributes.

Local\_doctor(doctor\_id fullname, clinic\_number, clinic\_address, clinic\_phone)

**Primary Key: doctor\_id**

## Relationships

|  |  |  |  |
| --- | --- | --- | --- |
| Relationship | | | Cardinality |
| Parents | Child | Type |  |
| Hospital | Ward | ID dependent | 1-N |
| Ward | Staff | Strong | M-N |
| Staff | Contract | ID-Dependent | 1-N |
| Staff | Work experience | ID-Dependent | 1-N |
| Staff | Qualification | ID-Dependent | 1-N |
| Hospital | Supplies | ID Dependent | 1-N |
| Supplies | Supplier | Strong | M-N |
| Hospital | Director | ID dependent | 1-1 |
| Hospital | Personal\_Officer | ID dependent | 1-1 |
| Hospital | Patient | ID dependent | 1-N |
| Ward | Charge Nurse | Strong | 1-1 |
| Charge Nurse | Ward Requisition | Strong | 1-N |
| Ward Requisition | Supplies | Strong | 1-N |
| Patient | Medication | ID Dependant | 1-N |
| Patient | Appointment | ID Dependant | 1-N |
| Patient | Next Of Kin | ID Dependant | 1-1 |
| Patient | Local Doctor | ID Dependant | 1-1 |

Diagram

Description automatically generated