

IT 340 Assignment2  
E-R Model (50 Points)  
Due Wednesday, April 21, by 11:59 PM

Name1: Hg1024hr  
Name2: Dc3465ee

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

- a. **Wards:** Wards of The Wellmeadows Hospital – 17 wards and 240 beds total
- b. **Staff:** Personnel at the Wellmeadows Hospital that each contribute responsibility in the management of the hospital. (Charge nurse)
- c. **Local Doctors:** Doctors that refer patients to hospital
- d. **Patients:** Persons who are referred or admitted to the hospital.
- e. **Patient's next of Kin:** Close people of the patient
- f. **Patient Appointments:** Appointment that is set up for the patient for examination
- g. **Outpatients:** Patients that leave the hospital
- h. **Inpatients:** Patients entering the hospital
- i. **Patient Medication:** The medication is prescribed to patients
- j. **Surgical and Non-Surgical Supplies:** Items needing to be on stock for surgical procedures
- k. **Pharmaceutical Supplies:** Drugs and treatments kept in store at the hospital
- l. **Ward Requisitions:** Forms required to fill out when ordering supplies
- m. **Suppliers:** The group(s) that deliver surgical, non-surgical, and pharmaceutical items to WellMeadows hospital

2. Identify relationship types with brief description. You must include the multiplicity and attributes if any.

**Relationship Types**

One patient can have multiple Appointments

One appointment can be for only one Patient

One staff can have multiple Appointments

One appointment can have only one Staff

One patient can have multiple Medications

One medication can have multiple Patient

One staff can have multiple Requisitions

One requisition can include only one Staff

One supplier can have multiple Items

One item can have multiple Suppliers

### 3. Describe each entity type in detail

#### **Entity Types**

##### **Ward**

ward\_no int (Primary key)

ward\_name varchar

ward\_location varchar

no\_of\_beds int

phone\_ext int

##### **Patient**

patient\_id int (Primary key)

first\_name varchar

last\_name varchar

address varchar

phone\_no varchar

date\_of\_birth date

sex char

marital\_status char

reg\_date date

next\_of\_kin varchar

relationship char

kin\_address varchar

kin\_phone\_no varchar

doctor\_name varchar

clinic\_no varchar

clinic\_phone\_no varchar

clinic\_address varchar

### **Staff**

staff\_id int (Primary key)

first\_name varchar

last\_name varchar

address varchar

phone\_no varchar

date\_of\_birth date

sex char

type\_of\_staff char

position varchar

salary float

salary\_scale varchar

NIN varchar

date\_of\_qualification date

type\_of\_qualification varchar

institution\_name varchar

org\_name varchar

position\_held varchar

start\_date date

end\_date date

no\_of\_hours int

contract\_type char

type\_of\_salary char

shift char

### **Appointment**

app\_id int (Primary key)

staff\_id int (Foreign key)

patient\_id int

ward\_no int

date\_of\_app date

time\_of\_app char

room\_no int

status char

type\_of\_app char

duration int

ward\_date date

leave\_date date

release\_date date

bed\_no int

### **Medication**

med\_no int (Primary key)

patient\_id int (Foreign key)

units\_per\_day int

method char

start\_date date

end\_date date

### **Items**

item\_id int (Primary key)

sup\_id int (Foreign key)

item\_name varchar

item\_desc varchar

quantity int

reorder\_level int

cost\_per\_unit int

### **Pharmacy**

drug\_id int (Primary key)

sup\_id int (Foreign key)

drug\_name varchar

drug\_desc varchar

dosage varchar

method char

quantity int

reorder\_level int

cost\_per\_unit int

### **Requisition**

reg\_no int (Primary key)

staff\_id int (Foreign key)

ward\_no int (Foreign key)

drug\_id int (Foreign key)

item\_id int (Foreign key)

reg\_type char

quantity int

order\_date date

delivery\_date date

Suppliers

sup\_id int (Primary key)

first\_name varchar

last\_name varchar

address varchar

phone\_no varchar

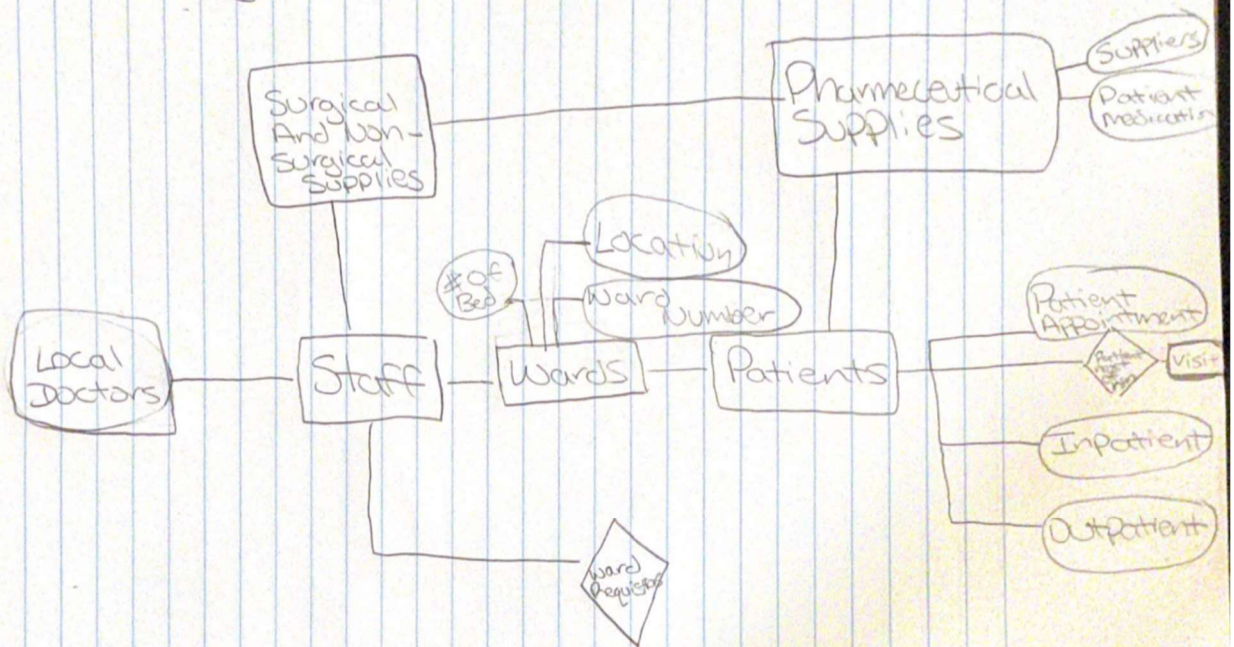
fax\_no varchar

ER Diagram

4.

Draw the E-R diagram

# ER 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:

<b>Wellmeadows Hospital</b> <b>Staff Form</b> <b>Staff Number:</b> <u>5011</u>	
<b>Personal Details</b>	
<b>First Name</b> <u>Moina</u>	<b>Last Name</b> <u>Samuel</u>
<b>Address</b> <u>49 School Road</u> <u>Broxburn</u>	<b>Sex</b> <u>Female</u> <b>Date of Birth</b> <u>30-May-61</u>
<b>Tel. No.</b> <u>01506-45633</u>	<b>NIN</b> <u>WB123423D</u>
<b>Position</b> <u>Charge Nurse</u>	<b>Allocated</b> <u>11</u> to ward
<b>Current Salary</b> <u>18,760</u>	<b>Hours/Week</b> <u>37.5</u>
<b>Salary Scale</b> <u>1C scale</u>	<b>Permanent or Temporary</b> (Enter P or T) <u>P</u>
<b>Paid Weekly or Monthly</b> (Enter W or M) <u>M</u>	
<b>Qualification(s)</b>	<b>Work Experience</b>
<b>Type</b> <u>BSc Nursing Studies</u>	<b>Position</b> <u>Staff Nurse</u>
<b>Date</b> <u>12-Jul-87</u>	<b>Start Date</b> <u>23-Jan-90</u>
<b>Institution</b> <u>Edinburgh University</u>	<b>Finish Date</b> <u>1-May-93</u>
	<b>Organization</b> <u>Western Hospital</u>
<b>Note:</b> Please enter additional qualifications/work experience overleaf	

<b>Wellmeadows Hospital</b> <b>Ward Staff Allocation</b>		<b>Page</b> <u>1</u>	<b>Week beginning</b> <u>9-Jan-04</u>																																				
<b>Ward Number</b> <u>Ward 11</u>	<b>Charge Nurse</b> <u>Moina Samuel</u>																																						
<b>Ward Name</b> <u>Orthopaedic</u>	<b>Staff Number</b> <u>5011</u>																																						
<b>Location</b> <u>Block E</u>	<b>Tel Extn</b> <u>7711</u>																																						
<table border="1" style="width: 100%; border-collapse: collapse; text-align: left;"> <thead> <tr> <th style="width: 10%;">Staff No.</th> <th style="width: 15%;">Name</th> <th style="width: 25%;">Address</th> <th style="width: 15%;">Tel No.</th> <th style="width: 15%;">Position</th> <th style="width: 10%;">Shift</th> </tr> </thead> <tbody> <tr> <td>5098</td> <td>Carol Cummings</td> <td>15 High Street Edinburgh</td> <td>0131-334-5677</td> <td>Staff Nurse</td> <td>Late</td> </tr> <tr> <td>5123</td> <td>Morgan Russell</td> <td>23A George Street Broxburn</td> <td>01506-67676</td> <td>Nurse</td> <td>Late</td> </tr> <tr> <td>5167</td> <td>Rolin Plevin</td> <td>7 Glen Terrace Edinburgh</td> <td>0131-339-6123</td> <td>Staff Nurse</td> <td>Early</td> </tr> <tr> <td>5234</td> <td>Amy O'Donnell</td> <td>234 Princes Street Edinburgh</td> <td>0131-334-9099</td> <td>Nurse</td> <td>Night</td> </tr> <tr> <td>5344</td> <td>Laurence Burns</td> <td>1 Apple Drive Edinburgh</td> <td>0131-334-9100</td> <td>Consultant</td> <td>Early</td> </tr> </tbody> </table>				Staff No.	Name	Address	Tel No.	Position	Shift	5098	Carol Cummings	15 High Street Edinburgh	0131-334-5677	Staff Nurse	Late	5123	Morgan Russell	23A George Street Broxburn	01506-67676	Nurse	Late	5167	Rolin Plevin	7 Glen Terrace Edinburgh	0131-339-6123	Staff Nurse	Early	5234	Amy O'Donnell	234 Princes Street Edinburgh	0131-334-9099	Nurse	Night	5344	Laurence Burns	1 Apple Drive Edinburgh	0131-334-9100	Consultant	Early
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*Wei/meadows Hospital*  
Patient Registration Form  
Patient Number: P10234

Personal Details

First Name \_\_\_\_\_ Last Name \_\_\_\_\_  
Address 44" f"he!e!; Sex \_\_\_\_\_  
North6rid es ftn'..11\e \_\_\_\_\_  
\_\_\_\_\_ Tel No. 0131:332-4 111  
Ca:111onmil  
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E.dirtbu h.  
! :HI 5GH  
DOB 12-0ec-33  
Date Registered 21- -04

Next of  
Kin Details

Full Name \_\_\_\_\_ Relationship So, \_\_\_\_\_  
..k1mPhed!  
Address 145  
R:O'Al:110< SW  
f.411,-e:i',.  
PAZ5FE  
Tel 0'141·&46·22  
No. 11

Local Doctor Details

Full Name Or Clinic No. EI02  
HelenPeJl (on  
,;uy..1:11:1  
Z2Cannon;1,1n,Yia\*t,  
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EdinVu h,  
EHi 61Y  
Tel No. 013!·332-  
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Weffmeadows Hospital
Patient Allocation
Week
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Ward Ntimber
Ws 11

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Statl Num M r 6-011
el Exlil 77"

Ward Na
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Location	510:k E	List	St y (Days)	Placed	Leave	Leave	t>lurnbeT
fiO-i-61	Ro e:r Q-U-11 re	1:2-J11n-04	5	12-J,j -04	17-J,-tri-04	16-J,i -04	84
f-104-00	S i, f h,,,	12-J.in-04	4	14-J,i -04	18-J,i -04	18-J,i,-04	79
f10t%:3	D.iYid t5lllt	On-IEx-04	14	1,-,-Jin-04	27-J,i,11-(l,(	IBil d	80
f10604	l.1nTh00100	14-J.-tn-04	,0	15-Jir-04	25-J.11'1-0<*		87
f-10787	f rSmith	17-J.,,;11-04	5	17-.mt1-04	22-J.,;111-04		84

Wellmeadow Hospital
Patient Me dication Form

D ug Num'be r	Name	0,oscription	PaQem: Number:	Un,ts per Day	Start Oat-a	f' In l&h Dale
10223	Dtpllne	Pain <lller	Om,a/111	Ors	5,:J	24-t,br-04
Fpl1> am	Tracydl,tg	>Antibiot: D>:nld	0-5:11-4<l	Wii!rd Number	Wii!rd	17-Apr-04
10223	atfll lne	Pain dllcr	Dmqim	Ors	10	25-Apr-04-

Bed Number 84
Ward Name Orthw tilli;

Wei/meadows Hospital Central Store
Requisition Form

It em/ Ott.1g Number	Name	Desur fion Dosage	Method of in	Cost per Unit	QWinl ity
10223	Motphl	'\ill lier	Om Im	Oril	27.75
		R qul sitl cm Numb er:			50

Ward Num er W,ml 1'
Samu !

Ward N me art,,(Oe IC:
RequI .ll loned By Mair

R•qul lion Cl t• 15•F b-04

e,c lYe d By: _____ D te flei:el ve : _____