HOSPITAL MANAGEMENT SYSTEM

INFO 605 DATABASE MANAGEMENT SYSTEM

DREXEL UNIVERSITY

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CONTRIBUTIONS:

Kavya Kumar: Requirements, wrote ER model using DIA, Database schema, Oracle code, wrote and ran the DDL and DML statements in oracle, wrote and ran Queries.
Yuanpu Hu: wrote and ran DDL, wrote and ran DML, modified Data Dictionary, wrote and ran Queries
Brian Dusape: Drew ER model to map out entities on Draw IO, wrote draft of requirements, defined data dictionary, wrote DML and queries

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REQUIREMENTS

This database will help the hospital to keep records of Patients, Doctors and other staff working in a hospital as well. There are many doctors and staff employed in this hospital. For staff, we mean everyone else except doctors that work here, such as receptionists, nurses, ward cleaners and so on.

For every doctor, there is a DoctorID that uniquely determines them. Also, each doctor's information such as first name, last name, date of birth, hourly pay and specialization are also stored. There is a derived attribute age, which can be determined by using the date of birth of the doctor.

There are various staff that help in making the functioning of the hospital smoother. They include nurses, wardens, receptionists and cleaners.

Each doctor and staff works for one or more department.

There are many departments in the hospital for various specializations. Each department is associated with a unique identifier department ID and department name. For every department there can be any number of doctors and staff working under it. Also, there might be no doctors or staff working in a department in some cases.

There can be any number of patients in the hospital database and each patient record is uniquely identified by patient ID. Also other information such as first name, last name, date of birth and the illness is recorded. Just like the doctors record, patients record also contains a derived attribute Age, whose value can be determined by the date of birth attribute.

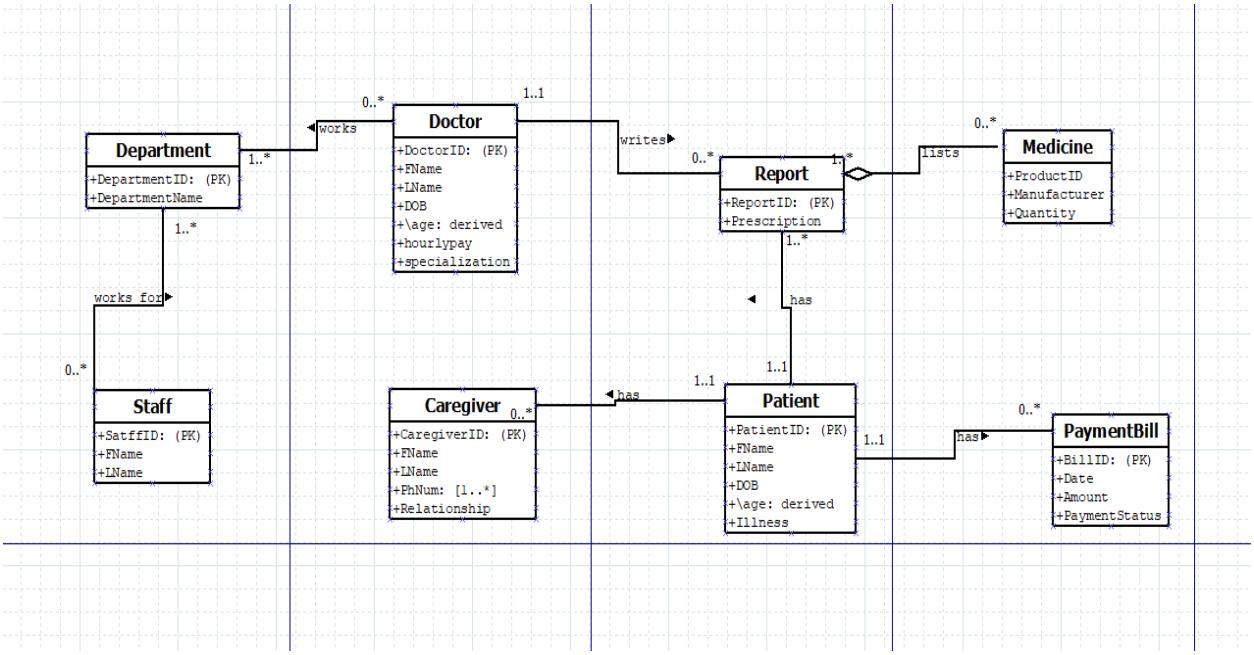
Each patient is associated with a caregiver, report and the payment bill. Every patient can be associated with any number of caregivers, reports and payment bills and some patients will not have caregiver and payment bill. Each Patient will have at least one report associated with their record.

Every report is uniquely identified with report ID which makes it easy to retrieve from a large database. It also contains prescription or notes written by the doctor. Reports can list any number of Medicines and some reports might not list any medicine.

Medicine needs to be listed by at least one report. This record contains product ID, manufacturer and the quantity required. In this case, Medicine is a weak entity which doesn't exist without the Report. Report, being the strong entity can have any number of medicine records associated with it. Also, Report can be associated with no medicine report at all.

Each Caregiver is associated with a unique ID present. We initially thought to have this unique identifier as driving license, but realized that international non-residents will not have them. First name, last name, phone number and the relationship between the patient and caregiver is also stored in the database. The attribute phone number is a multi-valued attribute since a person can have more than one phone number that can be best to be reached.

ER Diagram


Department
+DepartmentID: (PK)
+DepartmentName
works
Doctor
+DoctorID: (PK)
+FName
+LName
+DOB
+\age: derived
+hourlypay
+specialization
writes
Report
+ReportID: (PK)
+Prescription
lists
Medicine
+ProductID
+Manufacturer
+Quantity
works for
Staff
+SatffID: (PK)
+FName
+LName
has
Caregiver
+CaregiverID: (PK)
+FName
+LName
+PhNum: [1..*]
+Relationship
has
Patient
+PatientID: (PK)
+FName
+LName
+DOB
+\age: derived
+Illness
has
PaymentBill
+BillID: (PK)
+Date
+Amount
+PaymentStatus

DATABASE SCHEMA

Department(DepartmentID, DepartmentName)

Doctor(DoctorID, FName, LName, DOB, hourlypay, specialization)

Patient(PatientID, FName, LName, DOB, Illness)

Report(ReportID, Prescription, WrittenBy, PatientID) //WrittenBy points to DoctorID

Workson(DoctorID, DepartmentID)

Staff(StaffID, FName, LName)

StaffWorksfor(StaffID, DepartmentID)

Medicine(ReportID, ProductID, Manufacturer, Quantity)

Medicinelists(ReportID, ProductID)

Caregiver(CaregiverID, FName, LName, Relationship, PatientID)

CaregiverPhone(CaregiverID, PhNum)

PaymentBill(BillID, DateofBill, Amount, PaymentStatus, PatientID)

DATA DICTIONARY

Table: Patient						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
PatientID	Unique number per patient	NUMBER	00000000-99999999	No	Yes	No
FirstName	Patient's first name	VARCHAR2	All	No	No	No
LastName	Patient's last name	VARCHAR2	All	No	No	No
DateOfBirth	Date that patient was born	DATE	> 1/1/1900	Yes	No	No
Illness	Description of patient's illness/condition	VARCHAR2	All	No	No	No
Table: Caregiver						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
CaregiverID	Unique number per caregiver	NUMBER	000000000-99999999	No	Yes	No
FirstName	The consultant's first name	VARCHAR(50)	All	No	No	No
LastName	The consultant's last name	VARCHAR(50)	All	No	No	No
Phone Number	Phone number to contact caregiver	NUMBER	0000000000-9999999999	No	No	No
Relationship	Relationship of caregiver and patient	VARCHAR2	All	No	No	No
Table: Doctor						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
Doctor ID	Doctor's unique identification number	NUMBER	0000-9999	No	Yes	No
FirstName	Doctor's first name	VARCHAR(50)	All	No	No	No
LastName	Doctor's last name	VARCHAR(50)	All	No	No	No
DateOfBirth	Date that doctor was born	DATE	> 1/1/1900	Yes	No	No
HourlyPay	Pay per hour for the doctor	NUMBER	0 - 99	No	No	No

Specialization	Doctor's field of expertise	VARCHAR2	All	No	No	No
Table: Report						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
ReportID	Unique ID number for doctor's report	NUMBER	00000-99999	No	Yes	No
Prescription	Description of medicine prescribed	VARCHAR	All	No	No	No
Table: Payment Bill						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
BillID	The number associated with a patient's bill	NUMBER	0000000-9999999	No	Yes	No
Dateofbill	Date of bill	DATE	> 1/1/1900	No	No	No
Amount	Amount total of services	NUMBER	000000000-99999999	No	No	No
PaymentStatus	Description of payment's status	VARCHAR	All	No	No	No
Table: Medicine						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
ProductID	The medicine's unique identification number	NUMBER	000-999	No	Yes	No
Manufacturer	Manufacturer associated with transaction	VANCHAR	ALL	No	No	No
quantity	Quantity of units needed for patient's prescription	NUMBER	00-99	No	No	No
Table: Staff						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK

StaffID	Staff's unique employee identification number	NUMBER	000000000-99999999	No	Yes	No
FirstName	The member's first name	VARCHAR(50)	All	No	No	No
LastName	The member's last name	VARCHAR(50)	All	No	No	No
Table: Department						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
DepartmentID	ID of the site	NUMBER	000000000-99999999	No	Yes	No
DepartmentName	Name of specific site	CHAR	All	No	No	No

Table: WorksOn						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
Doctor ID	Doctor's unique identification number	NUMBER	0000-9999	No	Yes	No
DepartmentID	ID of the site	NUMBER	000000000-99999999	No	Yes	No
Table: StaffWorkson						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
StaffID	Staff's unique employee identification number	NUMBER	000000000-99999999	No	Yes	No
DepartmentID	ID of the site	NUMBER	000000000-99999999	No	Yes	No
Table: Medicinelists						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
ReportID	Unique ID number for doctor's report	NUMBER	00000-99999	No	Yes	No
ProductID	The medicine's unique identification number	NUMBER	000-999	No	Yes	No

Table: CaregiverPhone						
Attribute Name	Description	Data Type	Domain	Nullable	PK	FK
CaregiverID	Unique number per caregiver	NUMBER	000000000-99999999	No	Yes	No
Phone Number	Phone number to contact caregiver	NUMBER	0000000000-9999999999	No	No	No

DDL and DML

```
Create TABLE Department
(
DepartmentID NUMBER PRIMARY KEY,
DepartmentName VARCHAR(50)
)

Create TABLE Doctor
(
    DoctorID  CHAR(9) PRIMARY KEY,
    FName VARCHAR(50),
    LName VARCHAR(50),
    DOB DATE,
    hourlypay NUMBER,
    specialization VARCHAR2(20)

)
Create TABLE Patient
(
    PatientID  CHAR(9) PRIMARY KEY,
    FName VARCHAR(50),
    LName VARCHAR(50),
    DOB DATE,
    Illness VARCHAR2(50)
)
Create TABLE Report
(
ReportID NUMBER PRIMARY KEY,
Prescription VARCHAR2(50),
DoctorID CHAR(9) references Doctor(DoctorID),
PatientID CHAR(9) references Patient(PatientID)
)
Create TABLE Workson
(
DoctorID CHAR(9) references Doctor(DoctorID),
DepartmentID NUMBER references Department(DepartmentID)
)
Create TABLE Staff
(
StaffID NUMBER PRIMARY KEY,
Fname VARCHAR(50),
Lname VARCHAR(50)
)
Create TABLE StaffWorksfor
(
staffID NUMBER references Staff(staffID),
DepartmentID NUMBER references Department(DepartmentID)
```

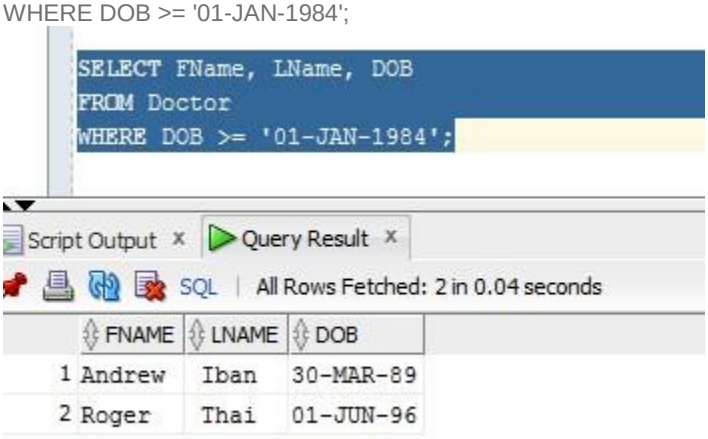
```
)
Create TABLE Medicine
(
ReportID NUMBER references Report(ReportID),
ProductID NUMBER PRIMARY KEY,
Manufacturer VARCHAR2(20),
Quantity NUMBER
)
Create TABLE Medicinelists
(
ReportID NUMBER references Report(ReportID),
ProductID NUMBER references Medicine(ProductID)
)
Create TABLE Caregiver
(
    CaregiverID  CHAR(9) PRIMARY KEY,
    FName VARCHAR(50),
    LName VARCHAR(50),
    Relationship VARCHAR2(50),
    PatientID CHAR(9) references Patient(PatientID)
)
Create TABLE CaregiverPhone
(
CaregiverID char(9) references Caregiver(CaregiverID),
PhNum NUMBER
)
Create TABLE PaymentBill
(
BillID NUMBER PRIMARY KEY,
Dateofbill DATE,
Amount NUMBER,
Paymentstatus VARCHAR2(50),
PatientID CHAR(9) references Patient(PatientID)
)

insert into Department
values (1, 'Cardiology')
insert into Department
values (2, 'Emergency')
insert into Department
values (3, 'Child Care')
insert into Doctor
values (265, 'Andrew', ' Iban', '30-MAR-1989', 50, 'cardiology');
insert into Doctor
values (259, 'Kaytene', ' Isabel', '5-SEP-1976', 50, 'child care');
insert into Doctor
values (789, 'Roger', ' Thai', '01-JUN-1996', 50, 'emergency');
insert into Patient
values (34, 'Kasturi', 'Rangan', '03-MAR-2001','fever');
insert into Patient
values (47, 'John', 'Rick', '18-JUL-1953','heart attack');
```

```
insert into Patient
values (4, 'Tong', 'Chil', '06-APR-1980','fracture');
insert into Report
values (123, 'Needs immediate assistance, ward 259, meftaspas', 789, 47);
insert into Report
values (124, ' ointments, cyclopam', 259, 4);
insert into Report
values (159, 'drips, blood check', 265, 34);
insert into Workson
values (265, 1);
insert into Workson
values (259, 2);
insert into Workson
values (789, 3);

insert into Staff
values (23, 'Jiaqi', 'Feng');
insert into Staff
values (24, 'Farhan', 'Misra');
insert into Staff
values (25, 'Julio', 'Lima');

INSERT INTO StaffWorksfor
VALUES (23, 1);
INSERT INTO StaffWorksfor
VALUES (24, 2);
INSERT INTO StaffWorksfor
VALUES (25, 3);

INSERT INTO Medicine
VALUES (123, 1234, 'JGAH', 999);
INSERT INTO Medicine
VALUES (124, 5678, 'RGS', 9999);
INSERT INTO Medicine
VALUES (159, 9012, 'JGAH', 99999);

INSERT INTO Medicinelists
VALUES (123, 1234);
INSERT INTO Medicinelists
VALUES (124, 5678);
INSERT INTO Medicinelists
VALUES (159, 9012);

INSERT INTO Caregiver
VALUES (59496989, 'Michael', 'Wilson', 'Father', 34);
INSERT INTO Caregiver
VALUES (71356678, 'Brian', 'Furst', 'Father', 47);
INSERT INTO Caregiver
VALUES (85851316, 'James', 'Thompson', 'Uncle', 4);
```

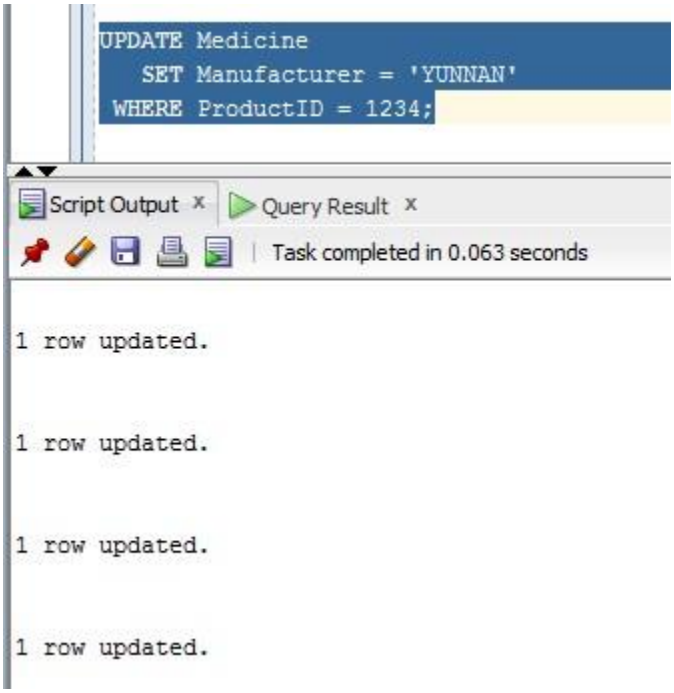
```
INSERT INTO CaregiverPhone
VALUES (59496989, 9733333333);
INSERT INTO CaregiverPhone
VALUES (71356678, 3528881719);
INSERT INTO CaregiverPhone
VALUES (85851316, 8554509015);

INSERT INTO PaymentBill
VALUES (4235705, '08-MARCH-1999', 356, 'Unpaid', 4);
INSERT INTO PaymentBill
VALUES (2435784, '28-MAY-1986', 1000, 'Unpaid', 47);
INSERT INTO PaymentBill
VALUES (9238172, '19-JULY-2008', 8900, 'Unpaid', 34);
```

QUERIES:

```
SELECT FName, LName, DOB
FROM Doctor
WHERE DOB >= '01-JAN-1984';
```



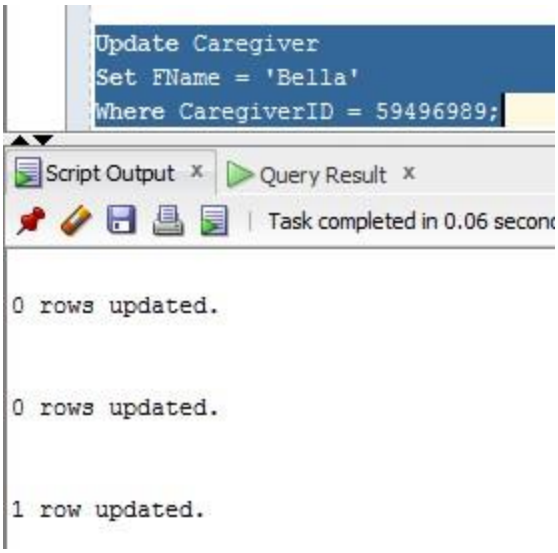

```
UPDATE Medicine
   SET Manufacturer = 'YUNNAN'
 WHERE ProductID = 5678;
```



```
SELECT COUNT(*) AS DebtHolders
FROM PaymentBill
WHERE Amount > 100;
```


```
SELECT Doctor.DoctorID, Doctor.LName, Workson.DepartmentID
FROM Doctor
INNER JOIN Workson
ON Doctor.DoctorID = Workson.DoctorID;
```


```
Update Caregiver
Set FName = 'Bella'
Where CaregiverID = 59496989;
```


Update Caregiver
Set FName = 'Bella'
Where CaregiverID = 59496989;
Script Output
Query Result
Task completed in 0.06 second
0 rows updated.
0 rows updated.
1 row updated.