

INEX 543

Hospital Database

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Purpose

- The purpose of this database is to maintain records of patients, doctors, and services provided. It will also keep track of appointments, relationships with other businesses & organizations (i.e. insurance, pharmaceutical, hospital resources), hospital staff, and other factors relating to the care of the hospital's patients.

Main Objectives & Problems Addressed

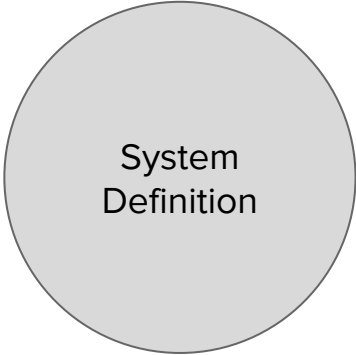
- Allow hospital staff to keep track of admitted patients.
- Help provide patients with an available doctor.
- Provide doctors with patient information.
- Maintain historical records of patients.
- Track hospital resources.

Life Cycle



Database
Planning

How we came up of
the idea; what is the
purpose?



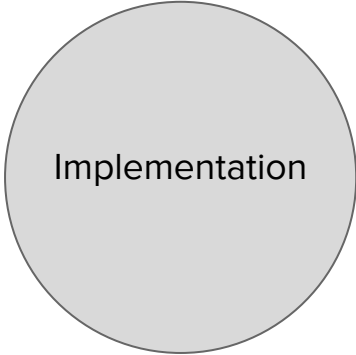
System
Definition

What is the target
user group;
application areas



Database
Design

1. Conceptual: what
entities we selected;
what are the
relationships (ERD draft)
2. Logical: what
attributes we added;
how we do
normalization (final ERD)



Implementation

DDL

Business Rules

1. Each patient record may have one or more employees.
2. Each patient record may have only one appointment.
3. Each patient record may have only one patient.
4. Each hospital resources may have zero or more patient record.
5. Each employee may have only one department.
6. Each insurance company may have zero or more patients.
7. Each pharmacy may have zero or more patients record.
8. Each patient may have zero or more appointments.
9. Each employee may have zero or more appointment.
10. Each board member may have only one department.

Design Decisions

| Entity Name | Why we included entity | How it's related |
|--------------------|---|--|
| Patients | One of the primary purposes of this database is collect and keep track of patient data in relation to the hospital. This entity helps us keep track of other entities such as doctors, nurses, resources, and other healthcare companies. | The Patient entity is the core of this database. This is the main type of information collected as the other entities depend on the patient. Since there are many-to-many relationships, we have created associative entities as well. |
| Employees | Another purpose of this database is to provide patients with available doctors and track hospital employees. This entity will help keep details of doctors name, availability and specialization. | The entity is related to patient entity as treatment of patients is one of the objectives. This entity relates to several other entities like Patients and Hospital_Resource via a one to many relationship. |
| EmployeePatients | Associative identity between Patients & Employees | Associative identity between Patients & Employees |
| Hospital_Resources | This entity keeps track of the equipment, devices, blood, medicine, and other resources used by the hospital by nurses and doctors to assist patients. | Hospital_Resource is related to nurses and doctors since they use them. Resources also relate to patients since that's why they're being used. |
| Patient_Records | Patient_Record is used to track patients, doctors, nurses, and other hospital resources used while the patient is at the hospital. | Patient_Record relates to many other entities and acts as an associative entity that relates the patient to the many hospital entities that are related with it. |

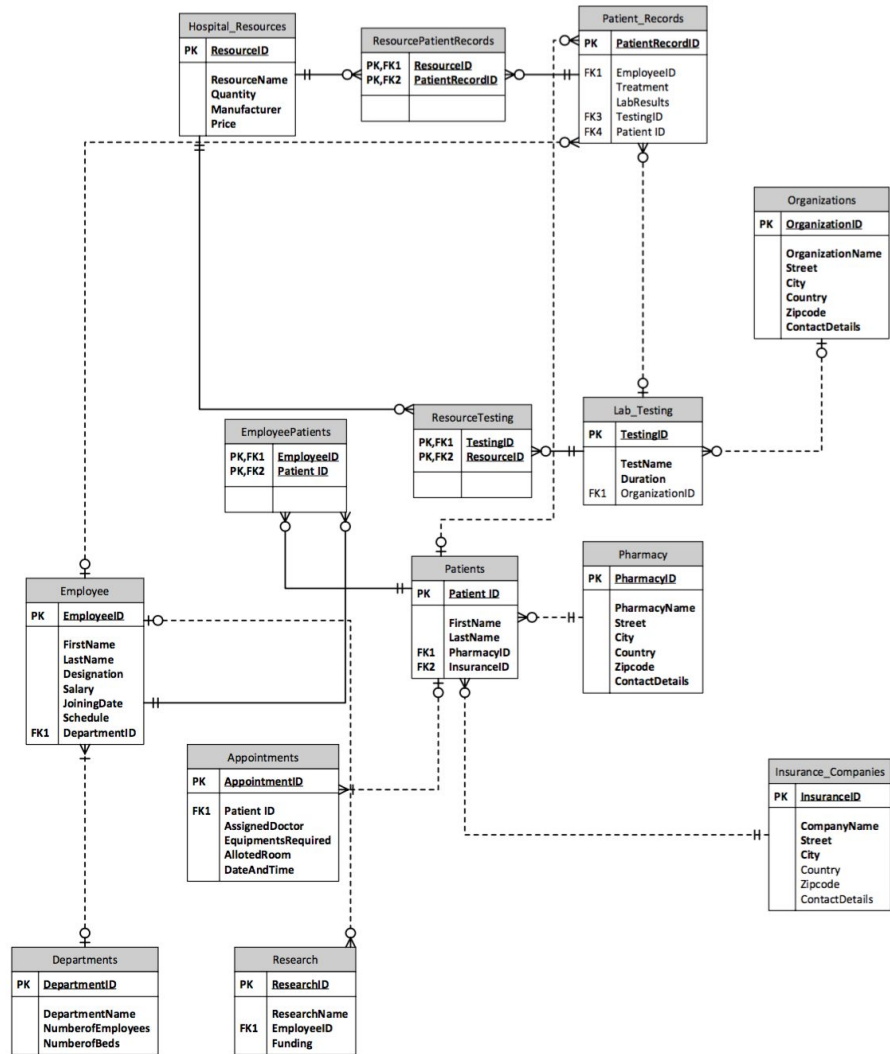
Design Decisions

| | | |
|------------------------|---|---|
| ResourcePatientRecords | Associative identity between Patient_Records & Hospital_Resources | Associative identity between Patient_Records & Hospital_Resources |
| Appointments | The Appointments entity traces the patient to the doctors, nurses, and resources back to any given time so it is easy to see how they are all related. | The Appointments records the relationship between patients, doctors, nurses, and other entities. This entity is an associative entity that helps connect other entities to one another. |
| Insurance_Companies | Every patient will need to be associated with an insurance company in order to be treated by the hospital. In order to help patients, the hospital will need to know what insurance they have. | Insurance_Companies relates to the others because it a requirement for all patients and it works with the hospital. |
| Pharmacy | Every Patients will need to be associated with a pharmacy in order to obtain medicine given to them by the hospital. Doctors, nurses, and other hospital staff need to know this to prescribe medication to the patients. | Pharmacy relates to the others because patients are assigned pharmacies when they are treated by doctors and nurses. |
| Organizations | Testing labs, NGOs, police, and others are considered outside resources for the hospital and help the hospital so it is another factor for managing the hospital. | Organizations entity is related to the treatments that are ordered by the doctors and nurses. It is also related to resources used and the patient that it is for. |

Design Decisions

| | | |
|-----------------|--|---|
| Departments | Each department of the hospital can have many different types of hospital employees so it is another part that keeps the hospital organized and running efficiently. | The Departments entity serves as a guide to where employees belong in the hospital. The patient will be assigned depending on where the employee is. |
| Lab_Testing | Lab_Testing was included because it uses other hospital entities in order to function. In turn, it affects patient_record and might affect pharmacy and hospital_resource. | Lab testing is done on some patients and it is done by nurses and doctors. The testing requires the use of other hospital resources and equipment. |
| ResourceTesting | Associative identity between Lab_Testing & Hospital_Resources | Associative identity between Lab_Testing & Hospital_Resources |
| Research | research tracks the research being done at the hospital. Different research projects have different employees from various departments working on a project that gets a certain amount of funding. | research is related to employee, and department as the projects are for various departments throughout the hospital and have different employees working on them. |

ERD



Implementation

Creating database

```
3 CREATE DATABASE Hospital_DB;  
4 GO
```

Creating tables

```
5  
6 USE Hospital_DB;  
7  
8 create table dbo.Hospital_Resources  
9     (  
10     ResourceID int not null primary key,  
11     ResourceName varchar(MAX) not null,  
12     Quantity int not null,  
13     Manufacturer varchar(MAX) not null,  
14     Price money not null,  
15     );
```

Inserting values

```
263 INSERT INTO Hospital_Resources([ResourceID],[ResourceName],[Quantity],[Manufacturer],[Price])  
264 VALUES (1,'Beds',7,'Lacus Cras Foundation',22),  
265         (2,'Testtube',2,'Lectus Pede Inc.',23),  
266         (3,'Beds',6,'Auctor Nunc Nulla Consulting',33),  
267         (4,'Beds',8,'Rutrum Magna Cras LLP',16),  
268         (5,'Chairs',8,'Nullam Lobortis Quam Company',19),  
269         (6,'Testtube',5,'Sed Turpis Nec Associates',48),  
270         (7,'Needles',9,'Diam Associates',7),  
271         (8,'Oxygen Bottles',7,'Eu Nibh Vulputate LLP',35),  
272         (9,'Oxygen Bottles',3,'Suspendisse Ac PC',30),  
273         (10,'Needles',2,'Nisl Nulla Eu Inc.',35);  
274
```

View 1

```
4 Create view Appointments_Details
5 as
6 select a.AppointmentID, p.FirstName + ' ' + p.LastName AS PatientName, a.DateAndTime
7 from Patients p inner join
8 Appointments a on a.PatientID = p.PatientID where DateAndTime > '2015-12-07'
```

| | AppointmentID | PatientName | DateAndTime |
|----|---------------|------------------|-------------------------|
| 1 | 4 | Dominique Graves | 2015-12-07 17:36:21.000 |
| 2 | 19 | Eve Estrada | 2015-12-07 06:40:28.000 |
| 3 | 29 | Upton Pennington | 2015-12-07 13:58:26.000 |
| 4 | 35 | Debra Higgins | 2015-12-07 00:40:31.000 |
| 5 | 44 | Ora Bridges | 2015-12-07 10:17:23.000 |
| 6 | 52 | Ginger Cardenas | 2015-12-07 17:55:14.000 |
| 7 | 53 | Regan Jimenez | 2015-12-07 23:15:02.000 |
| 8 | 54 | Charde Rodgers | 2015-12-07 02:38:25.000 |
| 9 | 55 | Adam Shaffer | 2015-12-07 13:09:25.000 |
| 10 | 58 | Yvonne Compton | 2015-12-07 05:32:51.000 |
| 11 | 67 | Kenneth Jimenez | 2015-12-07 00:27:08.000 |
| 12 | 75 | Griffin Burke | 2015-12-07 09:50:45.000 |
| 13 | 83 | Noah Calhoun | 2015-12-07 21:24:45.000 |
| 14 | 90 | Bruce Gamble | 2015-12-07 04:12:13.000 |
| 15 | 98 | Joel Gallagher | 2015-12-07 21:03:48.000 |

Report 1

| AppointmentID | PatientName | DateAndTime |
|---------------|------------------|--------------------|
| 4 | Dominique Graves | 2015-12-7 17:36:21 |
| 19 | Eve Estrada | 2015-12-7 06:40:28 |
| 29 | Upton Pennington | 2015-12-7 13:58:26 |
| 35 | Debra Higgins | 2015-12-7 00:40:31 |
| 44 | Ora Bridges | 2015-12-7 10:17:23 |
| 52 | Ginger Cardenas | 2015-12-7 17:55:14 |
| 53 | Regan Jimenez | 2015-12-7 23:15:02 |
| 54 | Charde Rodgers | 2015-12-7 02:38:25 |
| 55 | Adam Shaffer | 2015-12-7 13:09:25 |
| 58 | Yvonne Compton | 2015-12-7 05:32:51 |
| 67 | Kenneth Jimenez | 2015-12-7 00:27:08 |
| 75 | Griffin Burke | 2015-12-7 09:50:45 |
| 83 | Noah Calhoun | 2015-12-7 21:24:45 |
| 90 | Bruce Gamble | 2015-12-7 04:12:13 |
| 98 | Joel Gallagher | 2015-12-7 21:03:48 |

Select Appointment ID, Patient Name, and Date/Time of appointment for receptionist.

View 2

```
4 CREATE VIEW Patient_Testing AS
5 SELECT p.PatientID, p.FirstName + ' ' + p.LastName AS PatientName, e.FirstName + ' ' + e.LastName AS DoctorName,
6 l.TestName, a.LabResults
7 FROM Patients p INNER JOIN Patient_Records a ON a.PatientID = p.PatientID
8 JOIN Employee e ON e.EmployeeID = a.EmployeeID
9 JOIN Lab_Testing l ON l.TestingID = a.TestingID;
```

| | PatientID | PatientName | DoctorName | TestName | LabResults |
|----|-----------|------------------|---------------------|---------------------|------------|
| 1 | 20 | Lillian Dejesus | Yvette Mcmillan | Bilirubin Test | positive |
| 2 | 53 | Regan Jimenez | Moses Jones | EBV Antibody Test | neutral |
| 3 | 62 | Lenore Manning | Yen Morrow | EBV Antibody Test | no result |
| 4 | 93 | Keely Willis | Akeem Phillips | Ketone Test | negative |
| 5 | 38 | Isabelle Goodman | Sybill Woodward | X-Ray | no result |
| 6 | 61 | Ryan Dejesus | Cynthia House | Gastrin Test | no result |
| 7 | 96 | Riley Walls | Avram Randall | Ketone Test | neutral |
| 8 | 76 | Brooke Hurst | Portia Cote | Abdominal MRI | neutral |
| 9 | 57 | Dacey Blackburn | Gannon Buchanan | Allergy Tests | no result |
| 10 | 65 | Bradley Yates | Nevada Blair | Biopsy, Bone Marrow | negative |
| 11 | 14 | Lyle James | Cynthia House | Biopsy, Bone Marrow | no result |
| 12 | 54 | Charde Rodgers | Zoe Mayo | EBV Antibody Test | positive |
| 13 | 55 | Adam Shaffer | Jena Brooks | EBV Antibody Test | positive |
| 14 | 43 | Edan Roach | Constance Cantrell | Bilirubin Test | neutral |
| 15 | 65 | Bradley Yates | Fredericka Ray | Abdominal MRI | no result |
| 16 | 90 | Bruce Gamble | Penelope Stephenson | EBV Antibody Test | negative |
| 17 | 65 | Bradley Yates | Jameson Tanner | Gastrin Test | positive |
| 18 | 90 | Bruce Gamble | Lev Koch | X-Ray | no result |
| 19 | 13 | Kirk Espinoza | Quynn Conley | Ketone Test | no result |
| 20 | 100 | Ariel Delaney | Duncan Gentry | Antiglobulin Tests | negative |
| 21 | 34 | Vaughan Savage | Kimberly Owens | Allergy Tests | no result |
| 22 | 55 | Adam Shaffer | Colleen Tanner | Bilirubin Test | negative |
| 23 | 50 | Harlan House | Ainsley Kennedy | Antiglobulin Tests | no result |
| 24 | 53 | Regan Jimenez | Rinah Chambers | Gastrin Test | positive |
| 25 | 70 | Brent Solis | Orla Barlow | EBV Antibody Test | negative |

Report 2

| PatientID | PatientName | DoctorName | TestName | LabResults |
|-----------|------------------|--------------------|---------------------|------------|
| 20 | Lillian Dejesus | Yvette Mcmillan | Bilirubin Test | positive |
| 53 | Regan Jimenez | Moses Jones | EBV Antibody Test | neutral |
| 62 | Lenore Manning | Yen Morrow | EBV Antibody Test | no result |
| 93 | Keely Willis | Akeem Phillips | Ketone Test | negative |
| 38 | Isabelle Goodman | Sybill Woodward | X-Ray | no result |
| 61 | Ryan Dejesus | Cynthia House | Gastrin Test | no result |
| 96 | Riley Walls | Avram Randall | Ketone Test | neutral |
| 76 | Brooke Hurst | Portia Cote | Abdominal MRI | neutral |
| 57 | Dacey Blackburn | Gannon Buchanan | Allergy Tests | no result |
| 65 | Bradley Yates | Nevada Blair | Biopsy, Bone Marrow | negative |
| 14 | Lyle James | Cynthia House | Biopsy, Bone Marrow | no result |
| 54 | Charde Rodgers | Zoe Mayo | EBV Antibody Test | positive |
| 55 | Adam Shaffer | Jena Brooks | EBV Antibody Test | positive |
| 43 | Edan Roach | Constance Cantrell | Bilirubin Test | neutral |
| 65 | Bradley Yates | Fredericka Ray | Abdominal MRI | no result |

Select Patient ID, Patient Name, Doctor Name, Test Name, and Lab Results for all patients

Thank you!

Any questions?