

HOSPITAL MANAGEMENT SYSTEM DATABASE

Nichamon Han-idhikul 5610545684
Vasupol Chatmethakul 5610546788
İbrahim Dilaver 5710045314



SCOPE

- **Turkish public hospital model**
- Patients get **FREE** doctor checkups and procedures
- Doctor gives patient **CODE** in prescription
- Patients get the medicines from independent pharmacies
- Inpatients pay the cost of staying





ENTITY ATTRIBUTE KEY

List of entities

Doctor
Department
Patient
Address
Appointment
Prescription
Procedure
Procedure_Doctor
Procedure_Patient
Stay
Room

Doctor

PK

FK

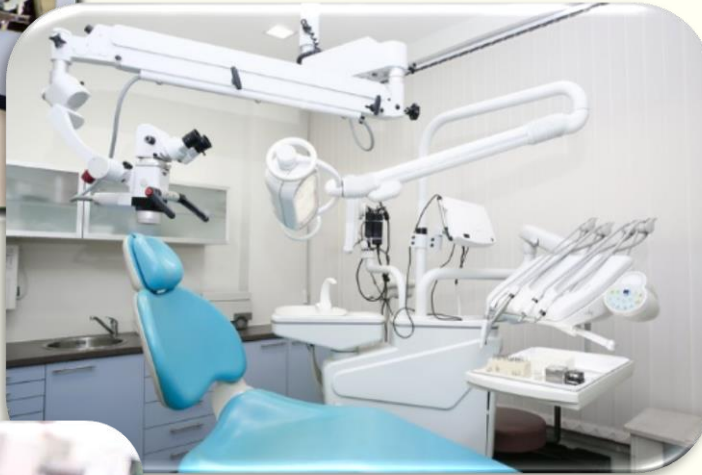
| doctor_id | firstname | lastname | department_id | salary | hiredate | email | phone_number |
|-----------|-----------|-----------|---------------|--------|------------|-------------------------|--------------|
| 1 | James | Shaw | 1 | 7500 | 2008-12-21 | jshaw@hospital.com | 454111258 |
| 2 | Ann | Humpries | 4 | 7700 | 2009-01-11 | ahumpries@hospital.com | 11258789 |
| 3 | Chris | Berkeley | 3 | 8500 | 2003-04-04 | cberkeley@hospital.com | 587871258 |
| 4 | Carla | Gomez | 2 | 6500 | 2010-12-28 | cgomez@hospital.com | 541871258 |
| 5 | Clara | Rodriguez | 1 | 7900 | 2009-01-15 | crodriguez@hospital.com | 464611258 |
| 6 | Paul | Clark | 1 | 9500 | 2006-01-18 | pclark@hospital.com | 258456321 |
| 7 | Clem | Martin | 7 | 6500 | 2012-12-21 | cmartin@hospital.com | 147856358 |
| 8 | Juan | Lopez | 18 | 7500 | 2008-01-01 | jlopez@hospital.com | 878953478 |
| 9 | Gillaume | Hostis | 1 | 7500 | 2008-12-21 | ghostis@hospital.com | 454111258 |
| 10 | Necati | Kartal | 24 | 9500 | 2006-05-11 | nkartal@hospital.com | 834561258 |
| 11 | Berk | Ozer | 24 | 7700 | 2009-03-06 | bozer@hospital.com | 753159468 |
| 12 | Kaan | Temur | 24 | 8250 | 2008-06-25 | ktemur@hospital.com | 874369512 |
| 13 | Ece | Metin | 24 | 5500 | 2013-07-14 | emetin@hospital.com | 753214789 |
| 14 | Tuba | Naz | 24 | 6500 | 2007-02-21 | tnaz@hospital.com | 789451258 |
| 15 | Tomas | Durcak | 27 | 8100 | 2008-08-21 | tdurcak@hospital.com | 454111258 |
| 16 | Franck | Oak | 27 | 7650 | 2009-12-21 | foak@hospital.com | 454111258 |
| 17 | Aaron | Hart | 27 | 9200 | 2007-03-29 | ahart@hospital.com | 454111258 |
| 18 | Joe | Wilson | 27 | 5200 | 2010-12-21 | jwilson@hospital.com | 454111258 |
| 19 | Paul | Chris | 27 | 8500 | 2008-01-02 | pchris@hospital.com | 454111258 |



Department

PK

| dept_id | dept_name |
|---------|--|
| 1 | Quality Pregnancy Center |
| 2 | Wellness Center |
| 3 | Heart Center |
| 4 | Fertility Center |
| 5 | Mental Health Clinic |
| 6 | Comprehensive Neurology Center |
| 7 | Gynecologic Cancer Treatment Center |
| 8 | Gastrointestinal System and Liver Clinic |
| 9 | Gynecologic Laparoscopic Surgery Center |
| 10 | Urinary Tract Center |
| 11 | Breast Cancer Center |
| 12 | Diagnostic Digital Imaging Center |
| 13 | Skin and Cosmetic Surgery Center |
| 14 | Respiratory Center |
| 15 | Diabetes Center |
| 16 | Minimally Invasive Surgery Center |
| 17 | Dental Center |
| 18 | Children & Teen Center |
| 19 | Orthopaedic Center |
| 20 | Operations Department |
| 21 | Laboratory Department |
| 22 | Nutrition Department |
| 23 | Hemodialysis Department |
| 24 | Emergency Department |
| 25 | Physical Therapy Department |



Patient



PK

| patient_firstname | patient_lastname | SSN | phone | date_of_birth | gender | address_id |
|-------------------|------------------|-----------|--------|---------------|--------|------------|
| Kim | Hong | 10201405 | 10101 | 1961-05-22 | M | 18 |
| Maria | Rey | 64578615 | 222222 | 1959-04-11 | F | 8 |
| Marta | Pal | 65102545 | 11441 | 1956-06-18 | F | 16 |
| Derrick | Lunde | 75001465 | 1453 | 1949-08-18 | M | 17 |
| Sergei | Papinski | 87511115 | 444555 | 1964-06-21 | M | 12 |
| Julia | Kindsey | 147890253 | 58754 | 1944-12-01 | F | 21 |
| Emily | Lopes | 147896325 | 45445 | 1971-12-12 | F | 3 |
| Jennifer | Caroll | 187400315 | 11111 | 1959-03-11 | F | 14 |
| Jorge | Costa | 196320175 | 2 | 1953-02-17 | M | 13 |
| Carlos | Manu | 230140785 | 15478 | 1984-01-05 | M | 5 |
| Luke | Wintekar | 232145245 | 1111 | 1951-12-12 | M | 11 |
| Manuel | Sanchez | 254789635 | 11111 | 1955-02-04 | M | 7 |
| Enrique | Gonzales | 255478963 | 44455 | 1990-01-15 | M | 4 |
| May | Kendricjk | 302358745 | 1044 | 1981-04-29 | F | 20 |
| Laura | Gome | 365410255 | 11111 | 1969-04-04 | F | 9 |
| Antonio | Navas | 475240145 | 10101 | 1960-01-04 | M | 6 |
| Hakeem | Lennon | 530009875 | 14441 | 1949-01-25 | M | 22 |
| Fede | Gustavo | 547863215 | 11111 | 1968-06-04 | F | 10 |
| Julie | Hart | 575315801 | 455545 | 1991-04-21 | F | 2 |
| Rita | Acosta | 617861075 | 4444 | 1994-01-22 | F | 1 |
| Rita | Acosta | 617861475 | 0 | 1994-01-22 | F | 4 |
| Holly | Brown | 654720055 | 41055 | 1946-05-12 | F | 15 |
| Jenny | Hannah | 963535355 | 33333 | 1970-01-07 | F | 19 |

Address



PK

| addr_id | house_number | building | street | city | state | postal_code | country |
|---------|--------------|-----------------------------------|-------------------|-----------------|----------------|-------------|----------|
| 1 | 28 | Ergo Plaza | Kelvin | Dallas | Texas | 76111 | USA |
| 2 | 2 | Texas Free Ranch | Horners | Washington D.C. | Maryland | 10002 | USA |
| 3 | 71 | Grand Mariott | The Strip | Los Angeles | California | 90001 | USA |
| 4 | 16 | 4th Park Avenue | The Little Cherry | Hollywood | California | 90001 | USA |
| 5 | 42 | Paramount Pictures 3 | Hollywood Blvd. | Hollywood | California | 90007 | USA |
| 6 | 22 | Beacon Hill | 21 Jump Street | Beacon | Boston | 80003 | USA |
| 7 | 19 | Frankling Streak | 22 Jump Street | Compton | California | 90013 | USA |
| 8 | 18 | Swissotel Istanbul | Eminonu Fatih | Istanbul | Istanbul | 34210 | Turkey |
| 9 | 17 | | StreetExp | Pattaya | Bang Khen | 10700 | Thailand |
| 10 | 12 | Minato-ku | Akasaka 1-chome | Tokyo | Tokyo | 1110020 | Japan |
| 11 | 11 | BuildingExp | BangKrauiSaiNoy | BangBuaThong | Nonthaburi | 11110 | Thailand |
| 12 | 50 | 6th computer engineering building | Ngamwongwan | Bangkhen | Bangkok | 10900 | Thailand |
| 13 | 8 | Cristina Building | Ottawa Street | Lansing | Michigan | 48908 | USA |
| 14 | 86 | BanIngRak | LiabKlongPrapa | Bangsue | Bangkok | 10400 | Thailand |
| 15 | 12 | Kanda | Yokouchi | Aomori | Aomori | 300132 | Japan |
| 16 | 1627 | LakSong Chicken Rice | Petchkasem | Bangkae | Bangkok | 10160 | Thailand |
| 17 | 171 | Lumpini Place pahon-saphankhwai | Pradipat | Phayathai | Bangkok | 10400 | Thailand |
| 18 | 37 | Cristina Building | Ottawa Street | Lansing | Michigan | 48908 | USA |
| 19 | 36 | Cristina Building | Ottawa Street | Lansing | Michigan | 48908 | USA |
| 20 | 32 | Greenday Apartment | Highway 17 | Murrells Inlet | South Carolina | 29576 | USA |
| 21 | 6 | City Complex | Cheltingham | Schenectady | New York | 12308 | USA |
| 22 | 13 | | Napa Arvenue | Lebanon | Oregon | 97355 | USA |
| 23 | 87 | Smart Condominium | Tri-state Avenue | Chula Vista | California | 91910 | USA |
| 24 | 80 | Life | Reading Drive | Burlingame | California | 94010 | USA |
| 25 | 50 | Smart Condominium | Tri-state Avenue | Chula Vista | California | 91910 | USA |

Appointment

| PK app_id | FK1 patient_id | FK2 doctor_id | date |
|---------------------|--------------------------|-------------------------|---------------------|
| 1 | 617861075 | 1 | 2015-05-01 13:00:00 |
| 2 | 575315801 | 2 | 2015-05-01 13:15:00 |
| 3 | 147896325 | 4 | 2015-05-01 13:15:00 |
| 4 | 255478963 | 12 | 2015-05-01 14:15:00 |
| 5 | 617861475 | 7 | 2015-05-01 15:15:00 |
| 6 | 230140785 | 3 | 2015-05-01 16:15:00 |
| 7 | 475240145 | 5 | 2015-05-02 08:15:00 |
| 8 | 254789635 | 8 | 2015-05-01 10:15:00 |
| 9 | 64578615 | 9 | 2015-05-02 13:15:00 |
| 10 | 365410255 | 10 | 2015-05-02 14:15:00 |
| 11 | 232145245 | 11 | 2015-05-02 09:30:00 |



Prescription



| | PK | FK1 | FK2 | | |
|----|---------|------------|-----------|----------------|----------|
| | pres_id | patient_id | doctor_id | admission_date | code |
| 1 | | 530009875 | 5 | 2015-04-28 | S5AWQ598 |
| 2 | | 530009875 | 5 | 2015-04-28 | 5A7QRF8O |
| 3 | | 147890253 | 7 | 2015-04-28 | ON520A7U |
| 4 | | 302358745 | 8 | 2015-04-28 | 69ZAKM54 |
| 5 | | 963535355 | 12 | 2015-04-28 | 78UZGK24 |
| 6 | | 10201405 | 7 | 2015-04-28 | 65AS4DSZ |
| 7 | | 75001465 | 15 | 2015-04-28 | 7820ZTHB |
| 8 | | 75001465 | 11 | 2015-04-28 | P7K5H6N5 |
| 9 | | 654720055 | 9 | 2015-04-28 | 6AQ5E2DA |
| 10 | | 187400315 | 12 | 2015-04-28 | 20OP51HG |
| 11 | | 196320175 | 8 | 2015-04-28 | 4A4T5T6Z |
| 12 | | 87511115 | 6 | 2015-04-28 | UB5A4F5A |
| 13 | | 87511115 | 15 | 2015-04-28 | 1Z2Z3U5I |
| 14 | | 232145245 | 12 | 2015-04-28 | V5H4H7U8 |
| 15 | | 232145245 | 10 | 2015-04-28 | UZH545AZ |
| 16 | | 547863215 | 9 | 2015-04-28 | 21G5GA75 |
| 17 | | 547863215 | 11 | 2015-04-28 | 1T2Z2U3I |
| 18 | | 64578615 | 8 | 2015-04-28 | K5J4H6G1 |

Procedure



PK

| procedure_id | procedure_name |
|--------------|---|
| 1 | Body check up |
| 2 | Blood transfusion |
| 3 | Prophylactic vaccinations and inoculations |
| 4 | Respiratory intubation and mechanical ventila |
| 5 | Cesarean section |
| 6 | Upper gastrointestinal endoscopy, biopsy |
| 7 | Circumcision |
| 8 | Hemodialysis |
| 9 | Fetal monitoring |
| 10 | Artificial rupture of membranes |
| 11 | Echocardiogram |
| 12 | Arthroplasty knee |
| 13 | Spinal fusion |
| 14 | Colonoscopy and biopsy |
| 15 | Laminectomy, excision intervertebral disc |

Procedure_Doctor

PK1
FK1

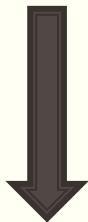
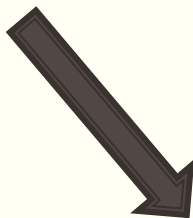
| doctor_id | procedure_id |
|-----------|--------------|
| 1 | 1 |
| 2 | 1 |
| 2 | 4 |
| 2 | 8 |
| 2 | 11 |
| 3 | 4 |
| 3 | 6 |
| 4 | 9 |
| 4 | 11 |

PK2
FK2



Procedure_Patient

| PK1 FK1 | | | PK2 FK2 |
|------------|------------|--------------|------------|
| | patient_id | procedure_id | date |
| | 10201405 | 4 | 2015-04-21 |
| | 64578615 | 4 | 2015-04-20 |
| | 65102545 | 7 | 2015-04-23 |
| | 75001465 | 6 | 2015-04-22 |
| | 87511115 | 6 | 2015-04-20 |
| | 87511115 | 11 | 2015-04-21 |
| | 147890253 | 9 | 2015-04-25 |
| | 147896325 | 8 | 2015-04-25 |
| | 196320175 | 4 | 2015-04-25 |
| | 230140785 | 5 | 2015-04-25 |
| | 232145245 | 6 | 2015-04-25 |
| | 254789635 | 8 | 2015-03-29 |
| | 302358745 | 6 | 2015-04-21 |



Stay



| PK | FK1 | FK2 | | | |
|-----------|------------|------------|------------|------------|-----------|
| stay_id | patient_id | room_id | start_date | end_date | stay_cost |
| 1 | 64578615 | 101 | 2015-04-25 | 2015-04-26 | 200 |
| 2 | 365410255 | 102 | 2015-04-25 | 2015-04-26 | 200 |
| 3 | 547863215 | 103 | 2015-04-25 | 2015-04-26 | 200 |
| 4 | 232145245 | 104 | 2015-04-25 | 2015-04-26 | 200 |
| 5 | 87511115 | 105 | 2015-04-25 | 2015-04-27 | 200 |
| 6 | 196320175 | 303 | 2015-04-25 | 2015-04-27 | 100 |
| 7 | 187400315 | 207 | 2015-04-25 | 2015-04-27 | 100 |
| 8 | 654720055 | 211 | 2015-04-25 | 2015-04-27 | 500 |
| 9 | 255478963 | 410 | 2015-04-25 | 2015-04-27 | 500 |

Room

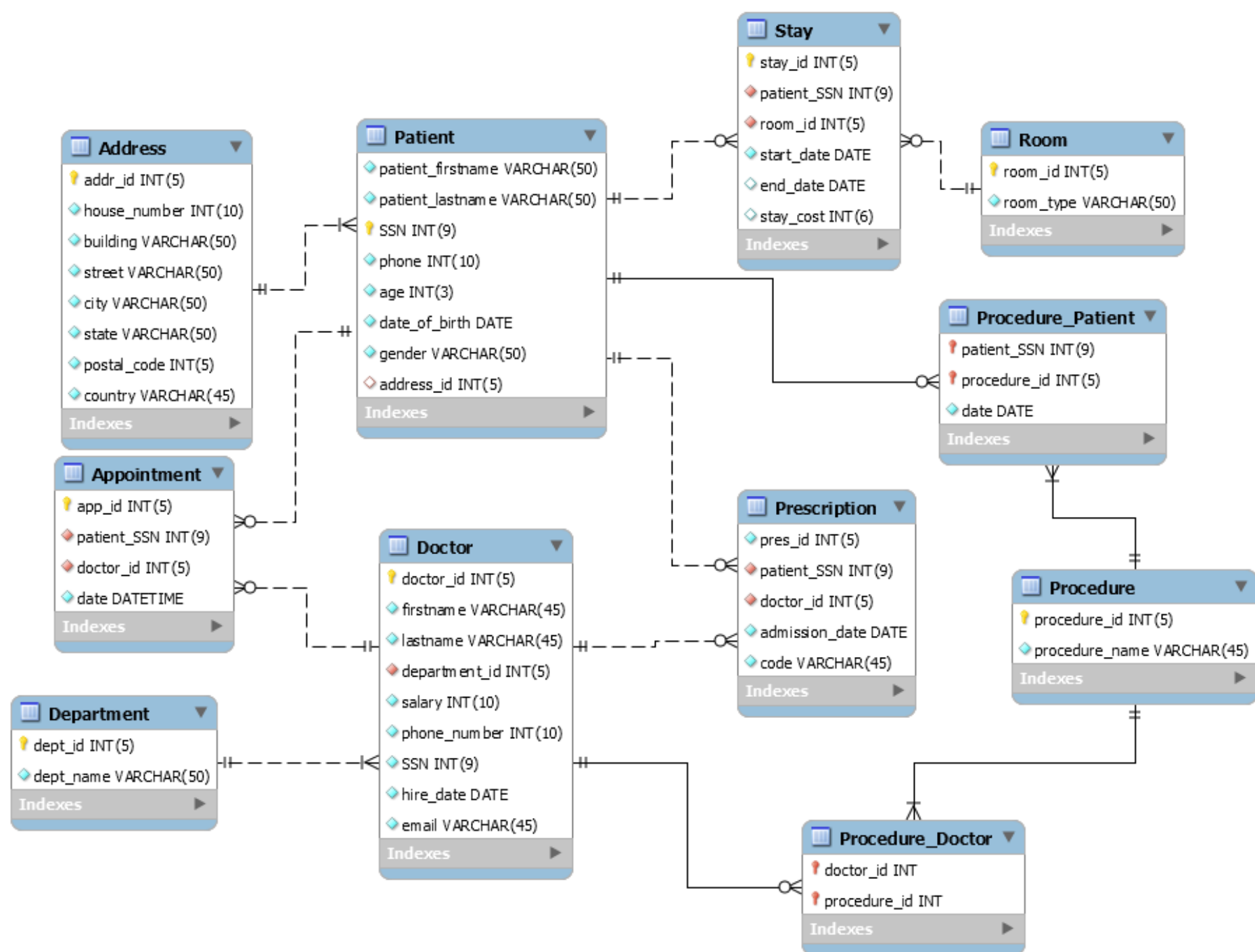
PK

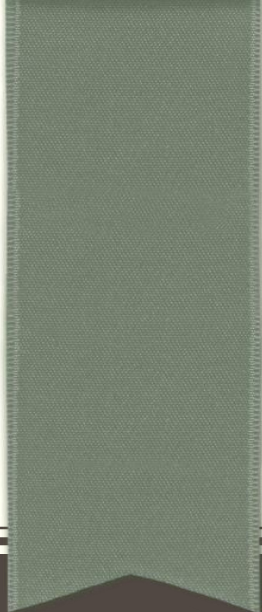
| room_id | room_type |
|---------|-----------|
| 101 | Single |
| 102 | Single |
| 103 | Single |
| 104 | Single |
| 105 | Single |
| 106 | Single |
| 107 | Single |
| 108 | Single |
| 109 | Single |
| 110 | VIP |
| 111 | VIP |
| 201 | Double |
| 202 | Double |





ER DIAGRAM



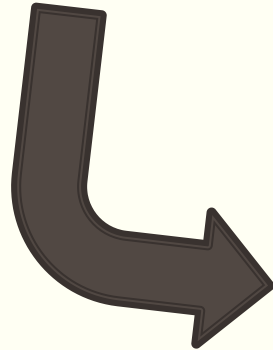


NORMALIZATION

FIRST NORMALIZATION (1NF)

Doctor_works-on_Procedure (un-normalized)

| procedure_id | procedure_name | doctor_id |
|--------------|--|-------------|
| 1 | Body check up | 1, 2 |
| 6 | Upper gastrointestinal endoscopy, biopsy | 3 |
| 11 | Echocardiogram | 2, 4 |



Doctor_works-on_Procedure (normalized)

| procedure_id | procedure_name | doctor_id |
|--------------|--|-----------|
| 1 | Body check up | 1 |
| 1 | Body check up | 2 |
| 6 | Upper gastrointestinal endoscopy, biopsy | 3 |
| 11 | Echocardiogram | 2 |
| 11 | Echocardiogram | 4 |

SECOND NORMALIZATION (2NF)

Doctor_works-on_Procedure (normalized)

| procedure_id | procedure_name | doctor_id |
|--------------|--|-----------|
| 1 | Body check up | 1 |
| 1 | Body check up | 2 |
| 6 | Upper gastrointestinal endoscopy, biopsy | 3 |
| 11 | Echocardiogram | 2 |
| 11 | Echocardiogram | 4 |



Procedure

| procedure_id | procedure_name |
|--------------|--|
| 1 | Body check up |
| 6 | Upper gastrointestinal endoscopy, biopsy |
| 11 | Echocardiogram |



Procedure_Doctor

| procedure_id | doctor_id |
|--------------|-----------|
| 1 | 1 |
| 1 | 2 |
| 6 | 3 |
| 11 | 2 |
| 11 | 4 |

QUERY EXAMPLE 1

- Display patient number, name(first and last),doctor name(first and last) from appointments which are completed on 1st of May,2015.

```
SELECT      Appointment.patient_id, Patient.patient_firstname,  
            Patient.patient_lastname, Doctor.firstname, Doctor.lastname  
FROM        ( Appointment INNER JOIN Patient ON Appointment.patient_id=Patient.SSN )  
INNER JOIN  Doctor ON Appointment.doctor_id = Doctor.doctor_id  
WHERE       Appointment.date LIKE '%2015-05-01%';
```

| patient_id | patient_firstname | patient_lastname | firstname | lastname |
|------------|-------------------|------------------|-----------|----------|
| 617861075 | Rita | Acosta | James | Shaw |
| 575315801 | Julie | Hart | Ann | Humpries |
| 147896325 | Emily | Lopes | Carla | Gomez |
| 255478963 | Enrique | Gonzales | Kaan | Temur |
| 617861475 | Rita | Acosta | Clem | Martin |
| 230140785 | Carlos | Manu | Chris | Berkeley |
| 254789635 | Manuel | Sanchez | Juan | Lopez |

QUERY EXAMPLE 2

- Display information of name, social security number of patients who are female and stay cost equals to 200.

```
SELECT      patient_firstname, patient_lastname, SSN
FROM        `Patient`
WHERE       gender="F" AND EXISTS (
SELECT *
FROM `Stay`
WHERE stay_cost = 200 AND Patient.SSN = Stay.patient_id )
```

| patient_firstname | patient_lastname | SSN |
|-------------------|------------------|-----------|
| Maria | Rey | 64578615 |
| Laura | Gome | 365410255 |
| Fede | Gustavo | 547863215 |

QUERY EXAMPLE 3

- Display doctors who have done Echocardiogram(id=11) all information.

```
SELECT * FROM `Doctor`
```

```
WHERE doctor_id IN( SELECT doctor_id FROM Procedure_Doctor  
WHERE procedure_id=11);
```

| doctor_id | firstname | lastname | department_id | salary | hiredate | email | phone_number |
|-----------|-----------|----------|---------------|--------|------------|------------------------|--------------|
| 2 | Ann | Humpries | 4 | 7700 | 2009-01-11 | ahumpries@hospital.com | 11258789 |
| 4 | Carla | Gomez | 2 | 6500 | 2010-12-28 | cgomez@hospital.com | 541871258 |



CONCLUSION



QUESTION ???