Project Idea: Hospital Management System (HMS)

Group Members:

Süleyman Berber - 31293

Hüseyin Doğan Türk - 31288

Emre Ozan Oral - 30797

Emre Tuygan – 30547

Project Description:

Our project focuses on the development of a comprehensive Hospital Management System (HMS) database, aimed to facilitate the administrative workflows within healthcare facilities. With a holistic approach, the HMS database covers a wide array of functionalities essential for efficient hospital operations.

At its core, the system facilitates the management of various stakeholders, including employees and patients. Detailed records of employees, ranging from doctors to nurses, are stored within the database, allowing for easy access to crucial information such as contact details and roles. Similarly, patient data, including demographic information, medical history, and contact details, is meticulously recorded to ensure accurate diagnosis and treatment planning.

Departments within the hospital are effectively organized and managed using the system, streamlining the allocation of resources and personnel. Furthermore, the database offers robust room management capabilities, enabling administrators to optimize room allocation and scheduling based on patient needs and resource availability. One of the key features of the HMS database is its ability to facilitate surgery and appointment scheduling. By automating these processes, healthcare providers can efficiently manage their schedules, minimize patient wait times, and optimize resource utilization.

Overall, our HMS database serves as a centralized platform for hospitals to streamline administrative processes, improve operational efficiency, and deliver superior patient care. By leveraging cutting-edge technologies and best practices in database management, our system empowers healthcare professionals to focus on what truly matters.

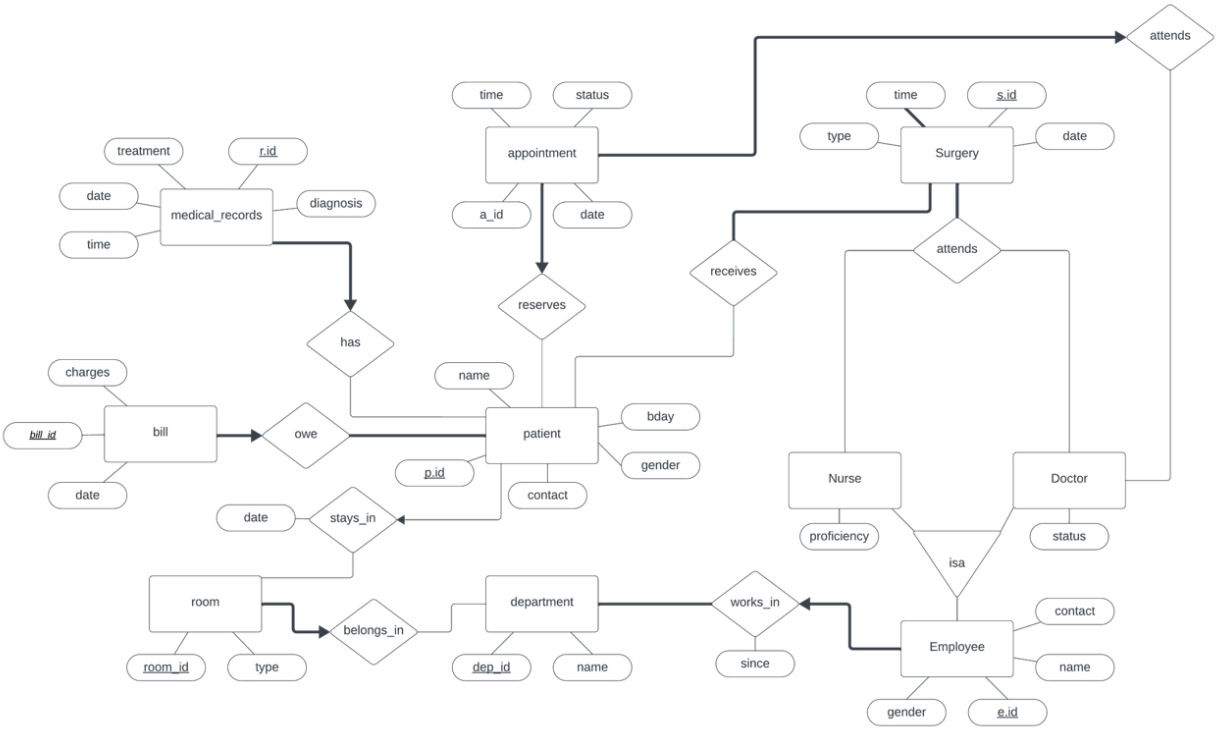
Entities(10):

- Employee
- Nurse
- Doctor
- Patient
- Surgery
- Appointment
- Medical_Records
- Bill
- Room
- Department

Relationships(12):

- Employee-Nurse (ISA)
- Employee-Doctor (ISA)
- Nurse-Surgery (M:M) (attends)
- Doctor-Surgery (M:M) (attends)
- Patient-Surgery (M:M) (receives)
- Patient-Appointment (1:M) (reserves)
- Doctor-Appointment (1:M)(attends)
- Patient-Medical_Records(1:M) (has)
- Patient-Bill (1:M) (owe)
- Patient-Room (M:1) (stays_in)
- Room-Department (M:1) (belongs_in)
- Department-Employee (1:M) (works_in)

ER Model:



Relational Model:

```
CREATE TABLE Employees(
    e_id INT,
    gender varchar(1),
    emp_name varchar(50),
    contact varchar(50),
    primary key (e_id)
);

INSERT INTO Employees VALUES (1, 'F', 'Nurse 1', '5551111111');
INSERT INTO Employees VALUES (2, 'M', 'Nurse 2', '5552222222');
INSERT INTO Employees VALUES (3, 'F', 'Nurse 3', '5553333333');
INSERT INTO Employees VALUES (4, 'M', 'Nurse 4', '5554444444');
INSERT INTO Employees VALUES (5, 'F', 'Nurse 5', '5555555555');
```

```
INSERT INTO Employees VALUES (6, 'M', 'Nurse 6', '5556666666');
INSERT INTO Employees VALUES (7, 'F', 'Nurse 7', '5557777777');
INSERT INTO Employees VALUES (8, 'M', 'Nurse 8', '5558888888');
INSERT INTO Employees VALUES (9, 'F', 'Nurse 9', '5559999999');
INSERT INTO Employees VALUES (10, 'M', 'Nurse 10', '5551010101');
INSERT INTO Employees VALUES (11, 'M', 'Doctor 1', '5551111112');
INSERT INTO Employees VALUES (12, 'F', 'Doctor 2', '5552222223');
INSERT INTO Employees VALUES (13, 'M', 'Doctor 3', '5553333334');
INSERT INTO Employees VALUES (14, 'F', 'Doctor 4', '5554444445');
INSERT INTO Employees VALUES (15, 'M', 'Doctor 5 (Surgeon)', '5555555556');
INSERT INTO Employees VALUES (16, 'F', 'Doctor 6 (Surgeon)', '5556666667');
INSERT INTO Employees VALUES (17, 'M', 'Doctor 7', '5557777778');
INSERT INTO Employees VALUES (18, 'F', 'Doctor 8', '5558888889');
INSERT INTO Employees VALUES (19, 'M', 'Doctor 9', '5559999990');
INSERT INTO Employees VALUES (20, 'F', 'Doctor 10', '5551010102');
INSERT INTO Employees VALUES (21, 'F', 'Doctor 11', '5551111113');
INSERT INTO Employees VALUES (22, 'M', 'Doctor 12', '5551212123');
INSERT INTO Employees VALUES (23, 'F', 'Doctor 13', '5551313134');
INSERT INTO Employees VALUES (24, 'M', 'Doctor 14', '5551414145');
INSERT INTO Employees VALUES (25, 'F', 'Doctor 15', '5551515156');


-- Inserting 10 nurse records
CREATE TABLE Nurse(
    e_id INT,
    proficiency varchar(50),
    primary key (e_id),
    Foreign Key (e_id) References Employees(e_id) ON DELETE CASCADE
);

INSERT INTO Nurse VALUES (1, 'Advanced');
INSERT INTO Nurse VALUES (2, 'Intermediate');
```

```
INSERT INTO Nurse VALUES (3, 'Beginner');
INSERT INTO Nurse VALUES (4, 'Advanced');
INSERT INTO Nurse VALUES (5, 'Intermediate');
INSERT INTO Nurse VALUES (6, 'Surgical');
INSERT INTO Nurse VALUES (7, 'Surgical');
INSERT INTO Nurse VALUES (8, 'Surgical');
INSERT INTO Nurse VALUES (9, 'Surgical');
INSERT INTO Nurse VALUES (10, 'Surgical');


-- Inserting 10 doctor records, 5 of them being surgeons
CREATE TABLE Doctor(
    e_id INT,
    d_surgeon bool,
    d_status varchar(50),
    primary key (e_id),
    Foreign Key (e_id) References Employees(e_id) ON DELETE CASCADE
);
INSERT INTO Doctor VALUES (11, True, 'General Physician');
INSERT INTO Doctor VALUES (12, True, 'Pediatrician');
INSERT INTO Doctor VALUES (13, False, 'Cardiologist');
INSERT INTO Doctor VALUES (14, False, 'Neurologist');
INSERT INTO Doctor VALUES (15, True, 'Orthopedic Surgeon');
INSERT INTO Doctor VALUES (16, False, 'Dermatologist');
INSERT INTO Doctor VALUES (17, True, 'Ophthalmologist');
INSERT INTO Doctor VALUES (18, False, 'Psychiatrist');
INSERT INTO Doctor VALUES (19, True, 'Gynecologist');
INSERT INTO Doctor VALUES (20, False, 'Urologist');
INSERT INTO Doctor VALUES (21, True, 'Endocrinologist');
INSERT INTO Doctor VALUES (22, False, 'Pulmonologist');
INSERT INTO Doctor VALUES (23, False, 'Rheumatologist');
INSERT INTO Doctor VALUES (24, True, 'Otolaryngologist');
```

```
INSERT INTO Doctor VALUES (25, False, 'Anesthesiologist');


-- Inserting 10 Departments
CREATE TABLE Departments(
    dep_id INT,
    dep_name varchar(50) UNIQUE,
    primary key (dep_id)
);
INSERT INTO Departments VALUES (1, 'Cardiology');
INSERT INTO Departments VALUES (2, 'Neurology');
INSERT INTO Departments VALUES (3, 'Orthopedics');
INSERT INTO Departments VALUES (4, 'Pediatrics');
INSERT INTO Departments VALUES (5, 'Gynecology');
INSERT INTO Departments VALUES (6, 'Dermatology');
INSERT INTO Departments VALUES (7, 'Ophthalmology');
INSERT INTO Departments VALUES (8, 'Psychiatry');
INSERT INTO Departments VALUES (9, 'Urology');
INSERT INTO Departments VALUES (10, 'Endocrinology');

-- Inserting 10 Rooms
CREATE TABLE Rooms(
    room_id INT,
    dep_id INT,
    room_type varchar (50),
    primary key (room_id),
     Foreign Key (dep_id) References Departments(dep_id) ON DELETE CASCADE
);
INSERT INTO Rooms VALUES (1, 1, 'Operating Room');
INSERT INTO Rooms VALUES (2, 2,'ICU');
INSERT INTO Rooms VALUES (3, 3,'Emergency Room');
INSERT INTO Rooms VALUES (4, 4,'Labor Room');
```

```
INSERT INTO Rooms VALUES (5, 5,'Patient Room 1');
INSERT INTO Rooms VALUES (6, 6,'Patient Room 2');
INSERT INTO Rooms VALUES (7, 7,'Patient Room 3');
INSERT INTO Rooms VALUES (8, 8,'Patient Room 4');
INSERT INTO Rooms VALUES (9, 9,'Patient Room 5');
INSERT INTO Rooms VALUES (10, 10,'Patient Room 6');

-- Inserting 10 Patients
CREATE TABLE Patients(
    p_id INT,
    gender varchar(1),
    p_name varchar(50),
    contact varchar(50),
    bday DATE,
    primary key (p_id)
);
INSERT INTO Patients VALUES (11, 'M', 'David Johnson', '5551111111', '1989-05-12');
INSERT INTO Patients VALUES (12, 'F', 'Sophie Brown', '5552222222', '1996-08-21');
INSERT INTO Patients VALUES (13, 'M', 'James Smith', '5553333333', '1979-02-03');
INSERT INTO Patients VALUES (14, 'F', 'Chloe Davis', '5554444444', '1972-11-15');
INSERT INTO Patients VALUES (15, 'M', 'Benjamin Wilson', '5555555555', '1960-07-29');
INSERT INTO Patients VALUES (16, 'F', 'Isabella Martinez', '5556666666', '1986-04-07');
INSERT INTO Patients VALUES (17, 'M', 'Alexander Anderson', '5557777777', '1995-12-
18');
INSERT INTO Patients VALUES (18, 'F', 'Mia Taylor', '5558888888', '1967-09-09');
INSERT INTO Patients VALUES (19, 'M', 'Ethan Thomas', '5559999999', '1977-03-24');
INSERT INTO Patients VALUES (20, 'F', 'Amelia Johnson', '5551010101', '1993-10-05');


-- Inserting 10 Surgery records
CREATE TABLE Surgery(
    s_id INT,
```

```
    s_date DATE,
    s_time TIME,
    s_type varchar(50),
    p_id INT NOT NULL,
    primary key (s_id),
    Foreign Key (p_id) References Patients(p_id) ON DELETE CASCADE
);
INSERT INTO Surgery VALUES (4, '2024-03-05', '09:00:00', 'Knee Replacement', 16);
INSERT INTO Surgery VALUES (5, '2024-03-06', '11:30:00', 'Laparoscopic
Cholecystectomy', 17);
INSERT INTO Surgery VALUES (6, '2024-03-07', '13:45:00', 'Coronary Angioplasty', 18);
INSERT INTO Surgery VALUES (7, '2024-03-08', '15:20:00', 'Lumbar Discectomy', 19);
INSERT INTO Surgery VALUES (1, '2024-03-09', '09:00:00', 'Knee Replacement', 11);
INSERT INTO Surgery VALUES (2, '2024-03-10', '11:30:00', 'Laparoscopic
Cholecystectomy', 14);
INSERT INTO Surgery VALUES (3, '2024-03-07', '13:45:00', 'Coronary Angioplasty', 12);
INSERT INTO Surgery VALUES (8, '2024-04-08', '15:20:00', 'Lumbar Discectomy', 13);
INSERT INTO Surgery VALUES (9, '2024-04-07', '13:45:00', 'Coronary Angioplasty', 20);
INSERT INTO Surgery VALUES (10, '2024-04-08', '15:20:00', 'Lumbar Discectomy', 19);



-- Inserting Health Personal to scheduled surgeries
Create table attend_surgery(
    s_id INT,
    primary_doctor INT NOT NULL,
    primary_nurse INT,
    primary key (s_id),
    Foreign Key (s_id) References Surgery(s_id) ON DELETE CASCADE,
    Foreign Key (primary_doctor) References Doctor(e_id) ON DELETE CASCADE,
    Foreign Key (primary_nurse) References Nurse(e_id) ON DELETE CASCADE
);
INSERT INTO attend_surgery VALUES (1, 16, 6);
```

```
INSERT INTO attend_surgery VALUES (2, 17, 7);
INSERT INTO attend_surgery VALUES (3, 18, 8);
INSERT INTO attend_surgery VALUES (4, 19, 6);
INSERT INTO attend_surgery VALUES (5, 20, 7);
INSERT INTO attend_surgery VALUES (6, 21, 8);
INSERT INTO attend_surgery VALUES (7, 22, 9);
INSERT INTO attend_surgery VALUES (8, 23, 7);
INSERT INTO attend_surgery VALUES (9, 24, 8);
INSERT INTO attend_surgery VALUES (10, 16, 9);


-- Inserting 10 works_in_Dep records
Create table works_in_Dep(
    e_id int NOT NULL,
    dep_id int NOT NULL,
    since DATE,
    primary key(e_id, dep_id),
    Foreign Key (dep_id) References Departments(dep_id) ON DELETE CASCADE,
    Foreign Key (e_id) References Employees(e_id) ON DELETE CASCADE
);
INSERT INTO works_in_Dep VALUES (1, 1, '2024-01-01');
INSERT INTO works_in_Dep VALUES (2, 2, '2024-01-01');
INSERT INTO works_in_Dep VALUES (3, 3, '2024-01-01');
INSERT INTO works_in_Dep VALUES (4, 4, '2024-01-01');
INSERT INTO works_in_Dep VALUES (5, 5, '2024-01-01');
INSERT INTO works_in_Dep VALUES (6, 6, '2024-01-01');
INSERT INTO works_in_Dep VALUES (7, 7, '2024-01-01');
INSERT INTO works_in_Dep VALUES (8, 8, '2024-01-01');
INSERT INTO works_in_Dep VALUES (9, 9, '2024-01-01');
INSERT INTO works_in_Dep VALUES (10, 10, '2024-01-01');
```

```
-- Inserting 10 in_Dep records
Create table belongs_in_Dep(
    room_id INT,
    dep_id INT NOT NULL,
    primary key (room_id, dep_id),
    Foreign Key (room_id) References Rooms(room_id) ON DELETE CASCADE,
    Foreign Key (dep_id) References Departments(dep_id) ON DELETE CASCADE
);
INSERT INTO belongs_in_Dep VALUES (1, 1);
INSERT INTO belongs_in_Dep VALUES (2, 2);
INSERT INTO belongs_in_Dep VALUES (3, 3);
INSERT INTO belongs_in_Dep VALUES (4, 4);
INSERT INTO belongs_in_Dep VALUES (5, 5);
INSERT INTO belongs_in_Dep VALUES (6, 6);
INSERT INTO belongs_in_Dep VALUES (7, 7);
INSERT INTO belongs_in_Dep VALUES (8, 8);
INSERT INTO belongs_in_Dep VALUES (9, 9);
INSERT INTO belongs_in_Dep VALUES (10, 10);

-- Add 10 appointment
Create table appointment(
    a_id INT,
    e_id INT NOT NULL,
    p_id INT NOT NULL,
    app_status varchar(50),
    time TIME,
    date DATE,
    primary key (a_id),
    Foreign Key (e_id) References Doctor(e_id) ON DELETE CASCADE,
    Foreign Key (p_id) References Patients(p_id) ON DELETE CASCADE
);
INSERT INTO appointment VALUES (2, 13, 14, 'Examination', '09:00:00', '2024-03-06');
```

```
INSERT INTO appointment VALUES (3, 14, 15, 'Examination', '09:00:00', '2024-03-07');
INSERT INTO appointment VALUES (4, 15, 16, 'Examination', '09:00:00', '2024-03-08');
INSERT INTO appointment VALUES (5, 16, 17, 'Examination', '09:00:00', '2024-03-09');
INSERT INTO appointment VALUES (6, 17, 18, 'Examination', '09:00:00', '2024-03-10');
INSERT INTO appointment VALUES (7, 18, 19, 'Examination', '09:00:00', '2024-03-11');
INSERT INTO appointment VALUES (8, 19, 20, 'Examination', '09:00:00', '2024-03-12');
INSERT INTO appointment VALUES (9, 20, 14, 'Examination', '09:00:00', '2024-03-13');
INSERT INTO appointment VALUES (10, 21, 15, 'Examination', '09:00:00', '2024-03-14');
INSERT INTO appointment VALUES (11, 22, 16, 'Examination', '09:00:00', '2024-03-15');


-- Add 10 Medical Reports
Create table has_medical_record(
    r_id INT,
    p_id INT,
    diagnosis varchar (50),
    treatment varchar (50),
    dep_id INT,
    r_date DATE,
    primary key (r_id),
    Foreign Key (p_id) References Patients(p_id) ON DELETE CASCADE,
    Foreign Key (dep_id) References Departments(dep_id)
);
INSERT INTO has_medical_record VALUES (1, 11, 'Diarhea', 'Talcid', 1, '2024-03-15');
INSERT INTO has_medical_record VALUES (2, 12, 'Fever', 'Tylenol', 1, '2024-03-16');
INSERT INTO has_medical_record VALUES (3, 13, 'Headache', 'Aspirin', 1, '2024-03-17');
INSERT INTO has_medical_record VALUES (4, 14, 'Sore Throat', 'Cepacol', 1, '2024-03-
18');
INSERT INTO has_medical_record VALUES (5, 15, 'Cough', 'Robitussin', 1, '2024-03-19');
INSERT INTO has_medical_record VALUES (6, 16, 'Allergy', 'Benadryl', 1, '2024-03-20');
INSERT INTO has_medical_record VALUES (7, 17, 'Sprain', 'Ibuprofen', 1, '2024-03-21');
INSERT INTO has_medical_record VALUES (8, 18, 'Stomach Ache', 'Pepto-Bismol', 1,
'2024-03-22');
```

```
INSERT INTO has_medical_record VALUES (9, 19, 'Rash', 'Cortizone', 1, '2024-03-23');
INSERT INTO has_medical_record VALUES (10, 20, 'Ear Infection', 'Amoxicillin', 1, '2024-03-24');



-- Add 10 Patient Bills
Create table owe_bill(
    bill_id INT,
    p_id INT,
    charges INT,
    date DATE,
    primary key (bill_id),
    Foreign Key (p_id) References Patients(p_id)
);
INSERT INTO owe_bill VALUES (1, 11, 250, '2024-03-15');
INSERT INTO owe_bill VALUES (2, 12, 300, '2024-03-16');
INSERT INTO owe_bill VALUES (3, 13, 350, '2024-03-17');
INSERT INTO owe_bill VALUES (4, 14, 400, '2024-03-18');
INSERT INTO owe_bill VALUES (5, 15, 450, '2024-03-19');
INSERT INTO owe_bill VALUES (6, 16, 500, '2024-03-20');
INSERT INTO owe_bill VALUES (7, 17, 550, '2024-03-21');
INSERT INTO owe_bill VALUES (8, 18, 600, '2024-03-22');
INSERT INTO owe_bill VALUES (9, 19, 650, '2024-03-23');
INSERT INTO owe_bill VALUES (10, 20, 700, '2024-03-24');

-- Add 10 Room Reservation
Create table stays_in_room(
    p_id INT,
    room_id INT,
    stay_in DATE,
    primary key (p_id, room_id),
    Foreign Key (p_id) References Patients(p_id) ON DELETE CASCADE,
```

```
    Foreign Key (room_id) References Rooms(room_id) ON DELETE CASCADE
);

INSERT INTO stays_in_room VALUES (11, 1,'2024-03-24');
INSERT INTO stays_in_room VALUES (12, 2, '2024-03-25');
INSERT INTO stays_in_room VALUES (13, 3, '2024-03-26');
INSERT INTO stays_in_room VALUES (14, 4, '2024-03-27');
INSERT INTO stays_in_room VALUES (15, 5, '2024-03-28');
INSERT INTO stays_in_room VALUES (16, 6, '2024-03-29');
INSERT INTO stays_in_room VALUES (17, 7, '2024-03-30');
INSERT INTO stays_in_room VALUES (18, 8, '2024-03-31');
INSERT INTO stays_in_room VALUES (19, 9, '2024-04-01');
INSERT INTO stays_in_room VALUES (20, 10, '2024-04-02');
```