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HEALTHCARE PORTAL

PROJECT DESIGN REPORT

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# **PROJECT SUMMARY**

The project involves the development of a complex database for the Healthcare portal. There are multiple individuals involved in this system namely patients, receptionists, doctors and insurance company. This project is for any organization such as a hospital or local medical clinic who are primarily focused on treating patients with various illnesses. This system will record the patient’s data, patient’s medical history, medical exam reports, doctor’s data, insurance company coverage and an interface to manage all the appointments.

When a patient wants to visit a healthcare organization, he must first place an appointment via the portal. After the patient visits the doctor, he is advised to undergo various medical examinations in order to carry out proper diagnosis of the patient’s illness. Then the doctor prescribes further medication or surgery based on the severity of the illness. After this phase, the bill is generated on the portal by the receptionist. The bills that will be generated for the patient will include the medical exam fees and the doctor’s fees. This payment will be covered by the insurance company based on the type of insurance coverage the patient possesses.

There is a tremendous amount of data generated in this process. The patient needs to be assigned the doctor of the correct specialization for proper treatment. The doctor’s need to approve the appointments such that there is no multiple booking at the same time slot. Also, the patient’s location is an important factor when it comes to claiming his insurance because the coverage rates differ if he is undergoing a surgery in state or out of state. In the end, the bill generation also involves collecting data from various sources and merging it before presenting it to the patient for payment. All of this is done manually and thus, there are a lot of issues for managing the system and scope for human errors.

The healthcare portal ensures efficient management of all this data. Each user can access the data that is only relevant to him. The data is organized in a structured manner to ensure automation, which in turn will reduce the manual efforts put in by the people.

This report further describes the entities and the associated attributes, the entity relationship model and business rules which will clarify any doubts which may arise in the minds of the readers.

**ENTITIES AND THEIR ATTRIBUTES**

|  |  |
| --- | --- |
| **Objects** | **Description** |
| 1. **Users** | This table stores the details of the users who are registered in the system. |
| 1. UserName | This is the primary key. This is the login username of the user. |
| 1. Password | This is the login password of the user. |
| 1. FirstName | First name of the user. |
| 1. LastName | Last name of the user. |
| 1. DateOfBirth | Date of birth of the user. |
| 1. StreetNumber | Stores the street number of the address section of the user. |
| 1. StreetName | Stores the street name of the address section of the user. |
| 1. City | Stores the city of the address section of the user. |
| 1. State | Stores the state of the address section of the user. |
| 1. ZipCode | Stores the zip code of the address section of the user. |
| 1. PhoneNumber | Stores the phone number of the user. |
| 1. EmailID | Stores the email ID of the user. |
| 1. UserType | Identifies the type of user logged in the portal. |
|  |  |
| 1. **DoctorDetails** | This table stores all the information of the doctors who are registered in the system. |
| 1. Username | This is the primary key. This is the login username of the doctor. |
| 1. Specialization | Field of specialization of the doctor. |
|  |  |
| 1. **PatientDetails** | This table stores all the information of the patients. |
| 1. Username | This is the primary key. This is the login username of the patient. |
| 1. isDisability | This field stores if the patient has disability or not.  1 – Yes  0 – No |
| 1. DisabilityDetails | Details of the disability, in case isDisability = 1. |
|  |  |
| 1. **ReceptionistDetails** | This table stores all the information of the receptionist. |
| 1. Username | This is the primary key. This is the login username of the receptionist. |
| 1. Schedule | This field stores the schedule of the receptionist. |
| 1. NoOfBillsGenerated | This field calculates the number of bills each receptionist generates. |
|  |  |
| 1. **MedicalExam** | This is the master table which stores all the exams which the hospital offers. |
| 1. ExamID | This is the primary key. |
| 1. ExamName | This field stores the name of the exam. |
| 1. ExamDesc | This field stores the description of the exam. |
| 1. ExamCost | Stores the total cost of the exam without insurance. |
| 1. IsCoveredUnderInsurance | This field stores 1 if the exam is covered under insurance, otherwise 0. |
|  |  |
| 1. **InsuranceDetails** | This is the master table which stores the coverage of insurance for exams offered. |
| 1. InsuranceID | This is the primary key. |
| 1. InsuranceName | Name of the insurance. |
| 1. InsuranceDesc | Description of the insurance. |
| 1. PercentageCoverageInstate | This field stores the percentage of instate coverage. |
| 1. PercentageCoverageOutstate | This field stores the percentage of outstate coverage. |
|  |  |
| 1. **InsuranceLine** | This table stores the insurance which each patient has. |
| 1. UserName | Foreign key from Patient (UserName). |
| 1. InsuranceID | Foreign key from InsuranceDetails (InsuranceID). |
| 1. StartDate | Start date of insurance. |
| 1. EndDate | End date of insurance. |
|  |  |
| 1. **DoctorAvailability** | This table stores the availability of the doctors. |
| 1. DoctorUserName | Foreign key from DoctorDetails (Username). |
| 1. DayOfWeek | Day of week the doctor is available. |
| 1. StartTime | Start time of the appointment. |
| 1. ActiveFlg | If the appointment is available or not.  1 – Available  0 – Not available |
|  |  |
| 1. **Appointment** | This table stores the details of the appointment which the patient has booked. |
| 1. AppointmentID | This is the primary key. |
| 1. PatientUserName | Foreign key from Patient (UserName). |
| 1. Doctor UserName | Foreign key from Doctor (UserName). |
| 1. AppointmentDate | Date of appointment. |
| 1. AppointmentStartTime | Time of appointment. Foreign key from DoctorAvailability (StartTime) |
| 1. ReasonForAppointment | Why was the appointment scheduled. |
| 1. ActiveFlg | 1. Active appointment. 2. Expired appointment |
|  |  |
| 1. **Diagnosis** | This table stores the details of exams conducted on the patient. |
| 1. AppointmentID | Foreign key from Appointment (AppointmentID). |
| 1. ExamID | Foreign key from MedicalExam (ExamID). |
| 1. MedicalNotes | Special notes or readings which the doctor has to take. |
|  |  |
| 1. **BillDetails** | This table stores the details of the bills. |
| 1. BillID | This is the primary key. |
| 1. AppointmentID | Foreign key from Appointment (AppointmentID). |
| 1. ExamID | Foreign key from Diagnosis (ExamID). |
| 1. ReceptionistUserName | Foreign key from Receptionist (UserName). |
| 1. DateOfBill | Date of bill generation. |
| 1. AdditionalCost | Additional costs if any, else 0. |
| 1. Comments | Comments regarding the bill. |
| 1. TotalCost | Total costs of all exams, which the patient has to pay. |

**ENTITY RELATIONSHIP DIAGRAM**



**Note:** The disjoint constraint between Users and Patient, Users and Doctor and Users and Receptionist is conceptual. While implementing, we will consider it as one to one relationship.

Figure 1 - ERD for the Healthcare Portal

**BUSINESS RULES**

1. A patient must book an appointment before entering the healthcare center and it can only be done using the healthcare portal.
2. Doctors cannot cancel an appointment once they are assigned to it.
3. Doctors can access all the patient data whenever they need it.
4. A patient can undergo one medical exam only once in a day.
5. Patient must show up 15 minutes before the appointment.
6. A patient cannot book more than 1 active appointment.
7. A doctor can attend multiple appointments, but one appointment must be attended by only one doctor.
8. A patient can have one or more medical insurance at a time and one type of medical insurance covers one or more patients.
9. A patient can book only one doctor for one appointment.
10. A user of the healthcare portal must either be a patient, doctor or a receptionist.
11. One appointment can have only one bill.
12. One appointment can consist of more than one diagnosis, but one diagnosis is pertained to one appointment.
13. One Diagnosis (entity name) can be determined by one medical exam, but one type of medical exam can make one or more Diagnosis.
14. One bill can consist of one or more Diagnosis (entity name), but one Diagnosis will be written in one bill.
15. One bill can consist of one or more medical exams and one type of medical exam can be included in many bills.
16. Insurance is provided by only one company to all the patients.

**MAJOR DATA QUESTIONS**

1. How many medical examinations are being conducted at the healthcare organization?
2. Which type of medical examination is being carried out most frequently?
3. How much is the income of the healthcare organization?
4. What is the maximum number of patients that can be admitted in the healthcare organization?
5. How many bills are being generated by a patient?
6. How to merge the data from doctors and insurance company for bill generation?