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**Applied Information Technology**

**AIT 735 Case Studies in Database Management Systems**

**Case Study Title: Patient Information Management System-on premises to cloud migration**

***Conceptual Design***

**PIMS Entity-relationship Diagram:**

The summary of entities and their relationships involved in the patient information system

* User\_type entity: There will be two user types (doctor and patients).
* User\_Account entity: Each account must belong to a user. One user\_type may have only one account.
* Patient entity: Includes patient’s personal information
* Appointment entity: Patient requests an appointment, and each appointment is assigned to a doctor. Appointment entity includes appointment schedule details. One patient may have one to many appointments and one appointment may belong to only one patient. Appointment must belong to a patient.
* Doctor entity: Each appointment is assigned to a doctor. The doctor entity includes doctor’s personal information. A doctor may have one to many appointments and one appointment may belong to only one doctor. An appointment must belong to a doctor.
* Record entity: Includes patient visit details. Doctor generates a record after each appointment. A doctor may generate one to many records. A record must belong to a doctor.
* Specialization entity: Includes the type of specialization like pediatrician, Gynecologist etc. specialization may belong to one-to-many doctors. Doctor must have a specialization. A doctor can have only one specialization.
* Medication entity: Includes patient medication details. Doctor enters medication details. Each medication must belong to a doctor. Doctor may prescribe one to many medication
* Address entity: Includes user (patient/doctor) address. A address must belong to a user. User may have one to many addresses.
* Address\_Type entity: Includes type of address (example: home and office address).
* Phone entity: Includes user (patient/doctor) phone number. A phone number must belong to a user. User may have one to many phone numbers.
* Phone\_Type entity: Includes type of phone numbers (example: Daytime phone number, evening phone number and mobile number).
* Payment entity: Includes the details of the payment made by the patient. A payment must belong to a patient. One payment may belong to one patient. Patient can make one to many payments.
* Payment\_Type entity: Includes type of payment (example credit card, debit card, and check)

***Figure 1: High-level ERD with entities and their relationship***

Diagram, engineering drawing

Description automatically generated

**Data flow diagrams:**

**Context data flow diagram**

Summary:

* The objective of the proposed PIMS migration from on-premises to cloud database is to improve the efficiency, scalability, and security of the hospital database.
* Admin manages the creation of users (patients and doctors) into the system and sends a confirmation email to the user.
* Admin manages appointment scheduling, and payment information in the system.
* A confirmation email will be sent to the patient when the appointment is scheduled and when the payment made by the patient is accepted and processed.
* Doctor manages the patient records and medication information in the system
* Patient may place a request for appointment by calling the hospital front desk

***Figure 2: Context data flow diagram***

Diagram, schematic

Description automatically generated

**DFD level 0 data flow diagram**

Summary:

* The patient information system in the hospital database comprises of patient and doctor profiles, appointment schedules, patient records, medication details and payments made.
* Patient Data store- contains patient information
* Doctor data store- contains doctor information
* Appointment Data store- contains appointment schedules with doctor association
* Record Data store- contains patient visit details with patient and doctor association
* Medication Data store- contains medication details with patient and doctor association
* Payment Data store- contains payment details with patient association

***Figure 3: DFD level 0 data flow diagram***

Diagram, schematic

Description automatically generated

**References:**

Carolyn E. Begg and Thomas Connolly, Database Systems: A Practical Approach to Design,

Implementation, and management,6th ed USA, Pearson,1996.