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| CS 340 Final Project | Kelvin Watson  OSU ID 932540242  onid: watsokel |

**Outline**

My database stores data about patients and their medical conditions and medications, medical office assistants, and healthcare providers. It is used to manage and organize patients’ medical appointments, as well as details about their medical history. A database and system such as this could be used in a doctor’s office or other medical practice requiring storage of medical information about patients and staff working at the medical office.

**Database Outline in Words**

The user will be an administrator that works at a medical office. As such, he/she has the ability to add records to every table. The administrator is able to add medical offices assistants (staff) to the Medical Office Assistants relation, patients’ appointments to the appointments relation, patients and their demographic information to the patients relation, patients’ medications to the medications relation, as well as patients’ medical conditions to the medical conditions relation.

Two additional relations, called “Takes” and “Diagnosed” result from the many-to-many relationship between Patient and Medication, and Patient and Medical Condition entities respectively. When the administrator (user) adds patient information into the Patient relation, he/she will also add information into the Medications and Medical Conditions relations as well.

The following describes the database relations and constraints applied to those relations.

DATABASE RELATIONS, RELATIONSHIPS, AND CONSTRAINTS

As expected, all entities will have their own tables in the database. However, there are two additional relations that result from many-to-many relationships between entities. The Takes relation is the result from the many-to-many relationship between Patient and Medication, and the Diagnosed relation is the result from the many-to-many relationship between Patient and Medical Conditions. Constraints of each relation are described below:

1. Medical Office Assistants:
   1. Attributes: Medical office assistants are the users that work in the medical clinic. They manage patients’ medical appointments. The will have names, employee ID’s, user names, and passwords.
   2. Participation Constraint: A particular medical office assistant is not required to schedule appointments for any patients. As such, the medical office assistant’s participation in this relationship is partial.
   3. Referential Constraint: Because each Medical Office Assistant can schedule multiple appointments, its relationship to Appointment entity is a one-to-many relationship. As a result, the Medical Office Assistants’ mID attribute is a foreign key in the Appointments relation in the database. Each appointment must be associated with a medical office assistant, as the medical office assistant is responsible for scheduling the appointment.
   4. Foreign Key Constraints:
      1. ON UPDATE CASCADE: Once an appointment is set, updating his/her information should not impact the scheduled appointment. If for some reason the mID of a record in the Medical Office Assistant table is altered, it should be reflected in the Appointments table.
      2. ON DELETE SET NULL: Deleting a medical office assistant should have no impact on the scheduled appointment, and the medical office assistant who scheduled the appointment becomes irrelevant and it is more important that the appointment is still available to the patient, even if the medical office assistant who originally scheduled the appointment no longer works in the office.
2. Healthcare Providers
   1. Attributes: A healthcare provider treats patients. They will have an internal ID (hID), names, professions (physician, dentist, dietician, pharmacist, physiotherapist etc.) and license numbers.
   2. Participation Constraint: Each healthcare provider can attend multiple appointments, but is not required to attend any appointment. As such, the healthcare provider’s participation in the “attends” relationship is partial.
   3. Referential constraint: As mentioned above, although a healthcare provider is not required to attend appointments, it is possible that he/she attends multiple appointments. This is a one-to-many relationship with the Appointments entity. As a result, the healthcare provider’s hID attribute is a foreign key in the Appointments table.
   4. Foreign Key Constraints:
      1. ON UPDATE CASCADE: If for some reason the hID of a record in the Healthcare Provider table is altered, it should be reflected in the Appointments table.
      2. ON DELETE CASCADE: If a healthcare provider no longer works at the medical office, then his/her appointments should be automatically canceled.
3. Patients
   1. Attributes: Patients have an internal ID for the medical office (pID), names and birthdates.
   2. Participation Constraints:
      1. Patients are required to have at least one medical condition to be seen in this medical office. As such, the participation of the Patient entity in the Diagnosed relationship with the Medical Condition entity is total.
      2. Patients may take multiple medications, but they are not required to be on any medications. As such, the participation of the Patient entity in the Takes relationship is partial.
   3. Referential Constraint: The Patient entity has many-to-many relationships with the Medication and the Medical Condition entities. Because of this, Patients’ pID’s serve as foreign keys in the Takes and Diagnosed relations in the database.
   4. Foreign Key Constraints:
      1. ON UPDATE CASCADE: If a patient’s pID is altered, it should be reflected in the Takes and Diagnosed tables that reference this pID.
      2. ON DELETE CASCADE: If a Patient were to be deleted, the records that reference the pID in the Takes and Diagnose tables should be deleted.
4. Appointments
   1. Patients will have medical appointments. Attributes include date, time, and reason for the appointment.
   2. These are medications that patients take. They will have names and national drug codes.
   3. Participation Constraint: Each appointment must be associated with a medical office assistant, as the medical office assistant is responsible for scheduling the appointment.
5. Medical Conditions
   1. Attributes: These are diseases and conditions that patients have. They will have names.
6. Medications
   1. Attributes: These are medications that patients take. They will have names and national drug codes.
7. Takes
   1. This table is the result of a many-to-many relationship between the Patient and Medication entities.
   2. Referential Constraint: The Takes table contains the pID and NDC (National Drug Code) as foreign keys from the Patient table and the Medication tables respectively. These foreign keys together serve as the composite primary key for the this table.
   3. Foreign Key Constraints:
      1. ON UPDATE
8. Diagnosed
   1. This table is the result of a many-to-many relationship between the Patient and Medical Condition entities.
   2. Referential Constraint: The Diagnosed table contains the pID and name attributes as foreign keys from the Patient table and the Medical Conditions tables respectively. These foreign keys together serve as the composite primary key for the this table.
   3. Foreign

**RELATIONSHIPS**

1. Patients have medical conditions: This is a many-to-many relationship as patients can have multiple medical conditions, and the same medical conditions affect different patients. Patients must have at least one medical condition. The reason for this is because the purpose of this database is to store patient appointments with healthcare providers, so there must be reason for a patient to see a healthcare provider. Thus, there is a total participation constraint on patients in this relationship. Because a particular medical condition/disease can affect none of the patients in a given patient entity set, the participation of medical conditions is partial.
2. Patients take medications: This is a many-to-many relationship as patients can take multiple medications, and the same medications are taken by many different patients. Because a patient is not necessarily taking any medications, the participation of patients in this relationship is partial. A medication may not be taken by any patients in a given patient entity set, so the participation by medications in this relationship is also partial.
3. Patients have appointments: This is a one-to-many relationship. While one appointment can only be tied to one patient, a patient can have several appointments. An appointment must be associated with a patient, so the participation of the appointment entity is total. On the other hand, a patient on the database may or may not have an appointment associated with him/her. Thus, the participation of the patient entity in the “requests” relationship is partial.
4. Medical office assistants schedule appointments: This is a one-to-many relationship as medical office assistants can schedule multiple appointments. However, an appointment must be scheduled by a medical office assistant. In fact, the existence of an appointment depends on it being scheduled by a medical office assistant. As such, the participation of the appointment entity in this relationship is total.
5. Healthcare providers attends appointments: This is a one-to-many relationship because a healthcare provider may have multiple appointments. The participation of appointment in this relationship is total because an appointment must be attended by one healthcare provider. On the other hand, a particular healthcare provider may have no scheduled appointments, so his/her participation in this relationship is partial.