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HO CHI MINH UNIVERSITY OF TECHNOLOGY,
FACULTY OF COMPUTER SCIENCE AND ENGINEERING



(CO2014) Database Systems

ASSIGNMENT 1

HOSPITAL DATABASE

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1 Introduction

DataBase Management System (DBMS) refers to a general-purpose software system that facilitates the processes of defining, constructing, manipulating, and sharing databases among various users and applications (or a software system that enables users to define, create, maintain, and control access to the database).

Entity-Relationship (ER) model is a popular high-level conceptual data model which is used for the conceptual design(logical organisation of data) of database applications. While EER model includes all modeling concepts of the ER model and additional concepts: subclasses/superclasses, specialization/generalization, categories, attribute inheritance.

Relational data model represents a database in the form of relations - 2D table with rows and columns of data.

Database systems are designed to handle large amounts of data. Data management entails both defining structures for storing information and providing mechanisms for manipulating that information. Furthermore, the database system must ensure the security of the information stored, even if the system crashes or unauthorized access attempts are made.

This project is aim at computerizing the manual process of management information system for hospital X. There are three main parts:

- Fully labelled EER diagram.
- Mapping (E)ER diagram to a relational database schema.
- The rest constraints not shown in EER diagram.

2 Business Description

Hospital Database

A hospital X needs to build a management information system to manage the information of their patients, doctors, and nurses.

The database of hospital X needs to store the information of employees (doctors and nurses) including: a unique code, full name consisting of first name and last name, date of birth, gender, address, start date (first day of work), phone number(s), and speciality with its related name and degree's year. The hospital has many departments. Each department has a unique code, a title, and a dean who is a doctor. The employees have to belong to a specific department. A department has at least one or many employees. The dean must hold a specific speciality and has had more than 5 years of experience since the date he or she was awarded the speciality degree.

The patients have to provide with the hospital their information such as: full name (first name and last name), date of birth, gender, address, and phone number. After receiving their information, the system will store them into the database, and generate a unique code to identify each patient simultaneously. Patients are divided into two types: outpatients and inpatients. The hospital also wishes to use the first two characters to determine the patient type by the unique code. If one is an outpatient, the unique code for him or her starts with "OP," which is then followed by 9 digits such as "OP000000001." If one is an inpatient, the unique code for him or her starts with "IP," which is then followed by 9 digits such as "IP000000001."

- For outpatients, the information of the examining doctor needs to be stored. The outpatients can have many examinations with their examining doctor. The hospital needs to

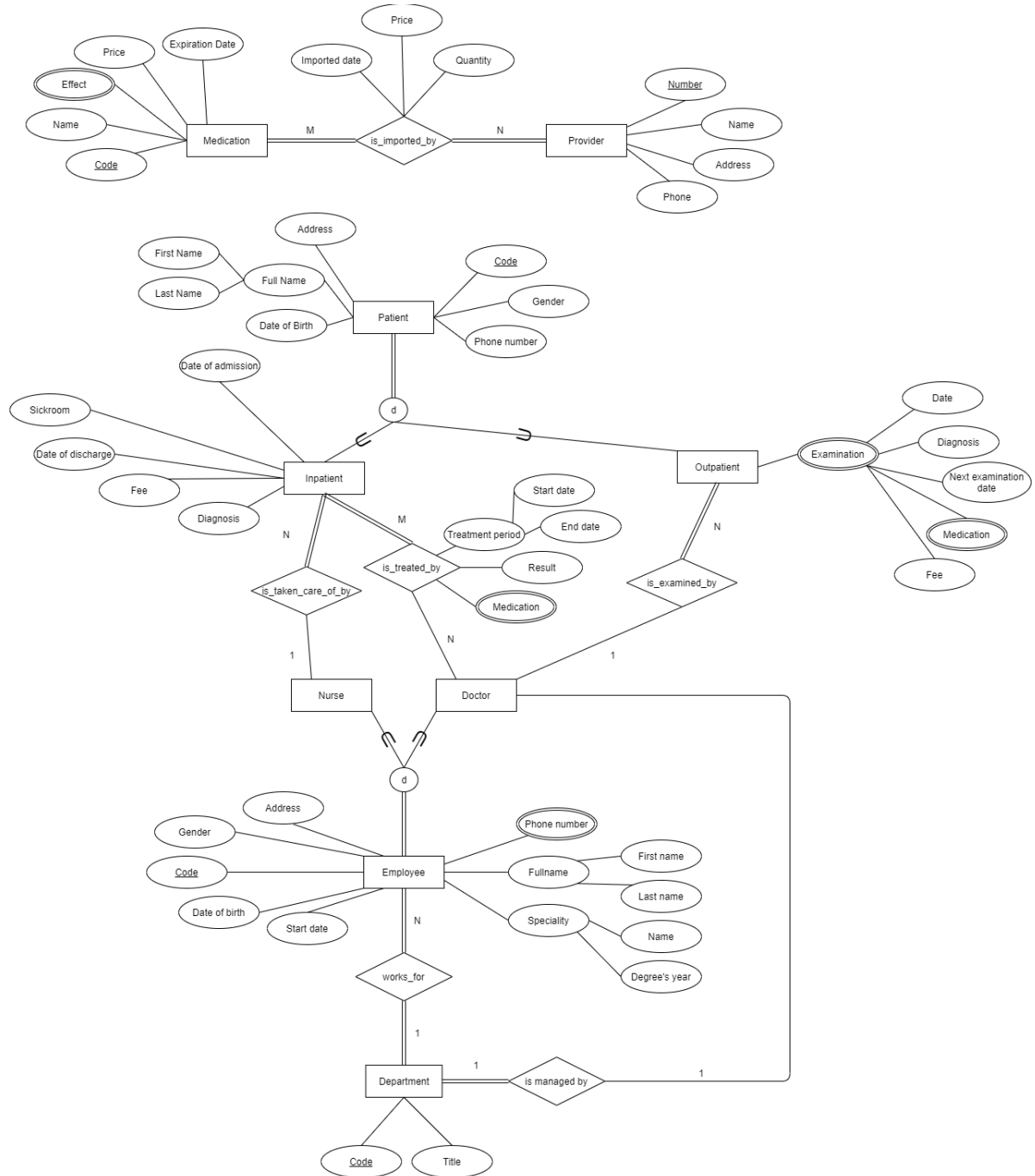


store the details of each examination such as: examination date, diagnosis, the next examination date if any, medications, and fee.

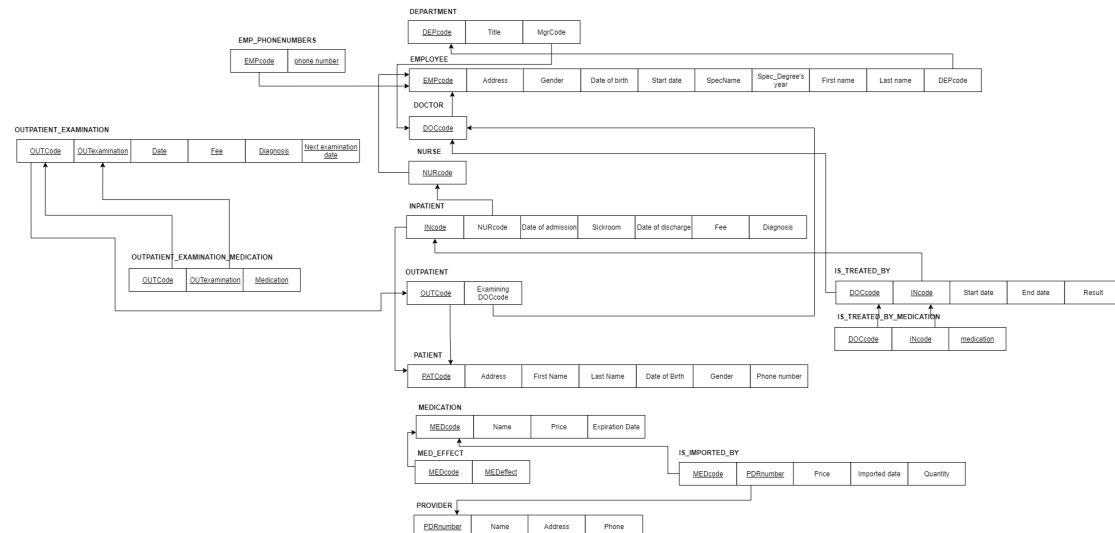
- For inpatients, some information is added such as: date of admission, treating doctors, caring nurse, diagnosis, sickroom, date of discharge, and fee. After admitting to the hospital, a patient can receive treatment from at least one doctor. A doctor can treat many patients at the same time, or sometimes, he has no patients to treat. The hospital needs the details of each treatment such as: treatment period (start date and end date), result, and medications. Each inpatient is taken care of by a nurse; a nurse can take care of many inpatients at the same time. Furthermore, when a patient is recovered and his or her last treatment has been confirmed as “recovered” by the doctor, he or she will be discharged from the hospital. As a result, the discharge date must be recorded by the system.

The information of a medication is also stored in the database. This information consists of a unique code, name of the medication, effects, price, and expiration date. A medication is provided by one or more providers, and one provider may provide many types of medication. A provider is tracked by its unique number, name, address, and phone. Moreover, the hospital also want to keep the imported medication information including imported date, price, and quantity. In case one medication is out-of-date, it will be automatically marked so in the database.

3 The Enhanced Entity–Relationship (EER) Model



4 The Relational Data Model



5 Outlier Analyzing

1. The dean must hold a specific speciality and has had more than 5 years of experience since the date he or she was awarded the speciality degree.
2. After receiving their information, the system will store them into the database, and generate a unique code to identify each patient simultaneously.
3. The hospital also wishes to use the first two characters to determine the patient type by the unique code. If one is an outpatient, the unique code for him or her starts with "OP," which is then followed by 9 digits such as "OP000000001." If one is an inpatient, the unique code for him or her starts with "IP," which is then followed by 9 digits such as "IP000000001."
4. When a patient is recovered and his or her last treatment has been confirmed as "recovered" by the doctor, he or she will be discharged from the hospital. As a result, the discharge date must be recorded by the system.
5. In case one medication is out-of-date, it will be automatically marked so in the database.

⇒ The diagram imply *which* data is stored in the database, not *what* data is stored.

6 Reference

R. Elmasri S.B. Navathe (2016): Fundamentals of Database Systems, 7th Edition, Addison-Wesley, ISBN-13: 978-0-13-397077-7