Assignment 8

Mengyuan Li

Part 1

The "Benefit All Today" is an IT company which mainly focuses on the design of medical database. This season it plans to design a health information database that help patients, especially those elder ones, better understand their prescriptions and manage their health information.

This database should include the information of patients, including the name, age, gender, phone number and address. At the same time, the information of dependents should be recorded for each patient, including the dependent's name, phone number and the relationship of this dependent to the patient. Each patient could have more than one dependent, and each dependent could take care of several patients at a time. Since people can use this database to help a patient find a suitable nurse, it should also store the information about a nurse, including the name, phone number, nursing years and so on. Moreover, some nurses are individual worker, which means that they are not hired by any institution, while some nurses work for institutions like hospitals and other nursing institutions. Therefore, the database also records the relevant information. For a hospital, the database should store its' name (unique), phone number, fax number, website and address. In the city where "Benefit All Today" locates, hospitals are classified into three levels ranging from 1 to 3, the higher the lever is, the better the hospital would be. For nursing institutions, the database should record their names, phone number, fax number and address. Doctors' information is

also included in this database, for example, the name, age, phone number, office number, education degree, address career years and so on. The attribute “Type” indicates which field a doctor works in, such as eye, brain, teeth, and so on. At the same time, the position of a doctor in the hospital is also very important for patients. Usually the doctors are divided into two groups, ordinary and highly-professional. The database also keeps track of what hospital does a doctor work in.

In order to help patients better get the knowledge of their disease and drugs, this database also records the disease name and its’ description. For drugs, the database should include information of Drug ID, Drug name, description, made year, the manufacturer, expire date, price and whether it is a prescription drug.

After each diagnosis, the patient will receive a prescription, this prescription shows the diseases a patient has, the drugs which are used to cure these diseases, drug quantity, doctors’ instructions and the diagnosis date. Meanwhile the severity of a disease will also be recorded, ranging from 1 to 3, where 1 stands for normal and 3 stands for serious. Only one patient and one doctor relate to each prescription, and each prescription just gives diagnosis of one disease, however, there could be several drugs used for curing each disease. Sometimes a patient may have some questions about their disease and thus wants to communicate with the doctors face to face, so this database also stores information of a doctor’s duty hour, including the date and the exact time.

Nurses should have some professional skills which are required for taking a patient. The information of a skill should include its’ name and description. The

database also keeps track of the certification name of a skill and the date a nurse gets this certification. A nurse is paid according to his/her job, so for each job, the database records the skill required, the start date, the end date, the estimated cost and the actual cost.

Part 2

Please Refer to my .pdf file.

Part 3 & Part 4

PERSON

PersonID (number)	FirstNM (varchar2)	LastNM (varchar2)	Age (number)	Gender (varchar2)	PhoneNumber (varchar2)	State (varchar2)	City (varchar2)	Street (varchar2)	Zip (varcha

FD: PersonID -> {FirstNM, LastNM, Age, Gender, PhoneNumber, State, City, Street, Zip}

This relation satisfies 3NF

PATIENT

PatientID (number)

PATIENT. PatientID -> PERSON. PersonID

Since this relation has only one attribute, it satisfies 3NF.

DOCTOR

DoctorID (number)	Type (varchar2)	Position (varchar2)	EduDegree (varchar2)	CareerYears (number)	OfficePhone (varchar2)

DOCTOR. DoctorID -> PERSON. PersonID

FD: DoctorID -> {Type, Position, EduDegree, CareerYears, OfficePhone}

This relation satisfies 3NF.

NURSE

NurseID (number)	NursingYears (number)

NURSE. NurseID -> PERSON. PersonID

FD: NurseID -> NursingYears

This relation satisfies 3NF.

HIRED_NURSE

HiredNurseID (number)

HIRED_NURSE. HiredNurseID -> NURSE. NurseID

Since this relation has only one attribute, it satisfies 3NF.

INDIVIDUAL_NURSE

IndiNurseID (number)

INDIVIDUAL_NURSE. IndiNurseID -> NURSE. NurseID

Since this relation has only one attribute, it satisfies 3NF.

DEPENDENT

DependentID (number)	PatientID (number)	Relationship (varchar2)

DEPENDENT. DependentID -> PERSON. PersonID

DEPENDENT. PatientID -> PATIENT. PatientID

FD: {DependentID, PatientID} -> Relationship

This relation satisfies 3NF.

SKILL

SkillNM (varchar2)	Description (varchar2)

FD: SkillNM -> Description

This relation satisfies 3NF.

HOSPITAL

HospitalNM (varchar2)	PhoneNumber (varchar2)	FaxNumber (varchar2)	HospitalLevel (number)	Website (varchar2)	State (varchar2)	City (varchar2)	Street (varchar2)	Zip (varchar

FD: HospitalNM -> {PhoneNumber, FaxNumber, HospitalLevel, Website, State, City, Street, Zip}

This relation satisfies 3NF.

NURSING_INSTITUTION

NursingInstNM (varchar2)	PhoneNumber (varchar2)	FaxNumber (varchar2)	State (varchar2)	City (varchar2)	Street (varchar2)	Zip (varchar2)

FD: NursingInstNM -> {PhoneNumber, FaxNumber, State, City, Street, Zip}

This relation satisfies 3NF.

DISEASE

DiseaseNM (varchar2)	Description (varchar2)

FD: DiseaseNM -> Description

This relation satisfies 3NF.

DRUG

DrugID (number)	DrugNM (varchar2)	Description (varchar2)	MadeYear (number)	MadeBy (varchar2)	ExpireDT (date)	Price (number)	IsPrescriptio (varchar2)

FD: DrugID -> {DrugNM, Description, MadeYear, MadeBy, ExpireDT, Price, IsPrescription}

This relation satisfies 3NF.

HOSPITAL_HIRED_NURSE

HospitalNM (varchar2)	HiredNurseID (number)	HiredDT (date)

HOSPITAL_HIRED_NURSE. HospitalNM -> HOSPITAL. HospitalNM

HOSPITAL_HIRED_NURSE. HiredNurseID -> HIRED_NURSE. HiredNurseID

FD: {HospitalNM, HiredNurseID} -> HiredDT

This relation satisfies 3NF.

NURSINGINST_HIRED_NURSE

NursingInstNM (varchar2)	HiredNurseID (number)	HiredDT (date)

NURSINGINST_HIRED_NURSE. NursingInstNM -> NURSING_INSTITUTION. NursingInstNM

NURSINGINST_HIRED_NURSE. HiredNurseID -> HIRED_NURSE. HiredNurseID

FD: {NursingInstNM, HiredNurseID} -> HiredDT

This relation satisfies 3NF.

DOCTOR_WORKS_IN

HospiatlNM (varchar2)	DoctorID (number)	HiredDT (date)

DOCTOR_WORKS_IN. HospitalNM -> HOSPITAL. HospitalNM

DOCTOR_WORKS_IN. DoctorID -> DOCTOR. DoctorID

FD: {HospitalNM, DoctorID} -> HiredDT

This relation satisfies 3NF.

PRESCRIPTION

PatientID (number)	DoctorID (number)	PrescriptionID (number)	DiseaseNM (varchar2)	Severity (number)	DrugID (number)	DrugQT (number)	Instruction (varchar2)	DiagnoseDT (date)

PRESCRIPTION. PatientID -> PATIENT. PatientID

PRESCRIPTION. DoctorID -> DOCTOR. DoctorID

PRESCRIPTION. DiseaseNM -> DISEASE. DiseaseNM

PRESCRIPTION. DrugID -> DRUG. DrugID

FD: {PatientID, DoctorID, PrescriptionID, DiseaseNM, DrugID} -> {Severity, DrugQT, Instruction, DiagnoseDT}

{PatientID, DiseaseNM} -> {Severity}

So this relation does not satisfy 2NF. Modify it as follows:

DISEASE_HISTORY

PatientID (number)	DiseaseNM (varchar2)	Severity (number)

DISEASE_HISTORY. PatientID -> PATIENT. PatientID

DISEASE_HISTORY. DiseaseNM -> DISEASE. DiseaseNM

PRESCRIPTION

PatientID (number)	DoctorID (number)	PrescriptionID (number)	DiseaseNM (varchar2)	DrugID (number)	DrugQT (number)	Instruction (varchar2)	DiagnoseDT (date)

PRESCRIPTION. PatientID -> PATIENT. PatientID

PRESCRIPTION. DoctorID -> DOCTOR. DoctorID

PRESCRIPTION. DiseaseNM -> DISEASE. DiseaseNM

PRESCRIPTION. DrugID -> DRUG. DrugID

Now these two relations satisfy 3NF.

DUTY_HOUR

DoctorID (number)	DutyDT (date)	StartTM (date)	EndTM (date)

DUTY_HOUR. DoctorID -> DOCTOR. DoctorID

Since this relation does not have non-key attribute, and its primary key has been correctly defined, this relation satisfies 3NF.

SKILL_IN

NurseID (number)	SkillNM (varchar2)	CertNM (varchar2)	CertDT (date)

SKILL_IN. NurseID -> NURSE. NurseID

SKILL_IN. SkillNM -> SKILL. SkillNM

FD: {NurseID, SkillNM} -> {CertNM, CertDT}

This relation satisfies 3NF.

JOB

PatientID (number)	NurseID (number)	SkillNM (varchar2)	StartDT (date)	EndDT (date)	EstimatedCost (number)	ActualCost (number)

JOB. PatientID -> PATIENT. PatientID

JOB. NurseID -> NURSE. NurseID

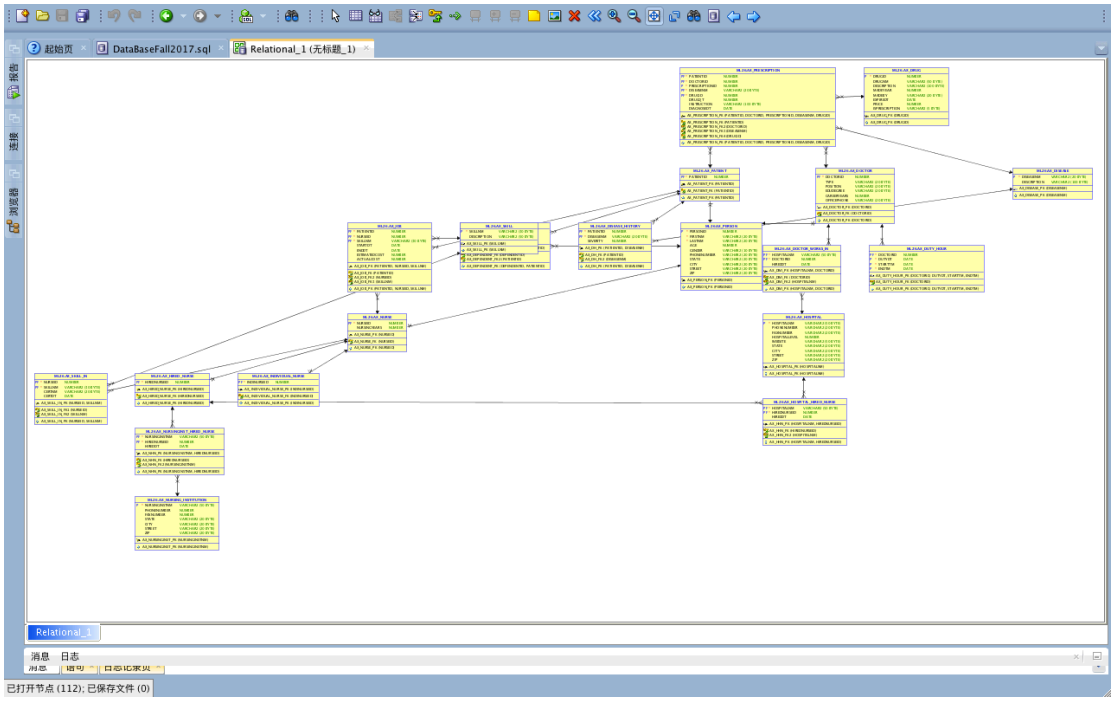
JOB. SkillNM -> SKILL. SkillNM

FD: {PatientID, NurseID, SkillNM} -> {StartDT, EndDT, EstimatedCost, ActualCost}

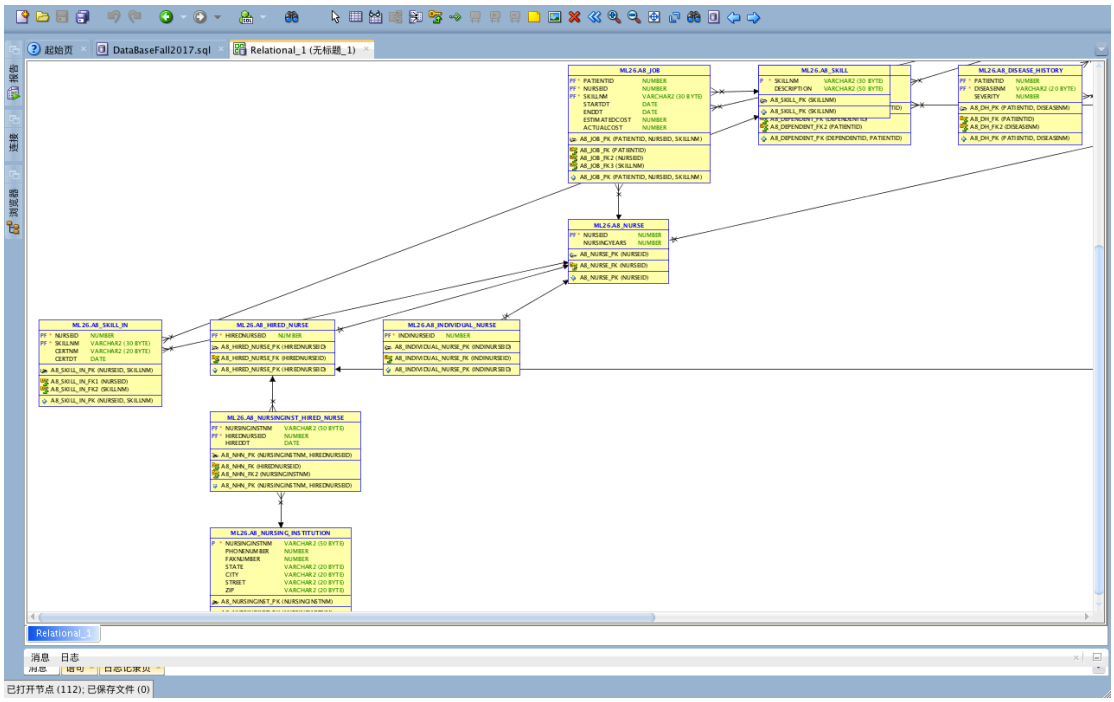
This relation satisfies 3NF.

Part 5

Sorry the complete screenshot is a little bit obscure, so I also copy pictures of the part



complete screenshot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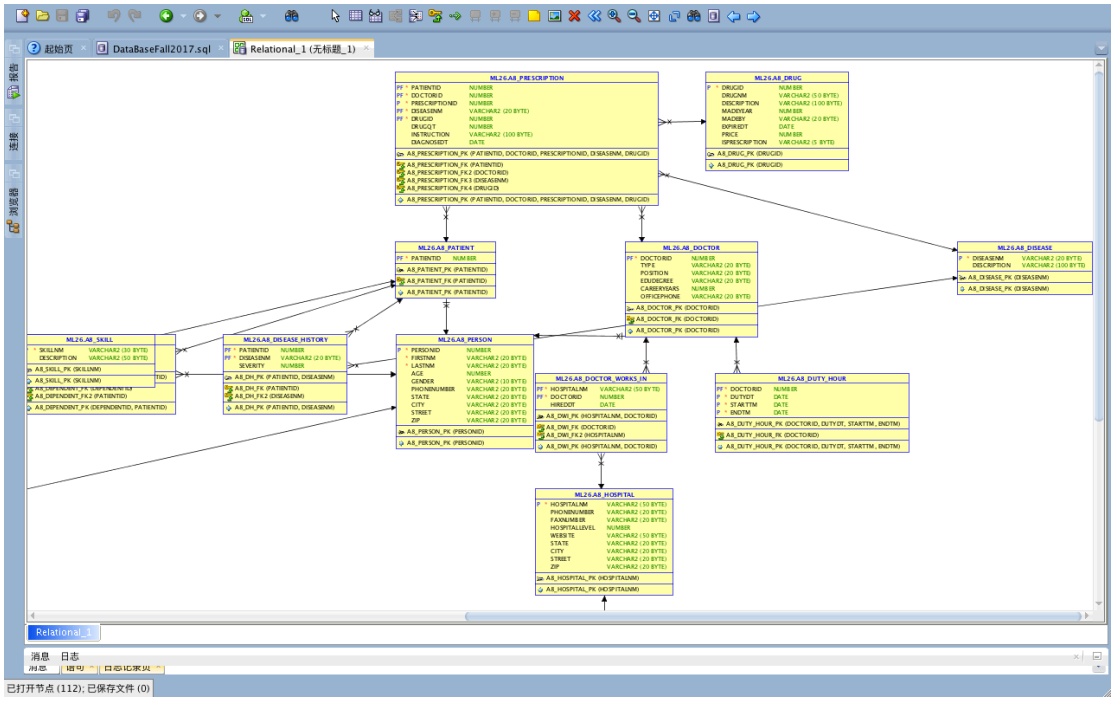
ML26.A8_SKILL
ML26.A8_DISEASE_HISTORY
ML26.A8_NURSE
ML26.A8_SKILL_IN
ML26.A8_HIRED_NURSE
ML26.A8_INDIVIDUAL_NURSE
ML26.A8_NURSINGINST_HIRED_NURSE
ML26.A8_NURSING_INSTITUTION
Relational_1
消息
日志
已打开节点 (112); 已保存文件 (0)


起始页
DataBaseFall2017.sql
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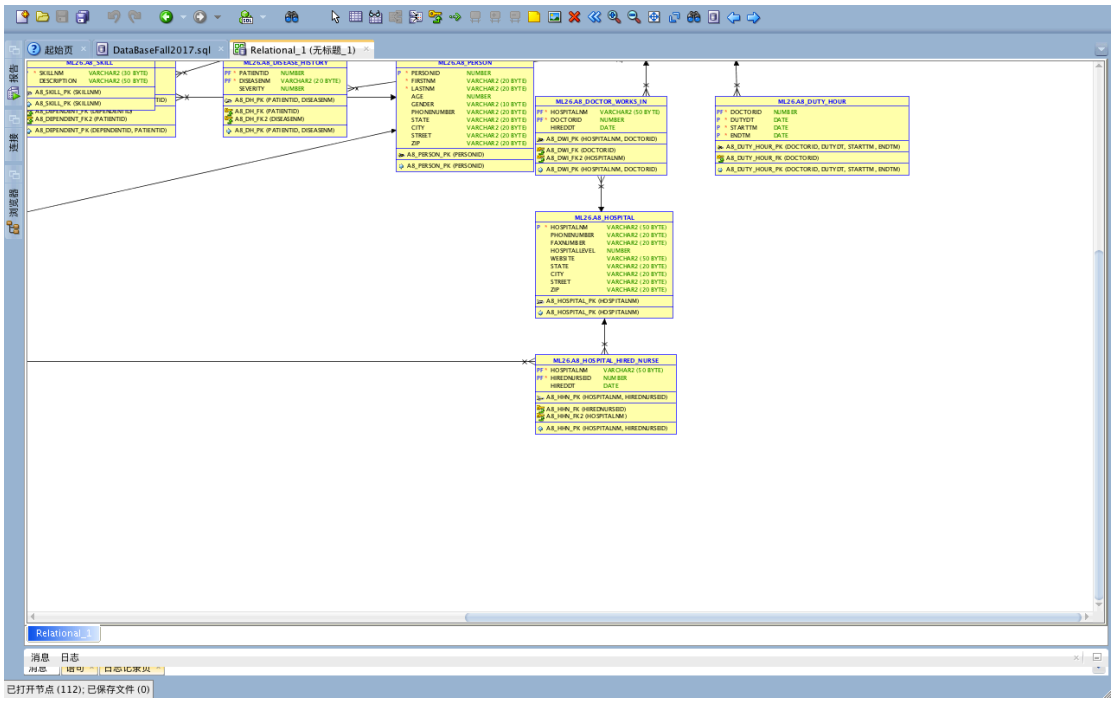
ML26.A8_DRUG
ML26.A8_PATIENT
ML26.A8_DOCTOR
ML26.A8_DISEASE
ML26.A8_SKILL
ML26.A8_DISEASE_HISTORY
ML26.A8_PERSON
ML26.A8_DOCTOR_WORKS_IN
ML26.A8_DUTY_HOUR
ML26.A8_HOSPITAL
Relational_1
消息
日志
已打开节点 (112); 已保存文件 (0)



Part 6 & Part 7

(a) Patient 1 has some questions about his diseases and he wants to know the duty hours and consult doctors. Please list the information of doctors who have ever diagnosed patient 1, the results should include doctor's name, phone number, office phone number, the name of the hospital this doctor works in and the doctor's duty hour.

(b) When a patient has more than 1 disease of which the severity equals to 3, this patient is in great danger and needs a nurse to take care of him/her. Please find this kind of patient and advise them to employ a nurse. The results should include the patient's name, age, phone number, the names of the diseases that have severity equaling to 3 and the relevant disease description.

(c) Patients always want to know how much they spend on their drugs. Please calculate the total cost of each patient on the drugs. The results should include patient's name, age, gender and total cost on drugs.

(d) There is a patient who is in great danger and needs a nurse who is hired by the hospital, has more than 15 years of nursing experience and is proficient in SkillA. Please help this patient find the nurse. The information should include the nurse's name, phone number, nursing years, the name of the hospital this nurse works in, and the phone number and address of the hospital.

(e) This database also helps nurses record information about their salary. Please help

nurses who have ever taken care of the patients to calculate their total salary, the information should include the name of the nurse, phone number, address and total salary.