Computer Engineering

CENG315
TERM PROJECT

“PHARMACY”

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CENG315

TERM PROJECT REPORT

Pharmacy

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Abstract

People may sometimes become weak due to external or internal influences, and have the potential to be ill in all seasons due to malnutrition. At this point, it is important to be able to diagnose and treat people correctly. People need medicines to overcome these diseases. The organizations responsible for the sale of these drugs also unite under the roof of the pharmacy. A pharmacy must have some basic features that can respond to

patients' wishes, and at the same time, they need some programs that contain records of all relevant information to respond quickly and systematically.

Introduction

We live in the information age, so we need to keep every job we do in a virtual environment in detail. As we all know, pharmacies also sell hundreds of drugs. In addition, the channels responsible for the supply of these drugs perform thousands of operations. When we go one step further, there are companies operating the factories responsible for the production of these drugs. As you have seen, the information contained in this structure must be stored and accessible on a regular basis. We have established a structure in which we can control all this flow in the Pharmacy system.

What Pharmacy Does?

We have employees in our pharmacies, who are responsible for the supplement. In the inventory, there are drugs that are stored for delivery to pharmacies, and there are two different types, medical and non-medical. Each drug has its own unique barcode number, which we keep in our table through this barcode number. Other features of the drugs are the name and type. Since the drugs will be taken by the patients, we have a patient table that stores the patients. One or more prescriptions for each patient in this table are written. We also created a recipe table to access these prescriptions. When we consider the conditions in Turkey, our country is available by prescription type, expressed as color names, these types of statements we've added to the bill as a separate feature. In addition, the day of prescriptions is an important attribute; therefore, we also have access to the days on which the prescriptions are written under the day column.

User Requirements Specification

- Daily & monthly income
- Daily & monthly outcome
- The drug which is the bestseller based on its type

- The drugs which are fully-supported by government
- Bestseller non-medical drugs
- Daily inventory information
- All expired drugs
- Salaries of the employee
- Whole drugs in the inventory
- Drug count in the inventory with respect to their name
- All drug supplier
- All patient
- All prescriptions that is written in a specific day
- Bestseller drug in a specific month/year
- The date of the last receipt of the specific drug by a patient

The owner of the system will be able to do the things in the below:

1. Drug Management
2. Inventory of the Drug Management
3. Employee Management
4. Drug Supplier Management

Entity Relationship Diagram

The diagram illustrated contains all inter-relations and connections. The bold & underlined ellipses is corresponding to their primary keys, also the nodes that have multi-connections are specified as the foreign keys which are the same values its corresponding data.

Some relation sets have more than one interconnection associated with their foreign keys, it means that some of them is many-to-one and the others one-to-one. As we see in the first draft of the E-R Diagram that there is no one-to-many cardinalities. Perhaps, it would be after we redesign the tables in other revisions, feedbacks.

The rectangles defines entity sets and the ellipses are connected to are their attributes *(entity).*

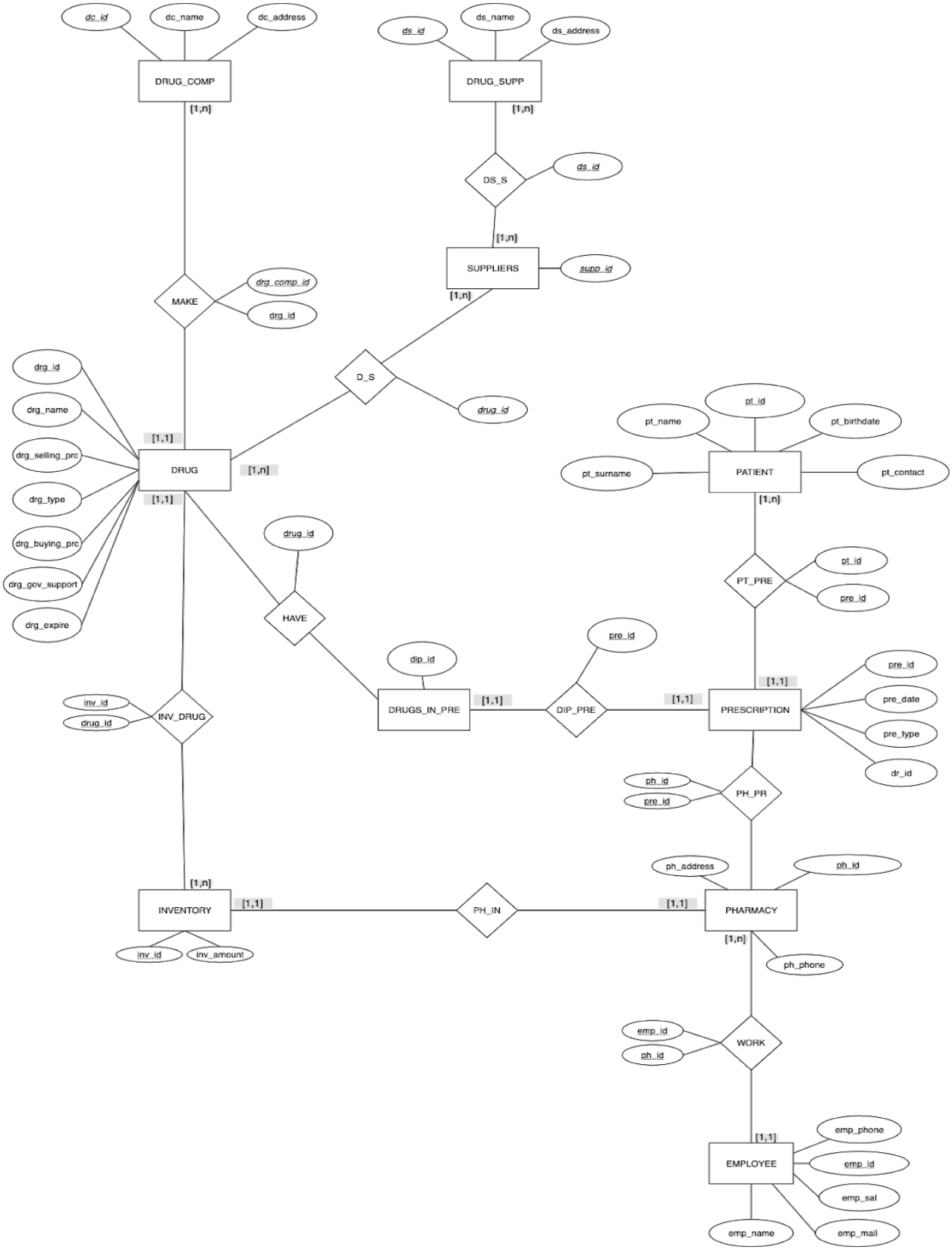


Figure 1: Entity-Relationship Diagrams with All Connections

Schema Design

The management system was built by using the Oracle with version 12c. It provides the illustration and running the code easily.

Reduced Relational Diagram

This diagram does not include relations (which has [0/1] or[1/1] etc.) remove them and distribute the primary keys as foreign keys.

Entities:

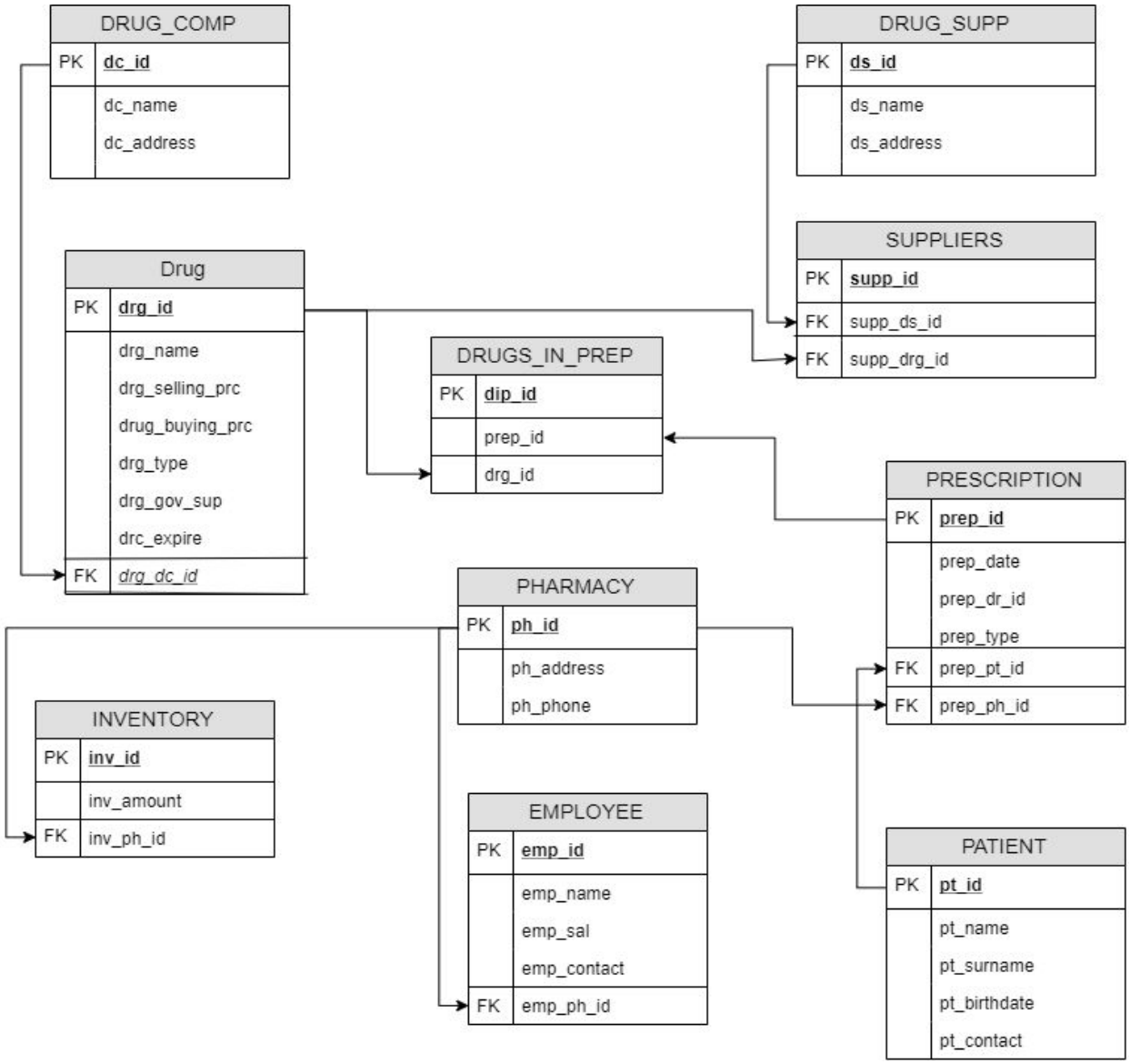
- DRUG_COMP(dc_id,dc_name,dc_address)
- DRUG(drg_id,drg_name,drg_selling_price,drg_buying_price,drg_type,drg_gov_sup,drg_expire,*drg_dc_id*)
- DRUG_SUPP(ds_id,ds_name,ds_address)
- SUPPLIERS(supp_id,*supp_ds_id*,*supp_drg_id*)
- INVENTORY(inv_id,inv_amount,*ph_id*)
- PHARMACY(ph_id, ph_address, ph_phone)
- EMPLOYEE(emp_id, emp_name, emp_sal, emp_contact, *emp_ph_id*)
- PRESCRIPTION(prep_id, prep_date, prep_dr_id, prep_type, *prep_pt_id*, *prep_ph_id*)
- PATIENT(pt_id, pt_name, pt_surname, pt_birthdate, pt_contact)
- DRUGS_IN_PREP(dip_id, *drg_id*, *prep_id*)

Relations:

- ~~MAKE(DRG_COMP_ID, DRG_ID)~~
- ~~INV_DRUG(INV_ID, DRG_ID)~~
- ~~PH_IN()~~
- ~~WORK(EMP_ID, PHA_ID)~~
- ~~PH_PR(PHA_ID, PREP_ID)~~
- ~~PT_PRE(PT_ID, PREP_ID)~~
- ~~DIP_PRE(PREP_ID)~~

- ~~HAVE(DRG_ID)~~
- D_S(DRG_ID)
- DS_S(DS_ID)

Reduced relations are eliminated and we just keep D_S and DS_S.



Drug Schema

Column Name	Data Type	Nullable	Default	Primary Key
DRG_ID	NUMBER(13,0)	No	-	1
DRG_NAME	VARCHAR2(35)	No	-	-
DRG_TYPE	VARCHAR2(15)	No	-	-
DRG_COMP_ID	NUMBER(13,0)	No	-	-
DRG_SELLING_PRC	NUMBER(6,2)	No	-	-
DRG_BUYING_PRC	NUMBER(6,2)	Yes	-	-
DRG_GOV_SUPPORT	NUMBER(2,2)	Yes	-	-
DRG_EXPIRE	DATE	No	-	-

DRG_ID is the product barcode number, that is primary key of the table. DRG_NAME is the name of the product, DRG_TYPE is the type of the drug.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
DRG_FK	Foreign	-	DRG_FK (CENG315BERKAY.DRUG_COMP)	DRG_COMP_ID	NO ACTION	ENABLED	11/20/2019 05:04:33 PM	-	-
DRG_PK	Primary	-	-	DRG_ID	-	ENABLED	11/20/2019 05:04:33 PM	DRG_PK	-
SYS_C0088050612	Check	"DRG_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050613	Check	"DRG_NAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050614	Check	"DRG_TYPE" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050615	Check	"DRG_COMP_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050616	Check	"DRG_SELLING_PRC" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050617	Check	"DRG_EXPIRE" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Drug table

Prescription Schema

Column Name	Data Type	Nullable	Default	Primary Key
PREP_ID	NUMBER(13,0)	No	-	1
PREP_DATE	DATE	No	-	-
PREP_TYPE	VARCHAR2(20)	Yes	-	-
PREP_PT_ID	NUMBER(13,0)	No	-	-
PREP_DR_ID	NUMBER(13,0)	Yes	-	-

Prescription contains all prescriptions that is written by doctors. But our database does not contain doctors, that is because the doctors belong to the hospital database.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
PREP_FK	Foreign	-	PREP_FK (CENG315BERKAY.PATIENT)	PREP_PT_ID	NO ACTION	ENABLED	11/20/2019 05:04:33 PM	-	-
PREP_PK	Primary	-	-	PREP_ID	-	ENABLED	11/20/2019 05:04:33 PM	PREP_PK	-
SYS_C0088050619	Check	"PREP_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050620	Check	"PREP_DATE" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050621	Check	"PREP_PT_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Prescription table

Pharmacy Schema

Column Name	Data Type	Nullable	Default	Primary Key
PHA_ID	NUMBER(11,0)	No	-	1
PHA_CONTACT	NUMBER(11,0)	Yes	-	-
PHA_ADDRESS	VARCHAR2(100)	Yes	-	-

Pharmacy table is one of the most important and critical part of our job. It enables to access employee's attributes,prescription .

'ph_id' is the primary key that represents pharmacy id. 'address' is the varchar typed attribute which specifies where the Pharmacy Branch is. 'phone' attribute is allow to contact with phone number to specified branch. For each branch of pharmacy there can ***work*** at least 1 employee (which is owner) and maximum 'n' employees. That implies you can access to specified employee with 'ph_id'(which is primary key) and employee's attributes. Also there are the same relations with prescription and the drug.By using the 'ph_id' you can access for example; prescription date, type etc.Also there is a relation between pharmacy and its inventory.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
PHA_PK	Primary	-	-	PHA_ID	-	ENABLED	11/20/2019 05:04:33 PM	PHA_PK	-
SYS_C0088050603	Check	"PHA_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Pharmacy table

Inventory Schema

Column Name	Data Type	Nullable	Default	Primary Key
INV_ID	NUMBER(11,0)	No	-	1
INV_AMOUNT	NUMBER(13,0)	Yes	-	-
INV_PHA_ID	NUMBER(11,0)	No	-	-

Inventory table is the common point of the tasks. ‘inv_id’ is the primary and auto incremented key of the table. ‘ph_id’ is specifies which pharmacy owns this inventory *(one of the foreign key)* . ‘amount’ is a integer typed value.There is a relation between inventory and drug. Because each pharmacy stores drugs in their inventory.’amount’ attributes holds how many drugs the specified pharmacy-inventory has.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
INV_FK	Foreign	-	INV_FK (CENG315BERKAY.PHARMACY)	INV_PHA_ID	NO ACTION	ENABLED	11/20/2019 05:04:33 PM	-	-
INV_PK	Primary	-	-	INV_ID	-	ENABLED	11/20/2019 05:04:33 PM	INV_PK	-
SYS_C0088050605	Check	"INV_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050606	Check	"INV_PHA_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Inventory table

Employee Schema

Column Name	Data Type	Nullable	Default	Primary Key
EMP_ID	NUMBER(11,0)	No	-	1
EMP_NAME	VARCHAR2(15)	No	-	-
EMP_SAL	NUMBER(5,0)	Yes	-	-
EMP_CONTACT	VARCHAR2(100)	Yes	-	-

Employee table is stands for working employees in pharmacy branch. ’emp_id’ is the primary key. ‘phone’ is phone number. Also there is ‘mail’ named another contact address of employee. ‘salary’ represents employees salary per month. ‘name’ is full-name of the employee.’ph_id’ is the foreign key of this table. It provides to access workplace (in which pharmacy branch) of specified employee.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
EMP_PK	Primary	-	-	EMP_ID	-	ENABLED	11/20/2019 05:04:33 PM	EMP_PK	-
SYS_C0088050623	Check	"EMP_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050624	Check	"EMP_NAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Employee table

Supplier Schema

Column Name	Data Type	Nullable	Default	Primary Key
SUPP_ID	NUMBER(11,0)	No	-	1
SUPP_DS_ID	NUMBER(11,0)	No	-	-
SUPP_DRG_ID	NUMBER(13,0)	No	-	-

Supplier holds the data that which drug supplied by which drug supplier. It has two different foreign key as an attribute. With combining suppliers schema we can all drugs that specific drug supplier (or drug suppliers) supply and which drug can supply by which drug suppliers

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
SUPP_FK_1	Foreign	-	SUPP_FK_1 (CENG315BERKAY.DRUG_SUPP)	SUPP_DS_ID	NO ACTION	ENABLED	11/20/2019 05:04:33 PM	-	-
SUPP_FK_2	Foreign	-	SUPP_FK_2 (CENG315BERKAY.DRUG)	SUPP_DRG_ID	NO ACTION	ENABLED	11/20/2019 05:04:33 PM	-	-
SUPP_PK	Primary	-	-	SUPP_ID	-	ENABLED	11/20/2019 05:04:33 PM	SUPP_PK	-
SYS_C0088050626	Check	"SUPP_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050627	Check	"SUPP_DS_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050628	Check	"SUPP_DRG_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Supplier Schema

Drug Company Schema

Column Name	Data Type	Nullable	Default	Primary Key
DC_ID	NUMBER(11,0)	No	-	1
DC_NAME	VARCHAR2(20)	No	-	-
DC_ADDRESS	VARCHAR2(100)	Yes	-	-

Drug company is a firm that manufacture medicines. Pfizer and Bayer can be an example of drug companies. Address holds headquarters, and name attribute holds the name of company.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
DC_PK	Primary	-	-	DC_ID	-	ENABLED	11/20/2019 05:04:32 PM	DC_PK	-
SYS_C0088050597	Check	"DC_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:32 PM	-	-
SYS_C0088050598	Check	"DC_NAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:32 PM	-	-

Fig. The model of Drug Company table

Drug Supplier Schema

Column Name	Data Type	Nullable	Default	Primary Key
DS_ID	NUMBER(11,0)	No	-	1
DS_NAME	VARCHAR2(20)	No	-	-
DS_ADDRESS	VARCHAR2(100)	Yes	-	-

Drug supplier is the firm that hold big amount of drugs and deliver to the pharmacies whenever they need. DS_ID (Which is the FK of the table Suppliers) is the primary key of this schema. Name holds the name of Drug supplier and address implies the location of Drug supplier.

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
DS_PK	Primary	-	-	DS_ID	-	ENABLED	11/20/2019 05:04:32 PM	DS_PK	-
SYS_C0088050600	Check	"DS_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:32 PM	-	-
SYS_C0088050601	Check	"DS_NAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:32 PM	-	-

Fig. The model of Drug Supplier table

Patient Schema

Column Name	Data Type	Nullable	Default	Primary Key
PT_ID	NUMBER(11,0)	No	-	1
PT_NAME	VARCHAR2(15)	No	-	-
PT_SURNAME	VARCHAR2(20)	No	-	-
PT_BIRTHDATE	DATE	Yes	-	-
PT_CONTACT	VARCHAR2(100)	Yes	-	-

Constraint	Type	Search Condition	Related Constraint	Columns	Delete Rule	Status	Last Change	Index	Invalid
PT_PK	Primary	-	-	PT_ID	-	ENABLED	11/20/2019 05:04:33 PM	PT_PK	-
SYS_C0088050608	Check	"PT_ID" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050609	Check	"PT_NAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-
SYS_C0088050610	Check	"PT_SURNAME" IS NOT NULL	-	-	-	ENABLED	11/20/2019 05:04:33 PM	-	-

Fig. The model of Patient table

Tables

The dummy data is added to corresponding tables and generated to illustrate the small pharmacy for draft. You can see the some of the generated tables as below.

Prescription Table

PREP_ID	PREP_DATE	PREP_TYPE	PREP_PT_ID	PREP_DR_ID
1	05/24/2019	MEDICINE	1	2
2	09/10/2019	MEDICINE	2	15
3	10/03/2019	MEDICINE	2	6
4	02/14/2019	MEDICINE	2	12
5	09/20/2019	MEDICINE	4	7
6	11/18/2019	MEDICINE	8	4
7	11/16/2019	MEDICINE	9	1
8	09/01/2019	MEDICINE	10	9

Pharmacy Table

PHA_ID	PHA_CONTACT	PHA_ADDRESS
1	02123553535	GUZELYALI/IZMIR
2	02123555555	GUZELYALI/IZMIR
3	02124204848	URLA/IZMIR
4	02127888484	HATAY/IZMIR
5	02128509698	CESME/IZMIR
6	02122345678	ALACATI/IZMIR
7	02127894523	KONAK/IZMIR

Inventory Table

INV_ID	INV_AMOUNT	INV_PHA_ID
1	1500	2
2	250	1
3	1000	1
4	500	3
5	1500	4
6	600	4
7	750	5
8	900	5
9	3000	6
10	2350	7
11	1750	7
12	1250	7

Employee Table

EMP_ID	EMP_NAME	EMP_SAL	EMP_CONTACT	EMP_PHA_ID
1	CALVIN KLEIN	2020	+901235424343	1
2	ERŞAN KUNERİ	1875	+905433734879	7
3	FRANK SİNATRA	2020	+905544747380	7
4	KEMAL SUNAL	2220	+905362575727	4
5	ERTEM ŞENER	2320	+905457855968	6
6	ABRAHAM LINCOLN	1213	+905452257545	1
7	MADISON	1665	+905536522973	2

Drug Company Table

DC_ID	DC_NAME	DC_ADDRESS
1	Pfizer	Pfizer Türkiye, Ortaköy 34347 İstanbul - Türkiye
2	Bayer	UNKNOWN
3	Roche	Foundation Medicine, Inc. 150 Second Street Cambridge MA 02141
4	Abbvie	USA
5	JOHNSON&JOHNSON	New Brunswick, New Jersey, USA
6	Sanofi	Paris/France
7	MERCK	NEW JERSEY/USA
8	NOVARTIS	BASEL/SWITZERLAND
9	GILEAD	CALIFORNIA/USA
10	AMGEN	CALIFORNIA/USA

Drug Supplier Table

DS_ID	DS_NAME	DS_ADDRESS
1	SELCUK ECZA DEPOSU	Buca Organize Sanayi Bölgesi/Konak/İzmir
2	DILEK ECZA DEPOSU	Karşıyaka/İzmir
3	EDAK ECZA DEPOSU	Balçova/İzmir
4	FARUK ECZA DEPOSU	Tepecik/İzmir
5	GUNDAN ECZA DEPOSU	Gunaltay/Konak/İzmir

Patient Table

PT_ID	PT_NAME	PT_SURNAME	PT_BIRTHDATE	PT_CONTACT
1	GERALT	ORIVIA	05/24/1915	Corvo Bianco/Toussaint
2	JOHN	DOE	05/24/1915	Manhattan/New York/United States
3	BOJACK	HORSEMAN	01/02/1964	Hollywoo/California/United States
4	WALTER	WHITE	04/13/1958	Albuquerque/New Mexico/United States
5	JESSE	PINKMAN	09/14/1984	Alaska/United States
6	DOGUKAN	GOK	06/25/1999	BARIS MAH. 353.SK NO.94/2 BUCA/IZMIR
7	SAID	ALIR	11/11/1993	IZMIR/TURKEY
8	CAGDAS BERKAY	VURKAN	08/30/1995	IZMIR/TURKEY
9	MERT	CALIS	06/25/1999	IZMIR/TURKEY
10	EFEKAN	GOK	10/23/2012	BARIS MAH. 353.SK NO.94/2 BUCA/IZMIR
11	JOHNNY	PETERS	04/05/1997	London/England
12	OLIVER	MORRIS	02/05/1989	London/England
13	VLADIMIR	SEMYONOV	06/07/1976	London/England
14	EMILIANO RUBEN	GARCIA	08/03/1994	Mexico City/Mexico
15	BRENDAN	MOORE	07/07/1999	Sydney/Australia