Insurance System Database

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Problem Description (part 1)

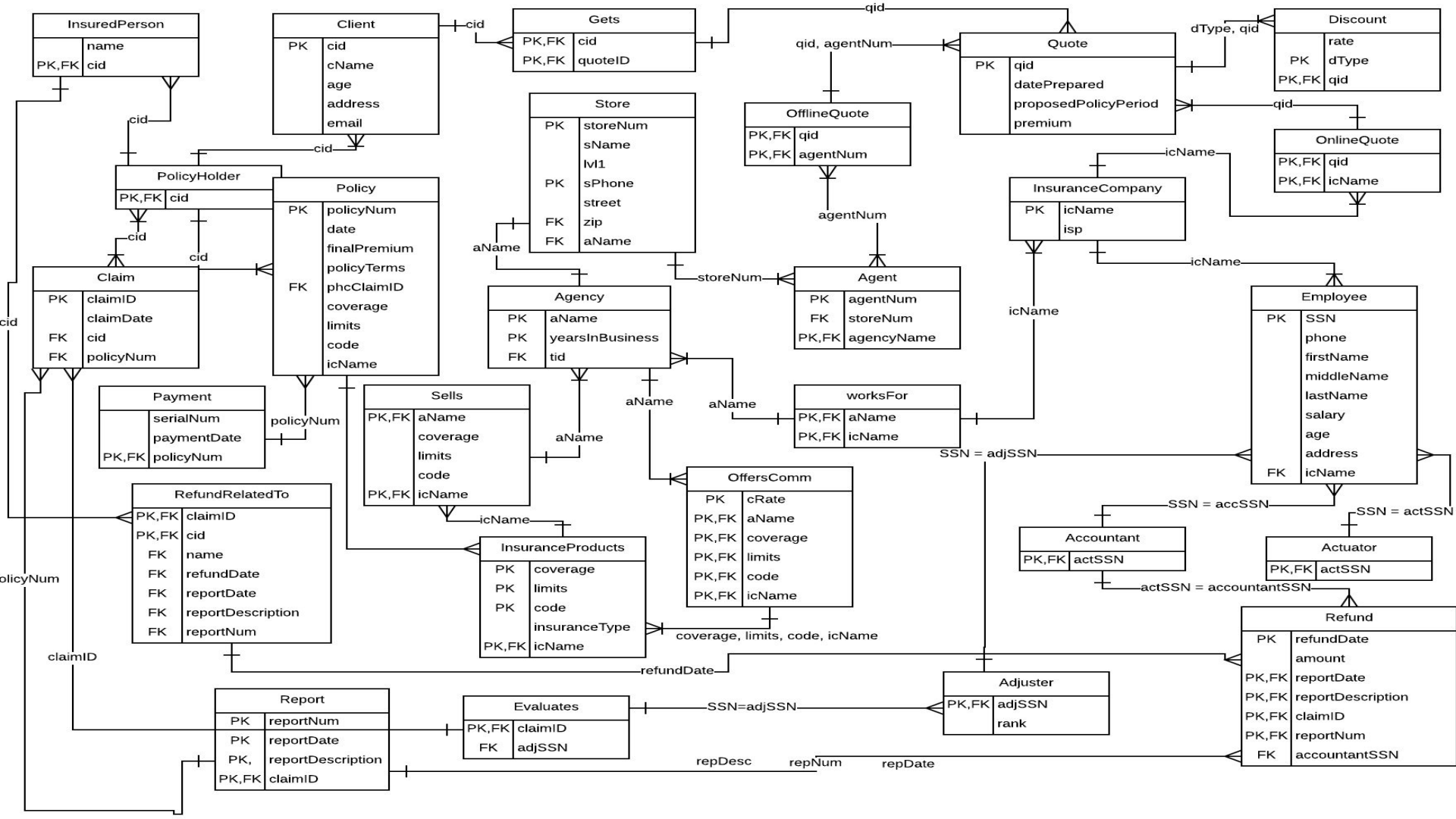
The premises of my proposal is to implement a database that consists of an insurance management system that will provide services to clients, insurance companies and agents. We will design, develop, and test the Insurance Management System in order to expand my knowledge and experience with designing relational databases.

-A client can get insurance quotes and file claims more than once. Each client contains a Client ID, Name, Age, Address, Phone Number, and an Email address that is recorded into the database system.

Provides 2 ways for clients to get quotes on their insurance plans. These ways are online with insurance companies and more physical with the insurance agents. Each quote contains the attributes Quote ID, Date Prepared, Proposed Policy Period, and Premium. This all pertains to an individual client. Some of these quotes have discounts which are directly related to discount name and the quote itself. Each individual quote can contain more than one discount within it.

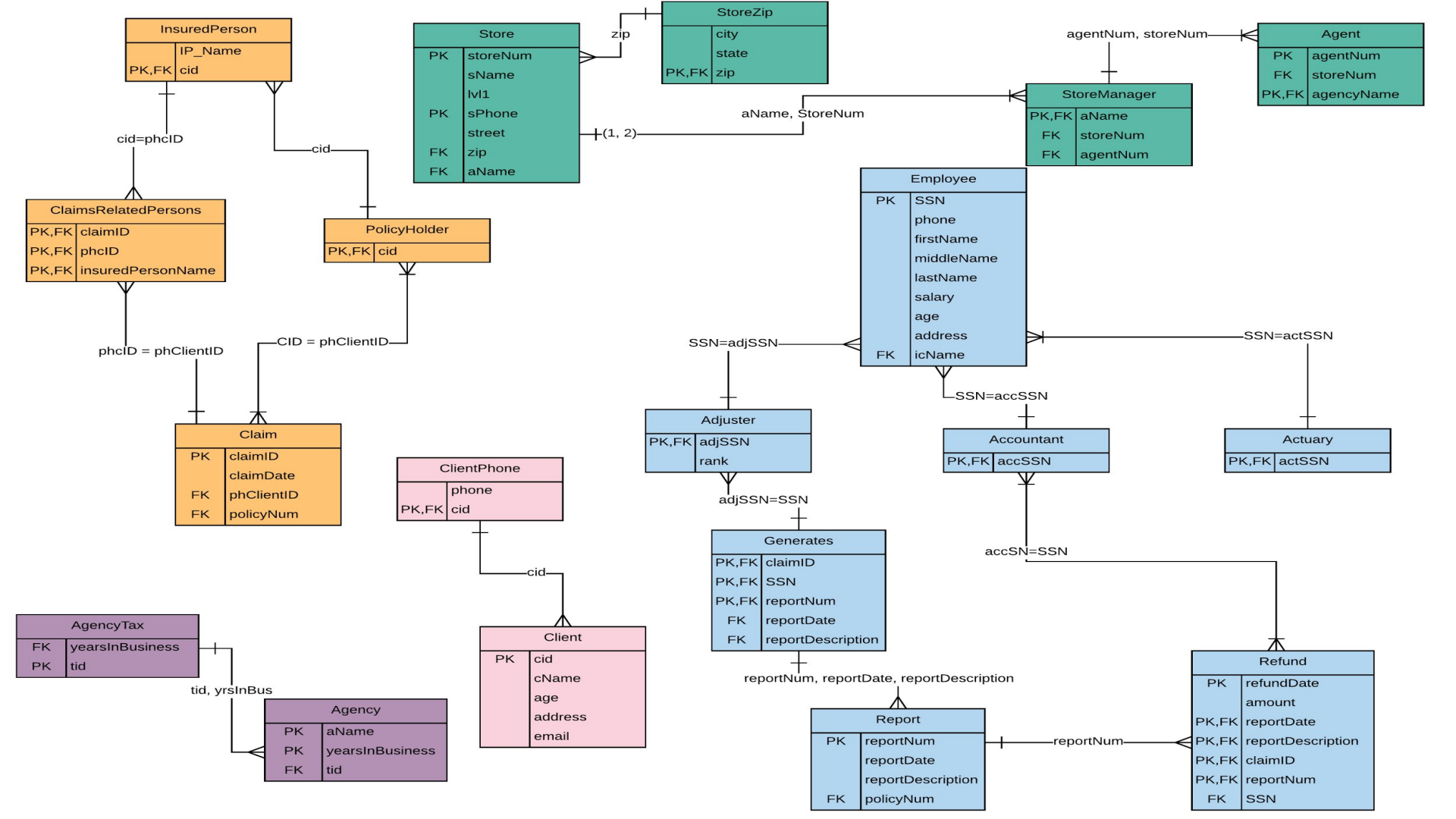
ER Diagrams

Main ER Diagram


InsuredPerson
name
PK,FK cid
Client
PK cid
cName
age
address
email
Gets
PK,FK cid
PK,FK quoteID
Quote
PK qid
datePrepared
proposedPolicyPeriod
premium
Discount
rate
PK dType
PK,FK qid
OfflineQuote
PK,FK qid
PK,FK agentNum
OnlineQuote
PK,FK qid
PK,FK icName
PolicyHolder
PK,FK cid
Policy
PK policyNum
date
finalPremium
policyTerms
FK phcClaimID
coverage
limits
code
icName
Store
PK storeNum
sName
lvl1
PK sPhone
street
FK zip
FK aName
InsuranceCompany
PK icName
isp
Claim
PK claimID
claimDate
FK cid
FK policyNum
Agency
PK aName
PK yearsInBusiness
FK tid
Agent
PK agentNum
FK storeNum
PK,FK agencyName
Employee
PK SSN
phone
firstName
middleName
lastName
salary
age
address
FK icName
Payment
serialNum
paymentDate
PK,FK policyNum
Sells
PK,FK aName
coverage
limits
code
PK,FK icName
worksFor
PK,FK aName
PK,FK icName
RefundRelatedTo
PK,FK claimID
PK,FK cid
FK name
FK refundDate
FK reportDate
FK reportDescription
FK reportNum
OffersComm
PK cRate
PK,FK aName
PK,FK coverage
PK,FK limits
PK,FK code
PK,FK icName
InsuranceProducts
PK coverage
PK limits
PK code
insuranceType
PK,FK icName
Accountant
PK,FK actSSN
Actuator
PK,FK actSSN
Refund
PK refundDate
amount
PK,FK reportDate
PK,FK reportDescription
PK,FK claimID
PK,FK reportNum
FK accountantSSN
Report
PK reportNum
PK reportDate
PK, reportDescription
PK,FK claimID
Evaluates
PK,FK claimID
FK adjSSN
Adjuster
PK,FK adjSSN
rank
cid
qid
qid, agentNum
dType, qid
icName
agentNum
aName
storeNum
policyNum
SSN = adjSSN
SSN = accSSN
SSN = actSSN
actSSN = accountantSSN
coverage, limits, code, icName
claimID
refundDate
SSN=adjSSN
repDesc
repNum
repDate

Partial ER Diagram

was not allowed to use any more objects w/o paying via lucidchart


InsuredPerson
IP_Name
PK,FK cid
Store
PK storeNum
sName
lvl1
PK sPhone
street
FK zip
FK aName
StoreZip
city
state
PK,FK zip
zip
Agent
PK agentNum
FK storeNum
PK,FK agencyName
agentNum, storeNum
StoreManager
PK,FK aName
FK storeNum
FK agentNum
aName, StoreNum
(1, 2)
cid=phcID
cid
ClaimsRelatedPersons
PK,FK claimID
PK,FK phcID
PK,FK insuredPersonName
PolicyHolder
PK,FK cid
Employee
PK SSN
phone
firstName
middleName
lastName
salary
age
address
FK icName
SSN=adjSSN
SSN=actSSN
SSN=accSSN
phcID = phClientID
CID = phClientID
Claim
PK claimID
claimDate
FK phClientID
FK policyNum
Adjuster
PK,FK adjSSN
rank
Accountant
PK,FK accSSN
Actuary
PK,FK actSSN
ClientPhone
phone
PK,FK cid
adjSSN=SSN
Generates
PK,FK claimID
PK,FK SSN
PK,FK reportNum
FK reportDate
FK reportDescription
accSN=SSN
cid
Client
PK cid
cName
age
address
email
AgencyTax
FK yearsInBusiness
PK tid
tid, yrsInBus
Agency
PK aName
PK yearsInBusiness
FK tid
reportNum, reportDate, reportDescription
Report
PK reportNum
reportDate
reportDescription
FK policyNum
reportNum
Refund
PK refundDate
amount
PK,FK reportDate
PK,FK reportDescription
PK,FK claimID
PK,FK reportNum
FK SSN

Create Table Statements

Client Table

```
CREATE TABLE Clients (
        cid                 char(6),
        clientName          char(30),
        age                 numeric,
        address             char(40),
        email               char(40),
PRIMARY KEY(cid)
);
```

Functional Dependencies

Cid → clientName, age, address, email

Sample Data

SELECT * FROM Clients;

```
5  SELECT * FROM Clients;
```

Data Output | Explain | Messages | History

cid character	clientname character	age numeric	address character	email character
c001	Alan Labouseur	25	3399 N Rd	Alan.Labouseur@marist.edu
c002	Alex Richin	21	37 Kelsey Rd	Alexander.Richin1@marist.edu
c003	Danielle DiLonardo	29	313 W High St	DanielleDilonardo@gmail.com
c004	John Smith	42	219 West Cedar St	John.Smith@gmail.com
c005	Daniel Nelson	21	29 Parker Pl	Daniel.Nelson@yahoo.com
c006	Sean Hayden	35	88 Houstan Ave	Sean.Hayden@marist.edu
c007	John Locke	41	64 Geremy Rd	J_locke@aol.com
c008	Sarah Thea	32	711 Rodger Pl	S.R@gmail.com
c009	Jaiden Martin	41	32 Pike Rd	Jaiden_Sm@yahoo.com
c010	George Wright	54	981 Main St	GEWR@microsoft.com
c011	Jeremy Renner	37	21 HollyWood Ave	J_renner@stars.com
c012	Liam Johnson	62	45 Hawthorne Rd	L_johnson@gmail.com
c013	Andreas Karsiotis	32	21 Anglewood Ave	Andreas.Karsiotis@rowan.edu
c014	Jamie Ricky	26	467 Killington Pl	Jamie.Rick@yahoo.com
c015	Martin Henry	72	71 Almond Tr	MangoMartin@aol.com
c016	Henry Pratt	35	23 Angel Rd	Henry.Pratt@marist.edu
c017	Patrick Trainor	43	10 Allendale Rd	Ptrain@gmail.com
c018	Dr. Labouseur	27	55 Alan Dr	Dr.Alan.Labouseur@marist.edu
c019	Professor Alan	29	23 Labouseur Ln	Prof_AlanL@marist.edu

ClientPhone Table

CREATE STATEMENT:

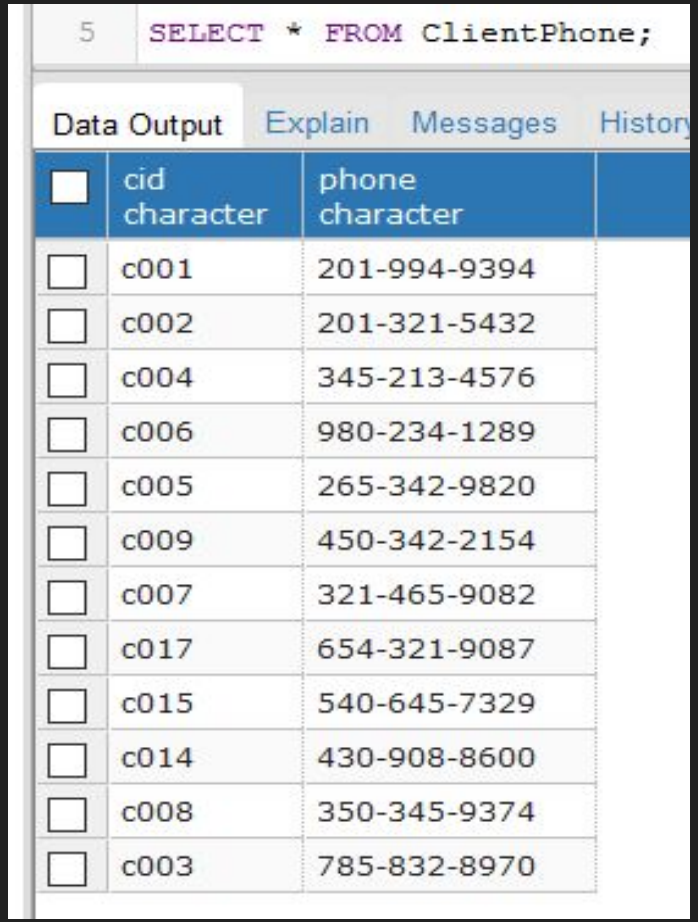
```
CREATE TABLE ClientsPhone (
      cid         char(6) references Clients(cid),
      phone     char(12),
PRIMARY KEY(cid, phone)
);
```

Functional Dependencies

Cid → phone

Sample Output:

SELECT * FROM ClientPhone;



cid character	phone character
c001	201-994-9394
c002	201-321-5432
c004	345-213-4576
c006	980-234-1289
c005	265-342-9820
c009	450-342-2154
c007	321-465-9082
c017	654-321-9087
c015	540-645-7329
c014	430-908-8600
c008	350-345-9374
c003	785-832-8970

PolicyHolder Table

```
CREATE TABLE PolicyHolder (
        cid      char(6) references Clients(cid),
PRIMARY KEY(cid)
);
```

FUNCTIONAL DEPENDENCIES:

Cid → cid

```
5  SELECT * FROM PolicyHolder;
```

Data Output | Explain | Messages | Histor

cid character
c001
c003
c005
c007
c008
c010
c012
c017
c014
c002

InsuredPerson Table

```
CREATE TABLE InsuredPerson (
        name        char(30) not null unique,
        cid     char(6) not null unique references Clients(cid),
PRIMARY KEY(name, cid)
);
```

Functional Dependencies:

Name, cid → name, cid

Sample Data:

```
5
6   SELECT * FROM InsuredPerson;
```

Data Output | Explain | Messages | History

name character	cid character
Dr. Labouseur	c018
Alan Labouseur	c001
Professor Alan	c019
Alex Richin	c002
Patrick Trainor	c017
Liam Johnson	c012
John Smith	c004
George Wright	c010
Henry Pratt	c016

Quote Table

```
CREATE TABLE Quote (
        qid                     char(6) NOT NULL UNIQUE,
        datePrepared            date,
        proposedPolicyPeriod    numeric,
        premium                 numeric(10,2),
PRIMARY KEY(qid)
);
```

Functional Dependencies

Cid → datePrepared, proposedPolicyPeriod, premium

Sample Data:

```
4
5  SELECT * FROM Quote;
```

Data Output | Explain | Messages | History

qid character	dateprepared date	propose... numeric	premium numeric (10,2)
q001	2016-04-10	5	100025.5
q002	2016-04-11	2	100055.72
q003	2016-04-10	6	12075.2
q004	2016-04-13	9	15000
q005	2016-04-12	20	175000
q006	2016-04-12	15	15000
q007	2016-03-19	10	20000
q008	2016-03-18	4	25000.5
q009	2016-03-20	10	785000.76
q010	2016-05-16	28	1235110
q011	2016-05-19	51	2222222.22
q012	2016-10-20	25	50000050.05

AgencyTaxID Table

```
create table AgencyTaxID (
        tid                     char(10) not null,
        yrsInBus                numeric,
primary key(tid)
);
```

Functional Dependencies:

Tid → yrsInBus

Sample Data

```
4
5   SELECT * FROM AgencyTaxID;
```

Data Output | Explain | Messages | Histor

tid character	yrsinbus numeric
t001	5
t002	3
t003	6
t004	7
t005	10
t006	15
t007	4
t008	5
t009	7
t010	27

Agency Table

Query: SELECT * FROM Agency;

```
CREATE TABLE Agency (
        aName       char(20) not null unique,
        tid         char(10) references AgencyTaxID(tid),
PRIMARY KEY(aName)
);
```

Functional Dependencies:

aName → tid

Sample Data:

```
4
5   SELECT * FROM Agency;
```

Data Output | Explain | Messages

aname character	tid character
Milford	t003
Jennings	t008
Mendleton	t005
Pierson	t009
Richard Co.	t010

StoreZip Table

```
CREATE TABLE StoreZip (
        city            char(20),
        state           char(20),
        zip             numeric(5,0),
PRIMARY KEY(zip)
);
```

Functional Dependencies

Zip → state, zip

Sample Data:

```
4
5   SELECT * FROM StoreZip;
```

Data Output | Explain | Messages | History

city character	state character	zip numeric (5)
Alanville	New York	12604
Denver	Colorado	8723
Boston	Mass.	26734
Seattle	Washington	73512
Sacremento	California	8341

Store Table

```
CREATE TABLE Store (
        storeNum        numeric not null unique,
        storeName       char(20),
        lvl1            integer,
        sPhone          char(12),
        zip             numeric(5,0) references StoreZip(zip),
        aName           char(20) references Agency(aName),
        street          numeric,
PRIMARY KEY(storeNum, aName)

);
```

Functional Dependencies:

storeNum, aName → storeName, lvl1, sPhone, street, zip

Sample Data

```
9  SELECT * FROM Store;
```

Data Output | Explain | Messages | History

storenum numeric	storename character	lvl1 integer	sphone character	zip numeric ...	aname character	street numeric
100	Alans Store	2	201-443-2345	12604	Milford	80
101	Alexs store	5	201-342-5432	26734	Jennings	30
102	Johns store	10	543-234-4567	8723	Mendleton	67
103	JLB	15	321-456-3254	73512	Richard Co.	187
104	Pierson Place	10	211-345-9823	8341	Pierson	95

Agent Table

```
CREATE TABLE Agent (
        agentNum            numeric not null unique,
        storeNum            numeric references Store(storeNum),
        aName               char(20) references Agency(aName),
PRIMARY KEY(agentNum)
);
```

Functional Dependencies:

agentNum → storeNum, agencyName

Sample Data

```
8  SELECT * FROM Agent;
```

Data Output | Explain | Messages | History

agentnum numeric	storenum numeric	aname character
100	100	Milford
101	102	Mendleton
102	102	Mendleton
103	101	Jennings
104	100	Milford
105	103	Richard Co.
106	104	Pierson
107	103	Richard Co.
108	104	Pierson

InsuranceCompany Table

```
CREATE TABLE InsuranceCompany (
        icName          char(20) not null unique,
        isp             char(20),
        website         char(40),
        address         char(40),
        email           char(20),
        phone           char(12),
PRIMARY KEY(icName)
);
```

Sample Data:

```
5  SELECT * FROM InsuranceCompany;
```

Data Output | Explain | Messages | History

icname character	isp character	website character	address character	email character	phone character
State Farm Insurance	ISP-0101	statefarm.com	31 milton rd	statefarm@insurance.com	111-111-1111
Geico Insurance	ISP-0202	geico.com	24 george st	insurance@geico.com	201-342-3434
Allstate Insurance	ISP-0303	allstate.com	1 cedar st	insurance@allstate.com	321-342-3421
Alan Insurance	ISP-0404	alan.com	2 alan ct	alan_insurance@alan.com	201-342-3421
Labouseur Insurance	ISP-0505	Labouseur.com	3 old chimney rd	labouseur_inurance@la...	845-321-3452
RichIn Insurance	ISP-0606	richIn.com	81 lane rd	richin_insurance@richIn....	201-446-7400

Functional Dependencies:

icName → isp, website, address, email, phone

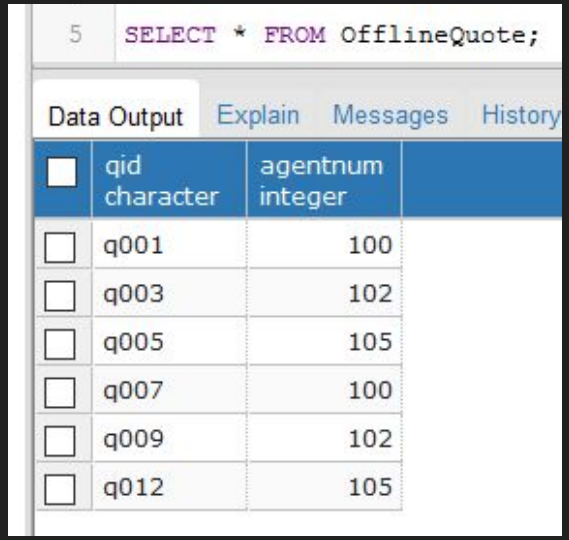
OfflineQuote Table

```
CREATE TABLE OfflineQuote (
        qid             char(7) references Quote(qid) not null,
        agentNum        integer references Agent(agentNum),
PRIMARY KEY(qid)
);
```

Functional Dependencies:

Qid → agentNum

Sample Data:



```
5  SELECT * FROM OfflineQuote;
```

Data Output | Explain | Messages | History

qid character	agentnum integer
q001	100
q003	102
q005	105
q007	100
q009	102
q012	105

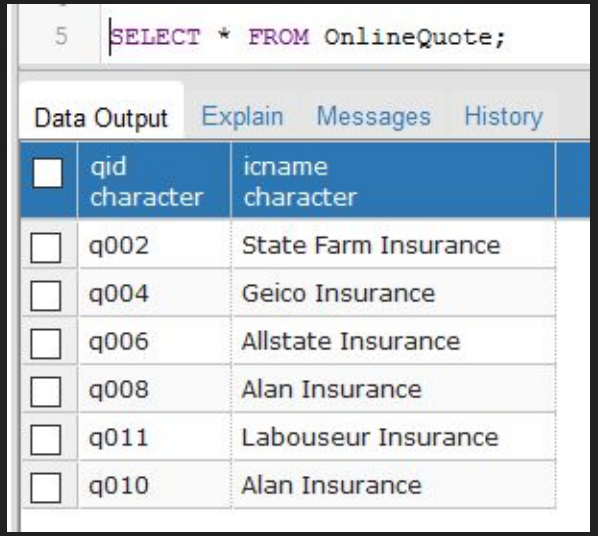
OnlineQuote Table

```
CREATE OnlineQuote (
        qid             char(7) references Quote(qid) not null,
        icName          char(20) references InsuranceCompany(icName),
PRIMARY KEY(qid)
);
```

Functional Dependencies:

Qid → icName

Sample Data:



qid character	icname character
q002	State Farm Insurance
q004	Geico Insurance
q006	Allstate Insurance
q008	Alan Insurance
q011	Labouseur Insurance
q010	Alan Insurance

InsuranceProducts Table

```
CREATE TABLE InsuranceProducts (
        coverage            char(40) not null unique,
        limits              char(40) not null unique,
        code                char(20) not null unique,
        insuranceType       char(10),
        icName              char(20)  not null unique references InsuranceCompany(icName),
PRIMARY KEY(coverage, limits, code, icName)
);
```

Functional Dependencies:

Coverage, limits, code, icName → insuranceType

```
5   SELECT * FROM InsuranceProducts;
```

Data Output | Explain | Messages | History

coverage character	limits character	code character	insurancetype character	icname character
cov-50	lim-20	c000	it-00-10	Alan Insurance
cov-51	lim-21	c001	it-00-11	Labouseur Insurance
cov-52	lim-22	c002	it-00-12	RichIn Insurance
cov-53	lim-23	c003	it-00-13	Geico Insurance
cov-54	lim-24	c004	it-00-14	Allstate Insurance
cov-55	lim-25	c005	it-00-15	State Farm Insurance

Discount Table

```
CREATE TABLE Discount (
        rate            float(8),
        dType           char(20) not null unique,
        qid             char(7) references Quote(qid),
PRIMARY KEY(dType, qid)
);
```

Functional Dependencies:

dType, qid → rate

Sample Data

```
5   SELECT * FROM Discount;
```

Data Output | Explain | Messages | History

rate real	dtype character	qid character
0.12	d-0-1	q001
0.13	d-0-2	q002
0.1221	d-0-3	q003
0.1224	d-0-4	q004
0.1214	d-0-5	q005
0.1254	d-0-6	q006
0.1298	d-0-7	q007

Employee Table

```
create table Employee (
        SSN                 char(11) not null unique,
        phone               char(12),
        firstName           char(20),
        middleInitial       char(20),
        lastName            char(20),
        salary              float(8),
        age                 integer,
        address             char(40),
        icName              char(20) references InsuranceCompany(icName),
primary key(SSN)
);
```

```
5  SELECT * FROM Employee;
```

Data Output | Explain | Messages | History

ssn character	phone character	firstname character	middleini... character	lastname character	salary real	age integer	address character	icname character
10-2000-200	201-456-7892	John	F	Doe	80000	35	10 mill rd	Alan Insurance
20-2000-200	202-456-7892	Alan	G	Labouseur	8000000	28	9 mill rd	Alan Insurance
30-3000-300	203-456-7892	Alex	J	Richin	85000	31	11 mill rd	Labouseur Insurance
40-4000-400	204-456-7892	Pete	L	Mattheus	100000	27	12 mill rd	RichIn Insurance
50-5000-500	205-456-7892	George	A	Johnson	90000	39	15 mill rd	Geico Insurance

Functional Dependencies:

SSN → phone, firstName, middleInital, lastName, salary, age, address, icName

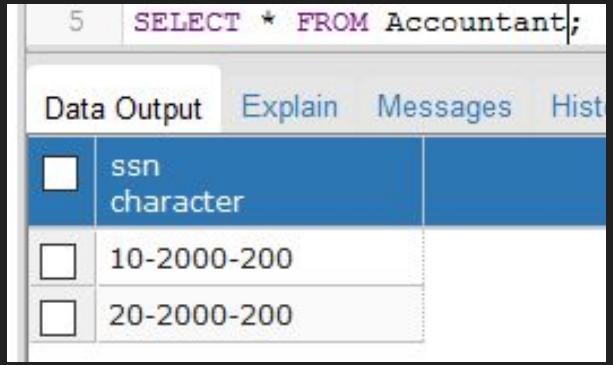
Accountant Table

```
CREATE TABLE Accountant (
        SSN    char(11) references Employee(SSN),
PRIMARY KEY(SSN)
);
```

Functional Dependencies:

SSN ⟶ SSN

Sample Data



Adjuster Table

```
CREATE TABLE Adjuster (
        SSN             char(11) references Employee(SSN),
        rank            integer,
PRIMARY KEY(SSN)
);
```

Functional Dependencies:

Employee.SSN → Adjuster.SSN, rank

Sample Data

```
5   SELECT * FROM Adjuster;
```

Data Output | Explain | Messages | Hist

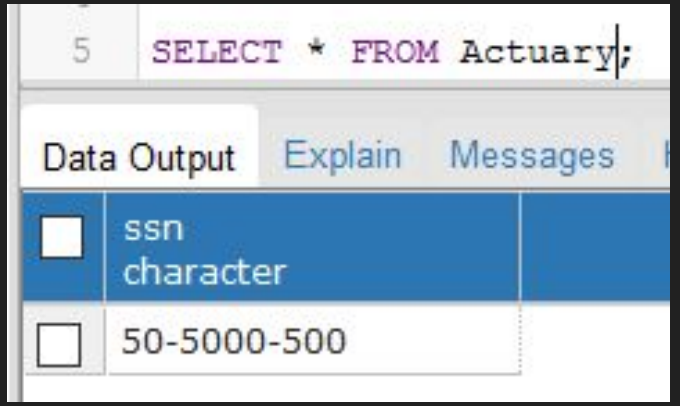
ssn character	rank integer
30-3000-300	2
40-4000-400	5

Actuator Table

```
CREATE TABLE Actuator (
        SSN char(11) references Employee(SSN),
PRIMARY KEY(SSN)
);
```

Functional Dependencies:

Employee(SSN) → Actuator(SSN)



Policy

```
CREATE TABLE Policy (
        policyNum           integer,
        pDate               char(20),
        finalPremium        float(8),
        policyTerms         char(40),
        phClientID          char(12) references PolicyHolder(cid),
        coverage            char(40) references InsuranceProducts(coverage),
        limits              char(40) references InsuranceProducts(limits),
        code                char(20) references InsuranceProducts(code),
        icName              char(20) references InsuranceProducts(icName),
PRIMARY KEY(policyNum)
);
```

Functional Dependencies:

policyNum→ pDate, finalPremium, policyTerms, phClientID, coverage, limits, code, icName

```
5  SELECT * FROM Policy;
```

Data Output | Explain | Messages | History

policynum integer	pdate date	finalpre... real	policyterms character	cid character	coverage character	limits character	code character	icname character
1001	2016-10-10	250	policy terms - 1	c001	cov-50	lim-20	c000	Alan Insurance
1002	2016-10-10	200	policy terms - 2	c003	cov-51	lim-21	c001	Labouseur Insurance
1003	2016-10-11	250	policy terms - 3	c005	cov-52	lim-22	c002	RichIn Insurance
1004	2016-10-11	225	policy terms - 4	c007	cov-53	lim-23	c003	Labouseur Insurance
1005	2016-10-12	150	policy terms - 5	c010	cov-55	lim-25	c005	State Farm Insurance

Sample Data ←

Claim Table

```
CREATE TABLE Claim (
        claimID             char(12),
        claimDate           date,
        phClientID          char(6) references PolicyHolder(cid),
        policyNum           integer references Policy(policyNum),
PRIMARY KEY(claimID)
);
```

Functional Dependencies:

claimID→ claimDate, phClientID, policyNum

```
5  SELECT * FROM claim;
```

Data Output | Explain | Messages | History

claimid character	claimdate character	cid character	policynum integer
claim-100	10-10-2016	c001	1001
claim-101	10-10-2016	c003	1002
claim-102	10-10-2016	c005	1003
claim-103	10-10-2016	c010	1005
claim-104	10-10-2016	c007	1004

Payment Table

```
CREATE TABLE Payment (
        serialNum               integer not null unique,
        paymentDate             char(20),
        policyNum               integer references Policy(policyNum),
PRIMARY KEY(policyNum)
);
```

Functional Dependencies:

serialNum, policyNum → paymentDate

```
5   SELECT * FROM Payment;
```

Data Output | Explain | Messages | History

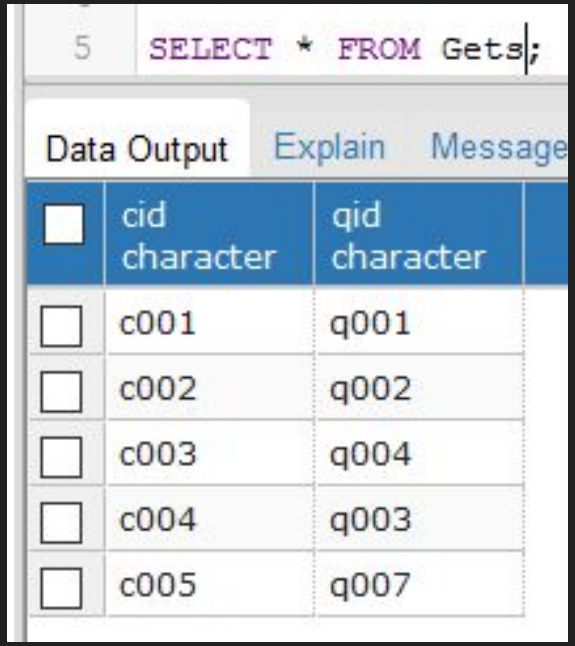
serialnum integer	paymentdate character	policynum integer
12345	10-10-2016	1001
12346	10-10-2016	1002
12347	10-11-2016	1003
12348	10-11-2016	1004
12349	10-12-2016	1005

Gets Table

```
CREATE TABLE Gets (
        cid             char(6) references Client(cid),
        qid             char(7) references Quote(qid),
PRIMARY KEY(cid, qid)
);
```

Functional Dependencies:

Cid, qid → cid, qid



cid character	qid character
c001	q001
c002	q002
c003	q004
c004	q003
c005	q007

Report Table

```
CREATE TABLE Report (
        reportNum                   integer not null unique,
        reportDate                  char(20) not null unique,
        reportDescription           char(40) not null unique,
        claimID                     char(12) not null references Claim(claimID),
PRIMARY KEY(reportNum, reportDate, reportDescription, claimID)
);
```

Functional Dependencies:

reportNum, reportDate, reportDescription, claimID →

```
5  SELECT * FROM Report;
```

Data Output | Explain | Messages | History

reportnum integer	reportdate character	reportdescripti... character	claimid character
100	10-10-2016	description-1	claim-100
101	10-11-2016	description-2	claim-101
102	10-12-2016	description-3	claim-102
103	10-13-2016	description-4	claim-103

WorksFor Table

```
CREATE TABLE WorksFor (
        aName        char(20) references Agency(aName),
        icName       char(20) references InsuranceCompany(icName),
PRIMARY KEY(aName,icName)
);
```

Functional Dependencies:

aName, icName →

```
5   SELECT * FROM WorksFor;
```

Data Output | Explain | Messages | Hist

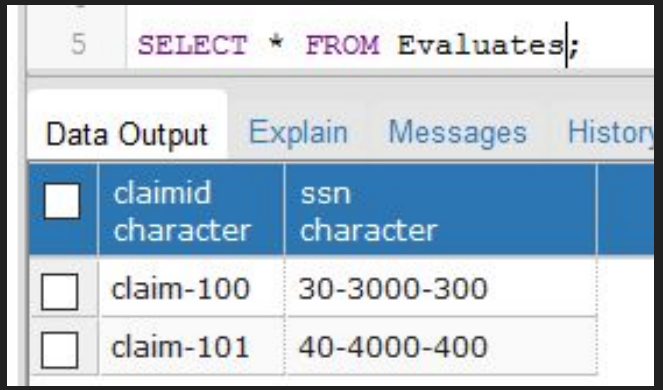
aname character	icname character
Pierson	Alan Insurance
Mendleton	Geico Insurance
Jennings	RichIn Insurance
Milford	Allstate Insurance

Evaluates Table

```
CREATE TABLE Evaluates (
        claimID                 char(12) references Claim(claimID),
        SSN                     char(11) references Adjuster(SSN),
PRIMARY KEY(ClaimID,adjSSN)
);
```

Functional Dependencies:

claimID, adjSSN→



OfferCom Table

```
CREATE TABLE OffersCom (
        cRate           float(8),
        aName           char(20) references Agency(aName),
        coverage        char(40) references InsuranceProducts(coverage),
        limits          char(40) references InsuranceProducts(limits),
        code            char(20) references InsuranceProducts(code),
        icName          char(20) references InsuranceProducts(icName),
primary key(cRate, aName, coverage, limits, code, icName)
);
```

Functional Dependencies:

cRate, aName, coverage, limits, code, icName →

```
5   SELECT * FROM OffersCom;
```

Data Output | Explain | Messages | History

crate real	aname character	coverage character	limits character	code character	icname character
50	Pierson	cov-50	lim-20	c000	Alan Insurance
51	Mendleton	cov-51	lim-21	c001	Geico Insurance
52	Jennings	cov-52	lim-22	c002	RichIn Insurance

Sells Table

```
CREATE TABLE Sells (
        aName       char(20) references Agency(aName),
        coverage    char(40) references InsuranceProducts(coverage),
        limits      char(40) references InsuranceProducts(limits),
        code        char(20) references InsuranceProducts(code),
        icName      char(20) references InsuranceProducts(icName),
PRIMARY KEY(aName, coverage, limits, code, icName)
);
```

Functional Dependencies:

aName, coverage, limits, code, icName →

```
5  SELECT * FROM Sells;
```

Data Output | Explain | Messages | History

aname character	coverage character	limits character	code character	icname character
Pierson	cov-50	lim-20	c000	Alan Insurance
Mendleton	cov-51	lim-21	c001	Geico Insurance
Jennings	cov-52	lim-22	c002	RichIn Insurance

Refund Table

```
5  SELECT * FROM Refund;
```

Data Output | Explain | Messages | History

refundd... character	amount real	reportda... character	reportde... character	claimid character	reportnum integer	ssn character
10-20-20...	150	10-10-20...	descripti...	claim-100	100	20-2000-200
10-21-20...	200	10-11-20...	descripti...	claim-101	101	10-2000-200
10-22-20...	250	10-12-20...	descripti...	claim-102	102	20-2000-200
10-23-20...	225	10-13-20...	descripti...	claim-103	103	10-2000-200

```
CREATE TABLE Refund (
refundDate              char(20) not null unique,
amount                  float(8),
reportDate              char(20) not null uniquereferences Report(reportDate),
reportDescription       char(40) not null uniquereferences Report(reportDescription),
claimID                 char(12) not null uniquereferences Report(claimID),
reportNum               integer not null unique references Report(reportNum),
accountantSSN           char(7) references Accountant(accountantSSN),
primary key(refundDate, reportDate, reportDescription, claimID, reportNum)
);
```

Functional Dependencies:

refundDate, reportDate, reportDescription, claimID, reportNum → amountaccountantSSN

Generates Table

```
CREATE TABLE Generates (
        claimID                 char(12) references Report(claimID),
        adjSSN                  char(11) references Adjuster(adjSSN),
        reportNum               integer references Report(reportNum),
        reportDate              char references Report(reportDate),
        reportDescription       char(40) references Report(reportDescription),
primary key(claimID, adjSSN, reportNum, reportDate, reportDescription)
);
```

Functional Dependencies:

claimID, adjSSN, reportNum, reportDate, reportDescription →

```
5  SELECT * FROM generates;
```

Data Output | Explain | Messages | History

ssn character	reportnum integer	reportda... character	reportdescription character	claimid character
30-3000-300	100	10-10-20...	description-1	claim-100
40-4000-400	101	10-11-20...	description-2	claim-101
30-3000-300	102	10-12-20...	description-3	claim-102
40-4000-400	103	10-13-20...	description-4	claim-103

```
5  SELECT * FROM RefundRelatedTo;
```

Data Output | Explain | Messages | History

claimid character	cid character	insuredpersonn... character	refundd... character	reportdate character	reportdescription character	reportnum integer
claim-100	c001	Alan Labouseur	10-20-20...	10-10-2016	description-1	100
claim-101	c019	Professor Alan	10-21-20...	10-11-2016	description-2	101
claim-102	c002	Alex Richin	10-22-20...	10-12-2016	description-3	103
claim-103	c017	Patrick Trainor	10-23-20...	10-13-2016	description-4	102

RefundRelatedTo Table

```
CREATE TABLE RefundRelatedTo (
        claimID                 char(12) references Refund(claimID),
        phcID                   char(6) references InsuredPerson(cid),
        insuredPersonName       char(12) references InsuredPerson(name),
        refundDate              char(20) references Refund(refundDate),
        reportDate              char(20  references Refund(reportDate),
        reportDescription       char(40) references Refund(reportDescription),
        reportNum               integer references Refund(reportNum),
PRIMARY KEY(phcID, insuredPersonName, refundDate, claimID , reportNum, reportDate, reportDescription)
);
```

Functional Dependencies:

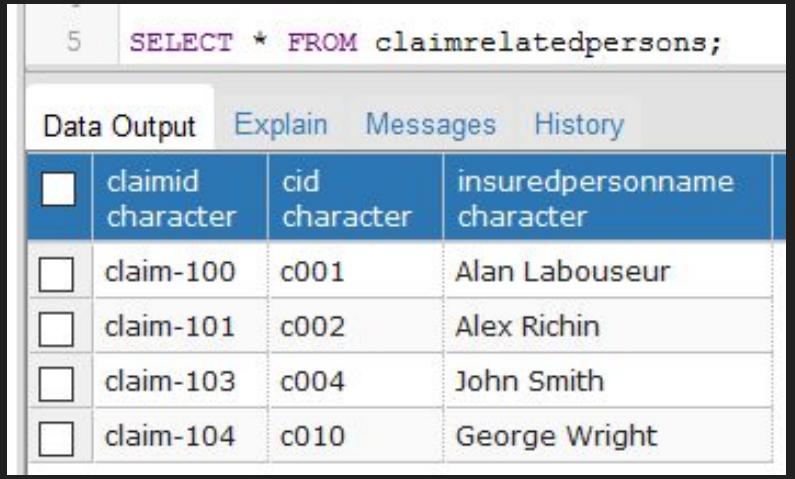
phcID, insuredPersonName, refundDate, claimID, reportNum, reportDate, reportDescription →

ClaimRelatedPersons Table

```
CREATE TABLE ClaimRelatedPersons (
        claimID                 char(12) references Claim(claimID),
        phcID                   char(6) references InsuredPerson(phcID),
        insuredPersonName       char(12) references InsuredPerson(name),
primary key(claimID, phcID, insuredPersonName)
);
```

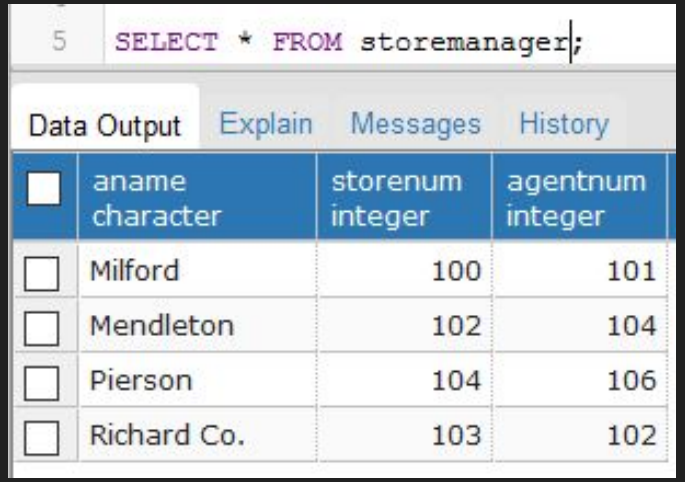
Functional Dependencies:

claimID, phcID, insuredPersonName →



StoreManager Table

```
CREATE TABLE StoreManager (
        aName                   char(20) not null references Store(aName),
        storeNum                integer references Store(storeNum),
        agentNum                integer references Agent(agentNum),
PRIMARY KEY(aName, storeNum, agentNum)
);
```



```
5   SELECT * FROM storemanager;
```

Data Output | Explain | Messages | History

aname character	storenum integer	agentnum integer
Milford	100	101
Mendleton	102	104
Pierson	104	106
Richard Co.	103	102

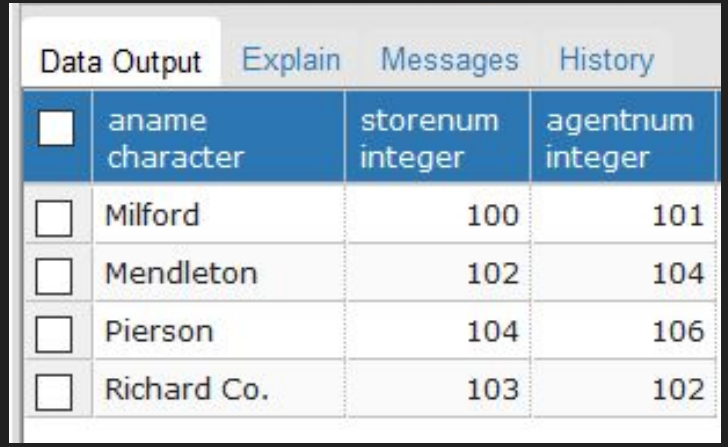
Functional Dependencies:

aName, storeNum, agentNum → aName, storeNum, agentName

Views

Views

```
Create or replace view QuoteProducts as
select IP.coverage, IP.limits, IP.code, IP.insuranceType, IP.icName
from InsuranceProducts IP
inner join sells S
        on (IP.coverage = S.coverage
                and IP.limits = S.limits
                and IP.code = S.code
                and IP.icName = S.icName);
```



Data Output | Explain | Messages | History

aname character	storenum integer	agentnum integer
Milford	100	101
Mendleton	102	104
Pierson	104	106
Richard Co.	103	102

-- All products relative to their quotes will be displayed. --

Views

```
CREATE OR REPLACE VIEW View2 AS
SELECT c.storeNum,c.storeName, c.lvl1, c.sPhone, c.aName, c.street, c.city, c.state, c.zip
FROM InsuranceProducts m, WorksFor n,
(SELECT storeNum, storeName, lvl1, sPhone, aName, street, city, state, b.zip
FROM Store a
INNER JOIN
StoreZip b on a.zip=b.zip) c, policy p
WHERE
m.icName=n.icName
AND c.aName=n.aName
AND p.coverage=m.coverage
AND p.code=m.code
AND p.limits=m.limits
AND p.icName=m.icName
AND p.finalPremium >= 450
```

Views

```
CREATE OR REPLACE VIEW Valid_Refunds as
SELECT p.policyNum,
            pDate,
            finalPremium,
            policyTerms,
            p.cid,
            coverage,
            limits,
            code,
            icName
FROM Refund r
        INNER JOIN Claim c
                ON c.claimID = r.claimID
                        INNER JOIN policy p on p.policyNum = c.policyNum
WHERE
        year IN (Select year FROM refundDate = 2011);
```

--Valid_Refunds: This view is designed to return all policies that are relative to any particular refunds issued to clients in the year of 2011.

Views

```
CREATE OR REPLACE VIEW Client_Online_Quotes AS
SELECT c.cid,  cName, age, address,  cp.phone,  email
FROM Client c
        INNER JOIN Gets g ON g.cid = c.cid
                INNER JOIN Quote q ON q.qid = g.qid
                        INNER JOIN clientPhone cp ON cp.cid = c.cid
WHERE q.qid IN ( SELECT qid
                        FROM OnlineQuote);
```

Stored Procedures

Stored procedure (1)

```
create or replace function  Client_in_Policy(cName text, resultset refcursor) returns refcursor
as
$$
declare
   --
begin
   open resultset for select policyNum
                      from policy_holder
                      Where
   return resultset;
end;
$$ language plpgsql
```

Reports

Reports

Will return the IDs of all clients who live in the city, Dallas.

```
Select cid  from Client where upper(address) like upper('%Dallas%');
```

Returns the Tax ID of all the agencies who sell every single product in stock.

```
Select a.aName, tid, count(insuranceType)
From agency a, sells w, insuranceProducts p
Where a.aName = w.aName
And p.icName = w.icName
group by a.aName,tid
having count(insuranceType)=3;
```

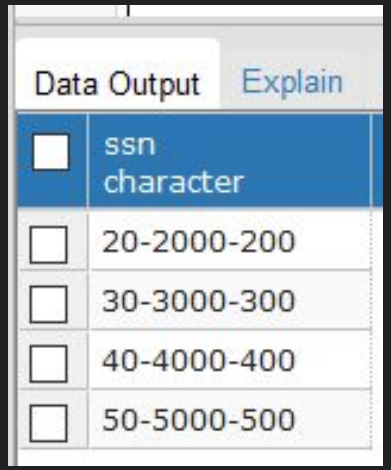
Reports

This query will return information for policy holders that have filed a claim

```
select cl.clientName, cl.address, c2.phone
from Clients cl, clientPhone c2
where  cl.cid = c2.cid and
exists (select 1
        from claimRelatedPersons c1 inner join claimRelatedPersons c2
                on c1.insuredPersonName = c2.insuredPersonName
        where c1.cid <> c2.cid and cl.cid = c1.cid);
```

This query will return employees(distinct) with the largest salary.

```
select distinct SSN from employee EP,
(select max(salary) as MaxSalary, icName from employee
group by icName) m
where EP.salary = m.MaxSalary
and ep.icName = m.icName;
```



This query will return clients who have a discounted rate higher than that of 5%.

```
select count(cid)                                                    from
discount d , gets g, policy p
where
p.phClientID = g.cid
and d.qid=g.qid
and rate > 5;
```

Security

Security(1)

CREATE ROLE Admin;

GRANT SELECT, INSERT, UPDATE ON Policy
TO Admin;

Admins can change the policy details only.

Security(2)

CREATE ROLE Client;

GRANT SELECT ON Policy

TO Client;

Clients can only view their policies, not change or delete them.

Triggers

Trigger:

Conclusion

Implementation Notes / Conclusion

We have used specialization for Employee, Client and Quote below.
We adopted the option which works for any specialization (total or partial, disjoint or overlapping).
Since all employees can be divided into three parts: Accountant, Actuary, and Adjuster, we have made them as subclasses of Employee and have used the overlapping constraint as they may play more than one role at the same time.
We created separate relations for Accountant, Actuary, and Adjuster.
Since some clients may accept the quote and then become Policy holder so we have made Policy Holder as a sub class of the Client and have used subset notation to show this in the ER diagram.

Future Enhancements

Some possible future enhancements of this database are...

Clients who have more than 3 insurance are considered as the Priority customers.

Client can not have more than one claim for the same ailment.
Employees can not work as adjuster/accountant claims which belong to themselves or their dependent/s.
Employee’s manager’s approval is needed in case belongs to any of his/her employee or their dependent/s to avoid conflict of interest.
Policy can not have more than 10 payments.

Conclusion

We have summarized all the necessary descriptions and solutions for Insurance management system database. This includes the process and result of the ER diagram, relational schemas in third normal form, SQL statements to create database, create view and solve corresponding queries. We have also tested each of the queries in a database environment to check for correctness. We also explained why we use superclass/subclass relationships to build the relational schema.