

Insurance System Database

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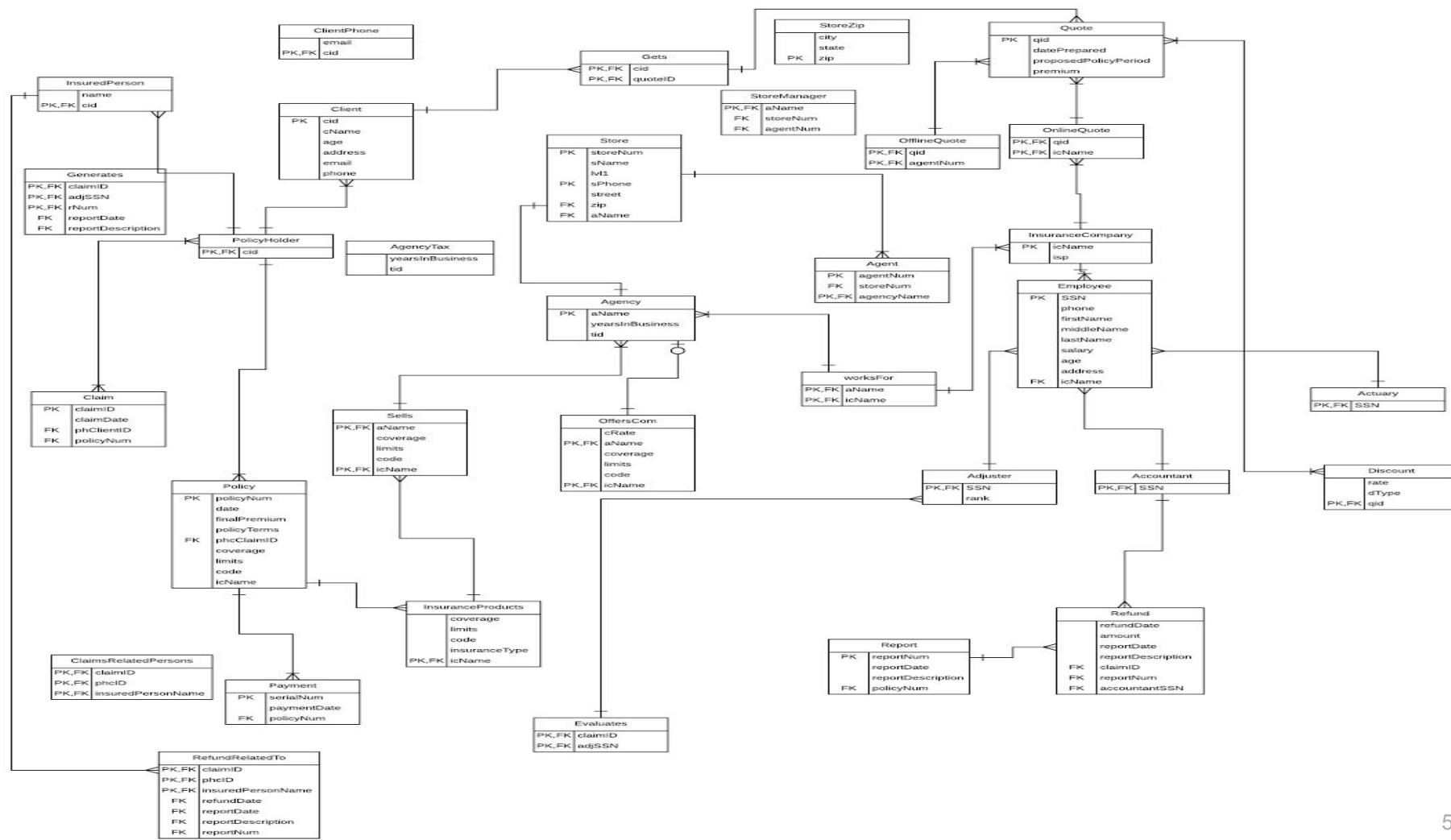
Problem Description (part 1)

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 Diagram



Create Table Statements

Sample Data

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

```
SELECT * FROM Clients;
```

5 | SELECT * FROM Clients;

	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 Houston Ave	Sean.Hayden@marist.edu
	c007	John Locke	41	64 Jeremy 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;

5 SELECT * FROM ClientPhone;					
		Data Output	Explain	Messages	History
	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;

	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

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		

Sample Data:

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

4	SELECT * FROM Quote;				
		Data Output	Explain	Messages	History
	qid	dateprepared	propose...	premium	
	character	date	numeric	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 ¹¹	

Sample Data

AgencyTaxID Table

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

Functional Dependencies:

Tid → yrsInBus

4		
5	SELECT * FROM AgencyTaxID;	
Data Output Explain Messages History		
	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:

$aName \rightarrow tid$

Sample Data:

The screenshot shows a MySQL Workbench interface with a query editor and a results grid.

Query Editor (Line 5):

```
SELECT * FROM Agency;
```

Results Grid:

	Data Output	Explain	Messages
	aname character	tid character	
	Milford	t003	
	Jennings	t008	
	Mendleton	t005	
	Pierson	t009	
	Richard Co.	t010	

Sample Data:

StoreZip Table

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

Functional Dependencies

Zip → state, zip

4

5 `SELECT * FROM StoreZip;`

	city	state	zip
	character	character	numeric (5)
	Alanville	New York	12604
	Denver	Colorado	8723
	Boston	Mass.	26734
	Seattle	Washington	73512
	Sacramento	California	83414

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

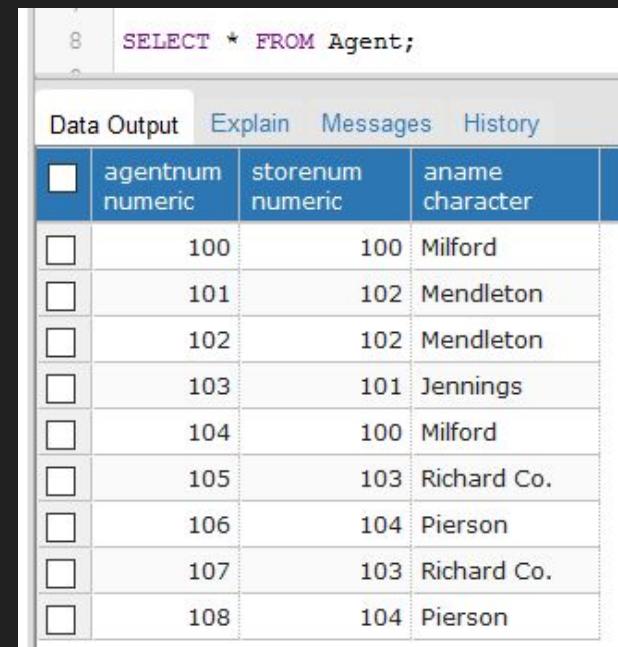
Agent Table

```
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



The screenshot shows a database query interface with the following details:

- Query ID: 8
- Query: `SELECT * FROM Agent;`
- Tab Bar: Data Output (selected), Explain, Messages, History
- Table Headers:

	agentnum numeric	storenum numeric	aname character
--	---------------------	---------------------	--------------------
- Table Data:

	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

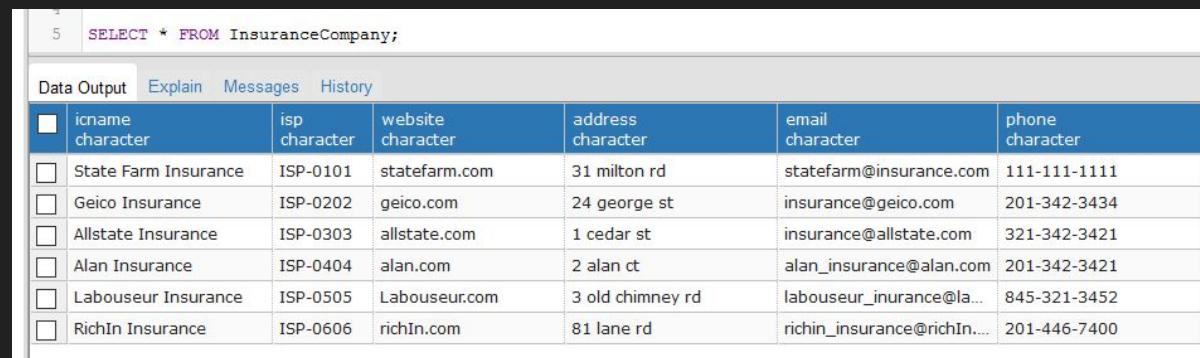
InsuranceCompany Table

```
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)
);
```

Functional Dependencies:

icName → isp, website, address, email, phone

Sample Data:



The screenshot shows a database query interface with the following details:

- Query ID: 5
- Query: `SELECT * FROM InsuranceCompany;`
- Tab Bar: Data Output (selected), Explain, Messages, History
- Table Headers:
 - icname character
 - isp character
 - website character
 - address character
 - email character
 - phone character
- Data Rows:
 - 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_insurance@la... | 845-321-3452
 - RichIn Insurance | ISP-0606 | richIn.com | 81 lane rd | richin_insurance@richIn.... | 201-446-7400

OfflineQuote Table

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

Functional Dependencies:

$\text{Qid} \rightarrow \text{agentNum}$

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

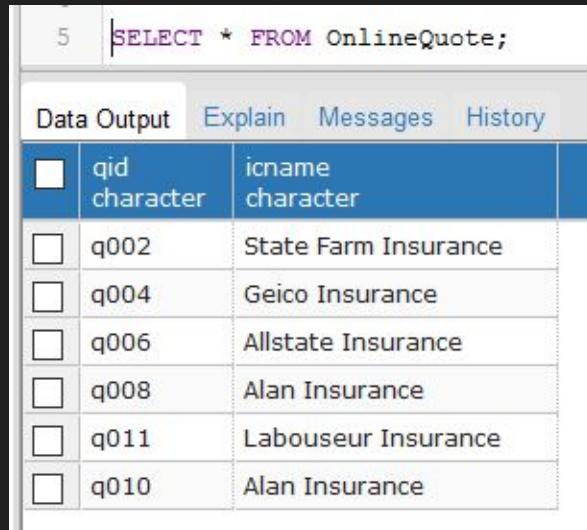
OnlineQuote Table

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

Functional Dependencies:

$\text{Qid} \rightarrow \text{icName}$

Sample Data:



The screenshot shows a MySQL Workbench interface with the following details:

- Query ID: 5
- Query: `SELECT * FROM OnlineQuote;`
- Tab: Data Output (selected)
- Table Headers: qid (character), icname (character)
- Data Rows:
 - q002, State Farm Insurance
 - q004, Geico Insurance
 - q006, Allstate Insurance
 - q008, Alan Insurance
 - q011, Labousieur Insurance
 - q010, Alan Insurance

	qid character	icname character
1	q002	State Farm Insurance
2	q004	Geico Insurance
3	q006	Allstate Insurance
4	q008	Alan Insurance
5	q011	Labousieur Insurance
6	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

Sample Data

```
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

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	800000	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, middleInitial, 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

5 | `SELECT * FROM Accountant;`

Data Output		Explain	Messages	Hist
	ssn character			
	10-2000-200			
	20-2000-200			

Adjuster Table

Sample Data

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

Functional Dependencies:

SSN → rank

5 | `SELECT * FROM Adjuster;`

Data Output Explain Messages History

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

Actuary Table

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

Functional Dependencies:

SSN → SSN

The screenshot shows a database query interface with the following details:

- Query ID: 5
- Query: `SELECT * FROM Actuary;`
- Result Set:

	ssn	
	character	
	50-5000-500	
- Tab Bar: Data Output (selected), Explain, Messages

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;

	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

The screenshot shows a MySQL command-line interface. The command entered is `SELECT * FROM Gets;`. The results are displayed in a table with two columns: `cid` and `qid`. The data consists of five rows, each containing a unique combination of `cid` and `qid`.

	cid	qid
	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;

	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	History																		
	<table border="1"><thead><tr><th></th><th>aname</th><th>icname</th></tr><tr><th></th><th>character</th><th>character</th></tr></thead><tbody><tr><td></td><td>Pierson</td><td>Alan Insurance</td></tr><tr><td></td><td>Mendleton</td><td>Geico Insurance</td></tr><tr><td></td><td>Jennings</td><td>RichIn Insurance</td></tr><tr><td></td><td>Milford</td><td>Allstate Insurance</td></tr></tbody></table>		aname	icname		character	character		Pierson	Alan Insurance		Mendleton	Geico Insurance		Jennings	RichIn Insurance		Milford	Allstate Insurance			
	aname	icname																				
	character	character																				
	Pierson	Alan Insurance																				
	Mendleton	Geico Insurance																				
	Jennings	RichIn Insurance																				
	Milford	Allstate Insurance																				
5																						

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→

5 | `SELECT * FROM Evaluates;`

Data Output Explain Messages History

	claimid character	ssn character
	claim-100	30-3000-300
	claim-101	40-4000-400

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

```
CREATE TABLE Refund (
    refundDate          char(20) not null unique,
    amount              float(8),
    reportDate          char(20) not null unique references Report(reportDate),
    reportDescription   char(40) not null unique references Report(reportDescription),
    claimID             char(12) not null unique references 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

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

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;

	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 →

5 | SELECT * FROM claimrelatedpersons;

	claimid character	cid character	insuredpersonname character
	claim-100	c001	Alan Labouseur
	claim-101	c002	Alex Richin
	claim-103	c004	John Smith
	claim-104	c010	George Wright

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)
);
```

Functional Dependencies:

aName, storeNum, agentNum → aName, storeNum, agentName

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	

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			
	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;
```

Data Output	
	ssn character
	20-2000-200
	30-3000-300
	40-4000-400
	50-5000-500

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.