

CS-GY 6083 B PRNCPLS DATABASE SYSTEMS

Final Project Part I Report

Name: Haotian Yi NetID: hy1651 UID: N18800809
Name: Siyuan Shi NetID: ss13376 UID: N18648680

April 10, 2020

Table of Content

Description	Description about the design	Page 2
Assumption	Detailed assumptions made for design	Page 2
Question (a)	Create Logical Model	Page 3
Question (b)	Create Relational Model	Page 3
Question (c)	Generate DDL code for schema	Page 3
Question (d)	Add constraints	Page 3
Question (e)	Populate sample data for all entities	Page 3
Question (f)	List total number of records populated for each entity	Page 4
Question (g)	Write queries for details of all tables	Page 6
Question (h)	Write queries as required by question	Page 11

Description:

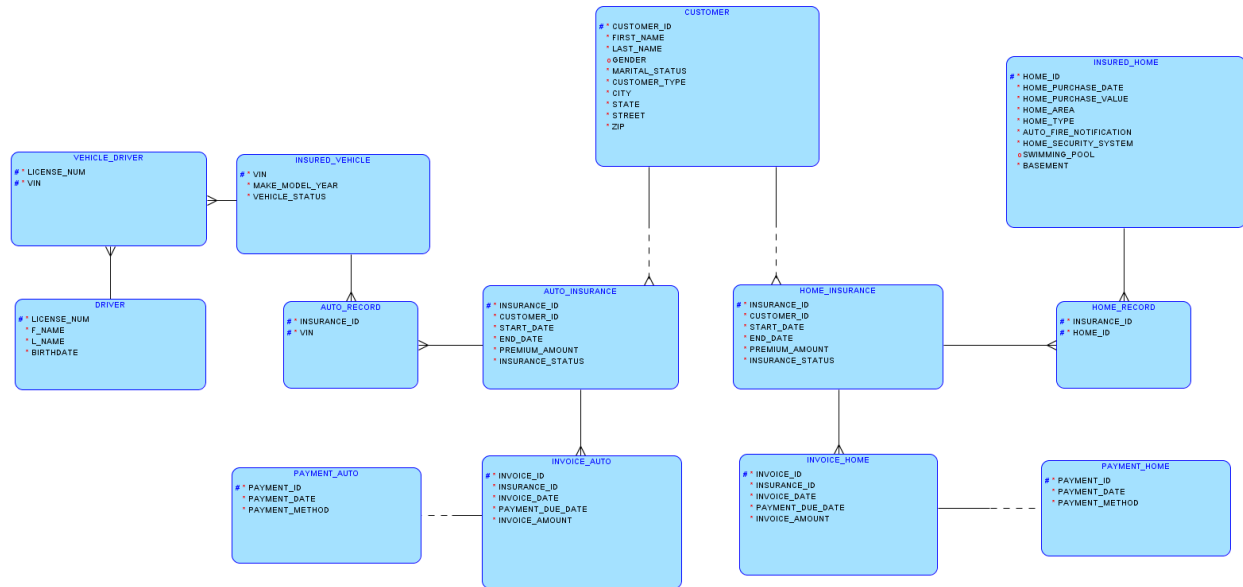
This design considers facts of insurance mechanism, achieving records of customer personal information and insurance information, also tracking the status of insurance and their insured objects. This design allows tracking multiple current insurances of one customer. More details are in assumptions.

Because of proxy error from Oracle Live SQL, we implement this on Oracle Cloud.

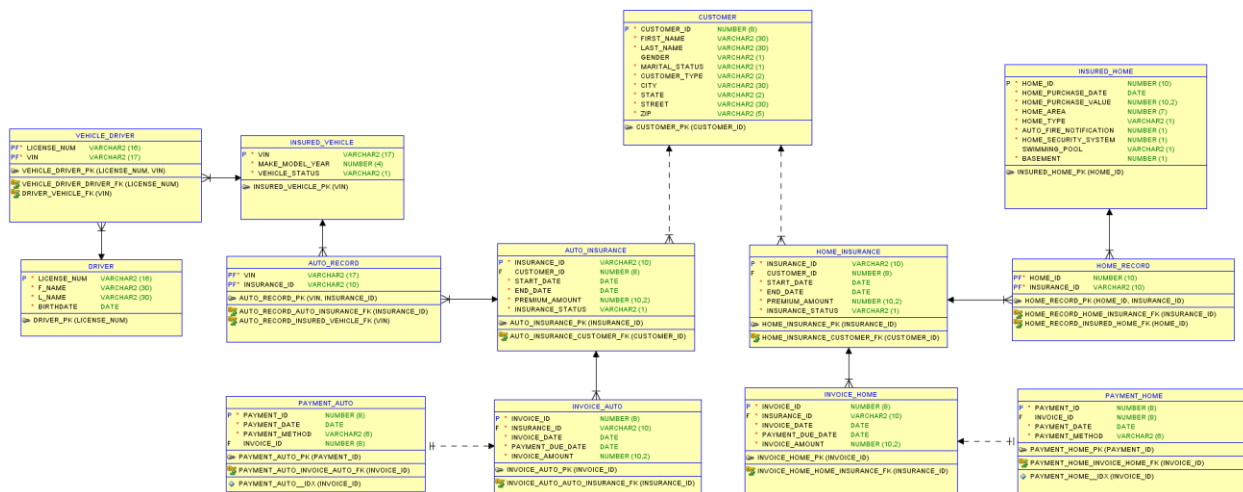
Assumptions:

- (1) Gender is optional (can be NULL) because customer can choose not to provide gender data.
- (2) A customer can have multiple insurances for different types, time periods, insured objects; also, a customer can have one or two insurance type. Thus customers' relationship with each type of insurance is mandatory one to optional many, and INSURANCE_ID for different types, time periods are different.
- (3) For customer type, it can be auto or home or both. We use "A" represents Automobile Insurance customer and "H" represents Home insurance customer, "B" represents both. By customer type, we can write view to check one or both types of insurance. If one has both types of insurance record but one type is expired, it will not be considered as "B".
- (4) A home insurance or auto insurance can have one or multiple insured objects so their relationships are both one to many.
- (5) A vehicle is corresponding to multiple drivers and a driver is possible to drive multiple vehicles in for different insurances, thus INSURED_VEHICLE has many-to-many relationship with DRIVER.
- (6) A customer can pay premium by installments and this is implemented by having multiple invoices, each invoice is corresponding to only one payment, it is like pay an assigned part of premium for each month. So INSURANCE entity has one-to-many relationship with INVOICE and INVOICE's relationship with PAYMENT is one to optional one. One invoice must only be generated after due of last invoice if paid by installments

Question (a)



Question (b)



Question (c)

Please see ddl.sql file in attachment.

Question (d)

Please see constraints.sql file in attachment.

Question (e)

Please see all_data.sql file in attachment.

Question (f)

List total number of records populated for each entity

```
1 --total number of records populated for CUSTOMER:
2 select COUNT(*)
3 from CUSTOMER;
```

	count(*)
1	15

```
5 --total number of records populated for HOME_INSURANCE:
6 select COUNT(*)
7 from HOME_INSURANCE;
```

	count(*)
1	19

```
9 --total number of records populated for HOME_RECORD:
10 select COUNT(*)
11 from HOME_RECORD;
```

	count(*)
1	22

```
12 --total number of records populated for INSURED_HOME:
13 select COUNT(*)
14 from INSURED_HOME;
```

	count(*)
1	22

```
17 --total number of records populated for INVOICE_HOME:
18 select COUNT(*)
19 from INVOICE_HOME;
```

	count(*)
1	25

```

21 --total number of records populated for PAYMENT_HOME:
22 select COUNT(*)
23 from PAYMENT_HOME;

```

	count(*)
1	24

```

25 --total number of records populated for AUTO_INSURANCE:
26 select COUNT(*)
27 from AUTO_INSURANCE;

```

	count(*)
1	16

```

29 --total number of records populated for AUTO_RECORD:
30 select COUNT(*)
31 from AUTO_RECORD;

```

	count(*)
1	16

```

33 --total number of records populated for INSURED_VEHICLE:
34 select COUNT(*)
35 from INSURED_VEHICLE;

```

	count(*)
1	16

```

37 --total number of records populated for VEHICLE_DRIVER:
38 select COUNT(*)
39 from VEHICLE_DRIVER;

```

	count(*)
1	18

```

41 --total number of records populated for DRIVER:
42 select COUNT(*)
43 from DRIVER;

```

	count(*)
1	10

```

45 --total number of records populated for INVOICE_AUTO:
46 select COUNT(*)
47 from INVOICE_AUTO;

```

	count(*)
1	18

```

48
49 --total number of records populated for PAYMENT_AUTO:
50 select COUNT(*)
51 from PAYMENT_AUTO;
52

```

	count(*)
1	18

Question (g)

The query that details all tables, columns-datatype-size-mandatory/optional and attribute comments of schema objects: (screenshot from exported .csv file)

```

53 select a.table_name, a.column_name, a.data_type, a.data_length, a.data_precision, a.data_scale, a.nullable, b.comments
54 from user_tab_columns a, user_col_comments b
55 where a.table_name=b.table_name and a.column_name=b.column_name
56 order by a.table_name;
57

```

	A	B	C	D	E	F	G	H
1	TABLE_NAME	COLUMN_NAME	DATA_TYPE	DATA_LENGTH	DATA_PRECISION	DATA_SCALE	NULLABLE	
2	AUTO_INSURANCE	START_DATE	DATE	7			N	
3	AUTO_INSURANCE	INSURANCE_STATUS	VARCHAR2	1			N	
4	AUTO_INSURANCE	PREMIUM_AMOUNT	NUMBER	22	10	2	N	
5	AUTO_INSURANCE	END_DATE	DATE	7			N	
6	AUTO_INSURANCE	INSURANCE_ID	VARCHAR2	10			N	
7	AUTO_INSURANCE	CUSTOMER_ID	NUMBER	22	8	0	Y	
8	AUTO_RECORD	INSURANCE_ID	VARCHAR2	10			N	
9	AUTO_RECORD	VIN	VARCHAR2	17			N	
10	CUSTOMER	ZIP	VARCHAR2	5			N	
11	CUSTOMER	STATE	VARCHAR2	2			N	
12	CUSTOMER	CUSTOMER_ID	NUMBER	22	8	0	N	
13	CUSTOMER	FIRST_NAME	VARCHAR2	30			N	
14	CUSTOMER	STREET	VARCHAR2	30			N	
15	CUSTOMER	GENDER	VARCHAR2	1			Y	
16	CUSTOMER	MARITAL_STATUS	VARCHAR2	1			N	
17	CUSTOMER	CUSTOMER_TYPE	VARCHAR2	2			N	
18	CUSTOMER	CITY	VARCHAR2	30			N	
19	CUSTOMER	LAST_NAME	VARCHAR2	30			N	
20	DRIVER	BIRTHDATE	DATE	7			N	
21	DRIVER	L_NAME	VARCHAR2	30			N	
22	DRIVER	F_NAME	VARCHAR2	30			N	
23	DRIVER	LICENSE_NUM	VARCHAR2	16			N	
24	HOME_INSURANCE	CUSTOMER_ID	NUMBER	22	8	0	Y	
25	HOME_INSURANCE	INSURANCE_ID	VARCHAR2	10			N	
26	HOME_INSURANCE	START_DATE	DATE	7			N	
27	HOME_INSURANCE	END_DATE	DATE	7			N	
28	HOME_INSURANCE	PREMIUM_AMOUNT	NUMBER	22	10	2	N	

29	HOME_INSURANCE	INSURANCE_STATUS	VARCHAR2	1			N
30	HOME_RECORD	INSURANCE_ID	VARCHAR2	10			N
31	HOME_RECORD	HOME_ID	NUMBER	22	10	0	N
32	INSURED_HOME	BASEMENT	NUMBER	22	1	0	N
33	INSURED_HOME	SWIMMING_POOL	VARCHAR2	1			Y
34	INSURED_HOME	HOME_SECURITY_SYSTEM	NUMBER	22	1	0	N
35	INSURED_HOME	HOME_ID	NUMBER	22	10	0	N
36	INSURED_HOME	HOME_PURCHASE_DATE	DATE	7			N
37	INSURED_HOME	HOME_PURCHASE_VALUE	NUMBER	22	10	2	N
38	INSURED_HOME	HOME_AREA	NUMBER	22	7	0	N
39	INSURED_HOME	HOME_TYPE	VARCHAR2	1			N
40	INSURED_HOME	AUTO_FIRE_NOTIFICATION	NUMBER	22	1	0	N
41	INSURED_VEHICLE	VIN	VARCHAR2	17			N
42	INSURED_VEHICLE	VEHICLE_STATUS	VARCHAR2	1			N
43	INSURED_VEHICLE	MAKE_MODEL_YEAR	NUMBER	22	4	0	N
44	INVOICE_AUTO	INVOICE_AMOUNT	NUMBER	22	10	2	N
45	INVOICE_AUTO	INVOICE_ID	NUMBER	22	8	0	N
46	INVOICE_AUTO	PAYMENT_DUE_DATE	DATE	7			N
47	INVOICE_AUTO	INSURANCE_ID	VARCHAR2	10			N
48	INVOICE_AUTO	INVOICE_DATE	DATE	7			N
49	INVOICE_HOME	INSURANCE_ID	VARCHAR2	10			N
50	INVOICE_HOME	INVOICE_ID	NUMBER	22	8	0	N
51	INVOICE_HOME	PAYMENT_DUE_DATE	DATE	7			N
52	INVOICE_HOME	INVOICE_DATE	DATE	7			N
53	INVOICE_HOME	INVOICE_AMOUNT	NUMBER	22	10	2	N
54	PAYMENT_AUTO	PAYMENT_ID	NUMBER	22	8	0	N
55	PAYMENT_AUTO	PAYMENT_DATE	DATE	7			N
56	PAYMENT_AUTO	INVOICE_ID	NUMBER	22	8	0	Y
57	PAYMENT_AUTO	PAYMENT_METHOD	VARCHAR2	6			N
58	PAYMENT_HOME	PAYMENT_DATE	DATE	7			N
59	PAYMENT_HOME	PAYMENT_METHOD	VARCHAR2	6			N
60	PAYMENT_HOME	PAYMENT_ID	NUMBER	22	8	0	N
61	PAYMENT_HOME	INVOICE_ID	NUMBER	22	8	0	Y
62	VEHICLE_DRIVER	LICENSE_NUM	VARCHAR2	16			N
63	VEHICLE_DRIVER	VIN	VARCHAR2	17			N
64							

1	TABLE_NAME	COLUMN_NAME	COMMENTS
2	AUTO_INSURANCE	START_DATE	start date of auto insurance policy
3	AUTO_INSURANCE	INSURANCE_STATUS	auto policy insurance status
4	AUTO_INSURANCE	PREMIUM_AMOUNT	auto insurance premium amount
5	AUTO_INSURANCE	END_DATE	end date of auto insurance policy
6	AUTO_INSURANCE	INSURANCE_ID	Insurance ID of auto-mobile insurance, starts with "A", followed by 9 digits number
7	AUTO_INSURANCE	CUSTOMER_ID	
8	AUTO_RECORD	INSURANCE_ID	
9	AUTO_RECORD	VIN	
10	CUSTOMER	ZIP	Zip code
11	CUSTOMER	STATE	customers' state
12	CUSTOMER	CUSTOMER_ID	customer's id
13	CUSTOMER	FIRST_NAME	customer's first name
14	CUSTOMER	STREET	customers' street
15	CUSTOMER	GENDER	customer's gender, must be either "M", or "F" representing "Male" or "Female". If it is NULL, means not provided
16	CUSTOMER	MARITAL_STATUS	customer's marital status, the possible data value of marital status must be either "M", "S", or "W", representing "Married", "Single", and "Widow/Widower" respectively.
17	CUSTOMER	CUSTOMER_TYPE	customer type, can be auto or home or both. "A" represents Automobile Insurance customer and "H" represents Home insurance customer, "B" represents both.
18	CUSTOMER	CITY	customer's living city
19	CUSTOMER	LAST_NAME	customer's last name
20	DRIVER	BIRTHDATE	driver's birthdate
21	DRIVER	L_NAME	driver's last name
22	DRIVER	F_NAME	driver's first name
23	DRIVER	LICENSE_NUM	driver's license number
24	HOME_INSURANCE	CUSTOMER_ID	
25	HOME_INSURANCE	INSURANCE_ID	Insurance ID of home insurance, starts with "H", followed by 9 digits number
26	HOME_INSURANCE	START_DATE	start date of home insurance policy
27	HOME_INSURANCE	END_DATE	end date of home insurance policy
28	HOME_INSURANCE	PREMIUM_AMOUNT	home insurance premium amount

29	HOME_INSURANCE	INSURANCE_STATUS	home policy insurance status. "C" for current, "P" for expired
30	HOME_RECORD	INSURANCE_ID	
31	HOME_RECORD	HOME_ID	
32	INSURED_HOME	BASEMENT	whether home has basement or not, 1 stands for yes, 0 stands for no
33	INSURED_HOME	SWIMMING_POOL	whether home has swimming pool or not and which kind of pool: "I" represents Indoor, "U" represents Underground, "O" represents Overground, "M" represents Multiple
34	INSURED_HOME	HOME_SECURITY_SYSTEM	whether home has security system or not, 1 stands for yes, 0 stands for no
35	INSURED_HOME	HOME_ID	home ID
36	INSURED_HOME	HOME_PURCHASE_DATE	home purchase date
37	INSURED_HOME	HOME_PURCHASE_VALUE	home purchase value
38	INSURED_HOME	HOME_AREA	home area in square feet
39	INSURED_HOME	HOME_TYPE	type of home, S,M,C,T representing Single family, Multi Family, Condominium, Town house respectively
40	INSURED_HOME	AUTO_FIRE_NOTIFICATION	whether home has auto fire notification or not, 1 stands for yes, 0 stands for no
41	INSURED_VEHICLE	VIN	vehicle identification number
42	INSURED_VEHICLE	VEHICLE_STATUS	status of the vehicle, can be one of "L", "F", or "O" representing "Leased", "Financed", and "Owned".
43	INSURED_VEHICLE	MAKE_MODEL_YEAR	vehicle make model year
44	INVOICE_AUTO	INVOICE_AMOUNT	invoice amount in usd
45	INVOICE_AUTO	INVOICE_ID	invoice id
46	INVOICE_AUTO	PAYMENT_DUE_DATE	payment due date
47	INVOICE_AUTO	INSURANCE_ID	
48	INVOICE_AUTO	INVOICE_DATE	date of invoice
49	INVOICE_HOME	INSURANCE_ID	
50	INVOICE_HOME	INVOICE_ID	invoice id
51	INVOICE_HOME	PAYMENT_DUE_DATE	payment due date
52	INVOICE_HOME	INVOICE_DATE	date of invoice
53	INVOICE_HOME	INVOICE_AMOUNT	invoice amount in usd

54	PAYMENT_AUTO	PAYMENT_ID	payment's ID
55	PAYMENT_AUTO	PAYMENT_DATE	date of payment
56	PAYMENT_AUTO	INVOICE_ID	
57	PAYMENT_AUTO	PAYMENT_METHOD	payment method: "PayPal", "Credit", "Debit", "Check"
58	PAYMENT_HOME	PAYMENT_DATE	date of payment
59	PAYMENT_HOME	PAYMENT_METHOD	payment method: "PayPal", "Credit", "Debit", "Check"
60	PAYMENT_HOME	PAYMENT_ID	payment's ID
61	PAYMENT_HOME	INVOICE_ID	
62	VEHICLE_DRIVER	LICENSE_NUM	
63	VEHICLE_DRIVER	VIN	

The query that details all constraints: (screenshot from exported .csv file)

```
--g
60 select table_name, constraint_name, constraint_type, search_condition, index_name, r_owner, r_constraint_name, delete_rule
61 from user_constraints
62 order by table_name;
63 |
```

1	CONSTRAINT_NAME	CONSTRAINT_TYPE	SEARCH_CONDITION	INDEX_NAME	R_OWNER	R_CONSTRAINT_NAME	DELETE_RULE
2	SYS_C0015768	C	"START_DATE" IS NOT NULL				
3	AUTO_INSURANCE_PK	P		AUTO_INSURANCE_PK			
4	A_INSUR_CUST_FK	R			ADMIN	CUSTOMER_PK	NO ACTION
5	SYS_C0015767	C	"INSURANCE_ID" IS NOT NULL				
6	SYS_C0015769	C	"END_DATE" IS NOT NULL				
7	SYS_C0015770	C	"PREMIUM_AMOUNT" IS NOT NULL				
8	C_AUTO_INSURANCE_INSURANCE_STATUS	C	(INSURANCE_STATUS="C") or (INSURANCE_STATUS="P")				
9	SYS_C0015771	C	"INSURANCE_STATUS" IS NOT NULL				
10	SYS_C0015774	C	"INSURANCE_ID" IS NOT NULL				
11	A_RCD_INSURED_VHCL_FK	R			ADMIN	INSURED_VEHICLE_PK	NO ACTION
12	A_RCD_A_INSUR_FK	R			ADMIN	AUTO_INSURANCE_PK	NO ACTION
13	SYS_C0015773	C	"VIN" IS NOT NULL				
14	AUTO_RECORD_PK	P		AUTO_RECORD_PK			
15	BINSovgou1PB/VHgUSIYAaR/HA==S0	C	"INSURANCE_ID" IS NOT NULL				
16	BINSovgou1PA/VHgUSIYAaR/HA==S0	C	"HOME_ID" IS NOT NULL				
17	BINSovgou1PC/VHgUSIYAaR/HA==S0	P		BINSovgou1PD/VHgUSIYAaR/HA==S0			
18	BINSovgou1PP/VHgUSIYAaR/HA==S0	C	(AUTO_FIRE_NOTIFICATION=1) or (AUTO_FIRE_NOTIFICATION=0)				
19	BINSovgou1PM/VHgUSIYAaR/HA==S0	C	"BASEMENT" IS NOT NULL				
20	BINSovgou1PR/VHgUSIYAaR/HA==S0	C	(BASEMENT=1) or (BASEMENT=0)				
21	BINSovgou1PS/VHgUSIYAaR/HA==S0	C	(SWIMMING_POOL="U") or (SWIMMING_POOL="O") or (SWIMMING_POOL="I") or (SWIMMING_POOL="M") or (SWIMMING_POOL IS NULL)				
22	BINSovgou1PQ/VHgUSIYAaR/HA==S0	C	(HOME_SECURITY_SYSTEM=1) or (HOME_SECURITY_SYSTEM=0)				
23	BINSovgou1PO/VHgUSIYAaR/HA==S0	C	(HOME_TYPE="S") or (HOME_TYPE="M") or (HOME_TYPE="C") or (HOME_TYPE="T")				
24	BINSovgou1PN/VHgUSIYAaR/HA==S0	P		BINSovgou1PT/VHgUSIYAaR/HA==S0			
25	BINSovgou1PF/VHgUSIYAaR/HA==S0	C	"HOME_ID" IS NOT NULL				
26	BINSovgou1PG/VHgUSIYAaR/HA==S0	C	"HOME_PURCHASE_DATE" IS NOT NULL				
27	BINSovgou1PL/VHgUSIYAaR/HA==S0	C	"HOME_SECURITY_SYSTEM" IS NOT NULL				
28	BINSovgou1PK/VHgUSIYAaR/HA==S0	C	"AUTO_FIRE_NOTIFICATION" IS NOT NULL				

29	BINSovgou1Pj/VHgUSIYAaR/HA==	\$0	C	"HOME_TYPE" IS NOT NULL					
30	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	C	"HOME_AREA" IS NOT NULL					
31	BINSovgou1Ph/VHgUSIYAaR/HA==	\$0	C	"HOME_PURCHASE_VALUE" IS NOT NULL					
32	BINSovgou1PW/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_DATE" IS NOT NULL					
33	BINSovgou1Pv/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_ID" IS NOT NULL					
34	BINSovgou1PZ/VHgUSIYAaR/HA==	\$0	C	(PAYMENT_METHOD="PayPal") or (PAYMENT_METHOD="Credit") or (PAYMENT_METHOD="Debit") or					
35	BINSovgou1PX/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_METHOD" IS NOT NULL					
36	BINSovgou1Pr/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pb/VHgUSIYAaR/HA==	\$0			
37	BINSovgou1Ph/VHgUSIYAaR/HA==	\$0	C	"INVOICE_AMOUNT" IS NOT NULL					
38	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_DUE_DATE" IS NOT NULL					
39	BINSovgou1Pf/VHgUSIYAaR/HA==	\$0	C	"INVOICE_DATE" IS NOT NULL					
40	BINSovgou1Pd/VHgUSIYAaR/HA==	\$0	C	"INVOICE_ID" IS NOT NULL					
41	BINSovgou1Pe/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_ID" IS NOT NULL					
42	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pj/VHgUSIYAaR/HA==	\$0			
43	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	C	"LICENSE_NUM" IS NOT NULL					
44	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Po/VHgUSIYAaR/HA==	\$0			
45	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	C	"VIN" IS NOT NULL					
46	BINSovgou1Pr/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_ID" IS NOT NULL					
47	BINSovgou1Pq/VHgUSIYAaR/HA==	\$0	C	"VIN" IS NOT NULL					
48	BINSovgou1Pa/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pt/VHgUSIYAaR/HA==	\$0			
49	BINSovgou1Pw/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_ID" IS NOT NULL					
50	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_DATE" IS NOT NULL					
51	BINSovgou1Pv/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_METHOD" IS NOT NULL					
52	BINSovgou1Pz/VHgUSIYAaR/HA==	\$0	C	(PAYMENT_METHOD="PayPal") or (PAYMENT_METHOD="Credit") or (PAYMENT_METHOD="Debit") or					
53	BINSovgou1Px/VHgUSIYAaR/HA==	\$0	P	"PAYMENT_METHOD" IS NOT NULL					
54	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	C	"PAYMENT_DUE_DATE" IS NOT NULL					
55	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	C	"INVOICE_AMOUNT" IS NOT NULL					
56	BINSovgou1Pj/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_ID" IS NOT NULL					
57	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pb/VHgUSIYAaR/HA==	\$0			
58	BINSovgou1Pp/VHgUSIYAaR/HA==	\$0	C	"INVOICE_ID" IS NOT NULL					
59	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	C	"INVOICE_DATE" IS NOT NULL					
60	BINSovgou1Pf/VHgUSIYAaR/HA==	\$0	C	"LICENSE_NUM" IS NOT NULL					
61	BINSovgou1Pd/VHgUSIYAaR/HA==	\$0	C	"F_NAME" IS NOT NULL					
62	BINSovgou1Pe/VHgUSIYAaR/HA==	\$0	C	"L_NAME" IS NOT NULL					
63	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	C	"BIRTHDATE" IS NOT NULL					
64	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	C	F_NAME=upper(F_NAME)					
65	BINSovgou1Pj/VHgUSIYAaR/HA==	\$0	C	L_NAME=upper(L_NAME)					
66	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pb/VHgUSIYAaR/HA==	\$0			
67	BINSovgou1Pp/VHgUSIYAaR/HA==	\$0	C	"MAKE_MODEL_YEAR" IS NOT NULL					
68	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pj/VHgUSIYAaR/HA==	\$0			
69	BINSovgou1Pf/VHgUSIYAaR/HA==	\$0	C	(VEHICLE_STATUS="L") or (VEHICLE_STATUS="F") or (VEHICLE_STATUS="O")					
70	BINSovgou1Pd/VHgUSIYAaR/HA==	\$0	C	"VEHICLE_STATUS" IS NOT NULL					
71	BINSovgou1Pe/VHgUSIYAaR/HA==	\$0	C	"VIN" IS NOT NULL					
72	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_ID" IS NOT NULL					
73	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pj/VHgUSIYAaR/HA==	\$0			
74	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	C	"PREMIUM_AMOUNT" IS NOT NULL					
75	BINSovgou1Pp/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_STATUS" IS NOT NULL					
76	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	C	(INSURANCE_STATUS="C") or (INSURANCE_STATUS="P")					
77	BINSovgou1Pf/VHgUSIYAaR/HA==	\$0	C	"END_DATE" IS NOT NULL					
78	BINSovgou1Pd/VHgUSIYAaR/HA==	\$0	C	"START_DATE" IS NOT NULL					
79	BINSovgou1Pe/VHgUSIYAaR/HA==	\$0	C	(INSURANCE_STATUS="C") or (INSURANCE_STATUS="P")					
80	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_STATUS" IS NOT NULL					
81	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	C	"END_DATE" IS NOT NULL					
82	BINSovgou1Pj/VHgUSIYAaR/HA==	\$0	C	"START_DATE" IS NOT NULL					
83	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	C	"INSURANCE_ID" IS NOT NULL					
84	BINSovgou1Pp/VHgUSIYAaR/HA==	\$0	C	"PREMIUM_AMOUNT" IS NOT NULL					
85	BINSovgou1Pg/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pj/VHgUSIYAaR/HA==	\$0			
86	BINSovgou1Pf/VHgUSIYAaR/HA==	\$0	C	STATE=upper(STATE)					
87	BINSovgou1Pd/VHgUSIYAaR/HA==	\$0	P		BINSovgou1Pb/VHgUSIYAaR/HA==	\$0			
88	BINSovgou1Pe/VHgUSIYAaR/HA==	\$0	C	LAST_NAME=upper(LAST_NAME)					
89	BINSovgou1Pn/VHgUSIYAaR/HA==	\$0	C	FIRST_NAME=upper(FIRST_NAME)					
90	BINSovgou1Pm/VHgUSIYAaR/HA==	\$0	C	(CUSTOMER_TYPE="A") or (CUSTOMER_TYPE="H") or (CUSTOMER_TYPE="B")					
91	BINSovgou1Pj/VHgUSIYAaR/HA==	\$0	C	(MARITAL_STATUS="M") or (MARITAL_STATUS="S") or (MARITAL_STATUS="W")					
92	BINSovgou1Pl/VHgUSIYAaR/HA==	\$0	C	(GENDER IS NULL) or (GENDER="M") or (GENDER="F")					

96	BIN\$ovgVH6MCyDgUSIYAAR0sg==0\$0	C	"CITY" IS NOT NULL					
97	BIN\$ovgVH6LCyDgUSIYAAR0sg==0\$0	C	"CUSTOMER_TYPE" IS NOT NULL					
98	BIN\$ovgVH6KCyDgUSIYAAR0sg==0\$0	C	"MARITAL_STATUS" IS NOT NULL					
99	BIN\$ovgVH6ICyDgUSIYAAR0sg==0\$0	C	"LAST_NAME" IS NOT NULL					
100	BIN\$ovgVH6HCyDgUSIYAAR0sg==0\$0	C	"FIRST_NAME" IS NOT NULL					
101	BIN\$ovgVH6HCyDgUSIYAAR0sg==0\$0	C	"CUSTOMER_ID" IS NOT NULL					
102	BIN\$ovgVH6YCyDgUSIYAAR0sg==0\$0	C	STREET=upper(STREET)					
103	BIN\$ovgVH6WCyDgUSIYAAR0sg==0\$0	C	CITY=upper(CITY)					
104	SYS_C0015776	C	"CUSTOMER_ID" IS NOT NULL					
105	C_CUSTOMER_PK	P		CUSTOMER_PK				
106	SYS_C0015778	C	"LAST_NAME" IS NOT NULL					
107	SYS_C0015779	C	"MARITAL_STATUS" IS NOT NULL					
108	SYS_C0015780	C	"CUSTOMER_TYPE" IS NOT NULL					
109	SYS_C0015781	C	"CITY" IS NOT NULL					
110	SYS_C0015782	C	"STATE" IS NOT NULL					
111	SYS_C0015783	C	"STREET" IS NOT NULL					
112	SYS_C0015784	C	"ZIP" IS NOT NULL					
113	C_CUSTOMER_GENDER	C	(GENDER IS NULL) or (GENDER='M') or (GENDER='F')					
114	C_CUSTOMER_MARITAL_STATUS	C	(MARITAL_STATUS='M') or (MARITAL_STATUS='S') or (MARITAL_STATUS='W')					
115	C_CUSTOMER_CUSTOMER_TYPE	C	(CUSTOMER_TYPE='A') or (CUSTOMER_TYPE='H') or (CUSTOMER_TYPE='B')					
116	C_CUSTOMER_FIRST_NAME	C	FIRST_NAME=upper(FIRST_NAME)					
117	C_CUSTOMER_LAST_NAME	C	LAST_NAME=upper(LAST_NAME)					
118	C_CUSTOMER_CITY	C	CITY=upper(CITY)					
119	C_CUSTOMER_STATE	C	STATE=upper(STATE)					
120	C_CUSTOMER_STREET	C	STREET=upper(STREET)					
121	SYS_C0015777	C	"FIRST_NAME" IS NOT NULL					
122	SYS_C0015786	C	"LICENSE_NUM" IS NOT NULL					
123	SYS_C0015787	C	"F_NAME" IS NOT NULL					
124	SYS_C0015788	C	"L_NAME" IS NOT NULL					
125	DRIVER_PK	P		DRIVER_PK				
126	C_DRIVER_F_NAME	C	F_NAME=upper(F_NAME)					
127	C_DRIVER_L_NAME	C	L_NAME=upper(L_NAME)					
128	SYS_C0015789	C	"BIRTHDATE" IS NOT NULL					
129	H_INSUR_CUST_FK	R			ADMIN	CUSTOMER_PK		NO ACTION
130	SYS_C0015794	C	"PREMIUM_AMOUNT" IS NOT NULL					
131	HOME_INSURANCE_PK	P		HOME_INSURANCE_PK				
132	C_HOME_INSURANCE_INSURANCE_STATUS	C	(INSURANCE_STATUS='C') or (INSURANCE_STATUS='P')					
133	SYS_C0015795	C	"INSURANCE_STATUS" IS NOT NULL					
134	SYS_C0015793	C	"END_DATE" IS NOT NULL					
135	SYS_C0015791	C	"INSURANCE_ID" IS NOT NULL					
134	SYS_C0015793	C	"END_DATE" IS NOT NULL					
135	SYS_C0015791	C	"INSURANCE_ID" IS NOT NULL					
136	SYS_C0015792	C	"START_DATE" IS NOT NULL					
137	SYS_C0015798	C	"INSURANCE_ID" IS NOT NULL					
138	SYS_C0015797	C	"HOME_ID" IS NOT NULL					
139	HOME_RECORD_PK	P		HOME_RECORD_PK				
140	H_RCD_INSURED_H_FK	R			ADMIN	INSURED_HOME_PK		NO ACTION
141	H_RCD_H_INSUR_FK	R			ADMIN	HOME_INSURANCE_PK		NO ACTION
142	INSURED_HOME_PK	P		INSURED_HOME_PK				
143	SYS_C0015803	C	"HOME_AREA" IS NOT NULL (SWIMMING_POOL='U') or (SWIMMING_POOL='O') or (SWIMMING_POOL='I') or (SWIMMING_POOL='M') or (SWIMMING_POOL IS NULL)					
144	C_INSURED_HOME_SWIMMING_POOL	C	(BASEMENT=1) or (BASEMENT=0)					
145	C_INSURED_HOME_BASEMENT	C	(HOME_SECURITY_SYSTEM=1) or (HOME_SECURITY_SYSTEM=0)					
146	C_INSURED_HOME_HOME_SECURITY_SYSTEM	C	(AUTO_FIRE_NOTIFICATION=1) or (AUTO_FIRE_NOTIFICATION=0)					
147	C_INSURED_HOME_AUTO_FIRE_NOTIFICATION	C	"HOME_PURCHASE_VALUE" IS NOT NULL					
148	SYS_C0015802	C	"HOME_PURCHASE_DATE" IS NOT NULL					
149	SYS_C0015801	C	"HOME_ID" IS NOT NULL					
150	SYS_C0015800	C	"HOME_TYPE" IS NOT NULL					
151	SYS_C0015804	C	"AUTO_FIRE_NOTIFICATION" IS NOT NULL					
152	SYS_C0015805	C	"HOME_SECURITY_SYSTEM" IS NOT NULL					
153	SYS_C0015806	C	"BASEMENT" IS NOT NULL					
154	SYS_C0015807	C	(HOME_TYPE='S') or (HOME_TYPE='M') or (HOME_TYPE='C') or (HOME_TYPE='I')					
155	C_INSURED_HOME_HOME_TYPE	C		INSURED_VEHICLE_PK				
156	INSURED_VEHICLE_PK	P						
157	SYS_C0015811	C	"VEHICLE_STATUS" IS NOT NULL					
158	SYS_C0015810	C	"MAKE_MODEL_YEAR" IS NOT NULL					
159	SYS_C0015809	C	"VIN" IS NOT NULL					
160	C_INSURED_VEHICLE_VEHICLE_STATUS	C	(VEHICLE_STATUS='I') or (VEHICLE_STATUS='F') or (VEHICLE_STATUS='O')					
161	SYS_C0015817	C	"INVOICE_AMOUNT" IS NOT NULL					
162	SYS_C0015816	C	"PAYMENT_DUE_DATE" IS NOT NULL					
163	SYS_C0015815	C	"INVOICE_DATE" IS NOT NULL					
164	SYS_C0015814	C	"INSURANCE_ID" IS NOT NULL					
165	SYS_C0015813	C	"INVOICE_ID" IS NOT NULL					
166	INV_A_A_INSUR_FK	R			ADMIN	AUTO_INSURANCE_PK		NO ACTION
167	INVOICE_AUTO_PK	P		INVOICE_AUTO_PK				
168	SYS_C0015821	C	"INVOICE_DATE" IS NOT NULL					
169	SYS_C0015822	C	"PAYMENT_DUE_DATE" IS NOT NULL					
170	SYS_C0015823	C	"INVOICE_AMOUNT" IS NOT NULL					
171	SYS_C0015819	C	"INVOICE_ID" IS NOT NULL					
172	INV_H_H_INSUR_FK	R			ADMIN	HOME_INSURANCE_PK		NO ACTION
173	INVOICE_HOME_PK	P		INVOICE_HOME_PK				
174	SYS_C0015820	C	"INSURANCE_ID" IS NOT NULL					
175	PAY_A_INV_A_FK	R			ADMIN	INVOICE_AUTO_PK		NO ACTION
176	C_PAYMENT_AUTO_PAYMENT_METHOD	C	(PAYMENT_METHOD='PayPal') or (PAYMENT_METHOD='Credit') or (PAYMENT_METHOD='Debit') or					
177	PAYMENT_AUTO_PK	P		PAYMENT_AUTO_PK				
178	SYS_C0015827	C	"PAYMENT_METHOD" IS NOT NULL					
179	SYS_C0015826	C	"PAYMENT_DATE" IS NOT NULL					
180	SYS_C0015825	C	"PAYMENT_ID" IS NOT NULL					
181	SYS_C0015829	C	"PAYMENT_ID" IS NOT NULL					
182	PAYMENT_HOME_PK	P		PAYMENT_HOME_PK				
183	C_PAYMENT_HOME_PAYMENT_METHOD	C	(PAYMENT_METHOD='PayPal') or (PAYMENT_METHOD='Credit') or (PAYMENT_METHOD='Debit') or					
184	SYS_C0015831	C	"PAYMENT_METHOD" IS NOT NULL					
185	SYS_C0015830	C	"PAYMENT_DATE" IS NOT NULL					
186	PAY_H_INV_H_FK	R			ADMIN	INVOICE_HOME_PK		NO ACTION
187	VHCL_DRV_DRV_FK	R			ADMIN	DRIVER_PK		NO ACTION
188	VHCL_DRV_VHCL_FK	R			ADMIN	INSURED_VEHICLE_PK		NO ACTION
189	VEHICLE_DRIVER_PK	P		VEHICLE_DRIVER_PK				
190	SYS_C0015834	C	"VIN" IS NOT NULL					
191	SYS_C0015833	C	"LICENSE_NUM" IS NOT NULL					

Question (h)

Q1) Table joins with at least 3 tables in join

Query:

```
64 --n
65 --Q1
66 SELECT CUSTOMER_ID, FIRST_NAME, LAST_NAME, INSURANCE_ID, PREMIUM_AMOUNT, INSURANCE_STATUS, HOME_ID, HOME_PURCHASE_VALUE, HOME_TYPE
67 FROM CUSTOMER NATURAL JOIN HOME_INSURANCE NATURAL JOIN HOME_RECORD NATURAL JOIN INSURED_HOME
68 ORDER BY CUSTOMER_ID;
```

Result: (screenshot from exported .csv file)

CUSTOMER_ID	FIRST_NAME	LAST_NAME	INSURANCE_ID	PREMIUM_AMOUNT	INSURANCE_STATUS	HOME_ID	HOME_PURCHASE_VALUE	HOME_TYPE
1	WINDOWS	LINUX	1100000011	5000	P	1000000011	150000	S
2	NATASHA	ROMANOFF	1100000021	6000	C	1000000021	100000	S
3	TOM	HOLLAND	1100000031	5000	P	1000000031	250000	M
4	ROBERT	DOWNEY	1100000041	5000	P	1000000041	100000	C
4	ROBERT	DOWNEY	1100000043	6000	C	1000000042	120000	S
5	TAYLOR	SWIFT	1100000051	18000	C	1000000051	100000	S
5	TAYLOR	SWIFT	1100000051	18000	C	1000000052	130000	C
5	TAYLOR	SWIFT	1100000051	18000	C	1000000053	350000	T
6	KEVIN	DURANT	1100000061	7000	P	1000000061	130000	S
6	KEVIN	DURANT	1100000062	5000	C	1000000062	100000	C
7	KYRIE	IRVING	1100000071	7000	C	1000000071	130000	S
7	KYRIE	IRVING	1100000072	5000	C	1000000072	100000	C
8	CLOUD	STRIFE	1100000081	17000	P	1000000081	110000	S
8	CLOUD	STRIFE	1100000081	17000	P	1000000082	100000	S
8	CLOUD	STRIFE	1100000081	17000	P	1000000083	130000	C
8	CLOUD	STRIFE	1100000082	15000	C	1000000084	330000	T
9	AARON	ROSS	1100000091	7000	C	1000000091	130000	C
9	AARON	ROSS	1100000092	7000	P	1000000092	100000	S
10	JONATHAN	SPENCER	1100000101	5000	P	1000000101	200000	C
10	JONATHAN	SPENCER	1100000102	5000	C	1000000102	150000	S
15	SOPHIA	BAILEY	1100000153	5000	P	1000000151	70000	S
15	SOPHIA	BAILEY	1100000153	5000	P	1000000152	80000	C

Goal: obtain some information about customer's personal information, home insurance he/she has and information of his insured home.

Q2) Multi-row subquery

Query:

```
71 --Q2
72 SELECT CUSTOMER_ID, PREMIUM_AMOUNT
73 FROM HOME_INSURANCE
74 WHERE PREMIUM_AMOUNT >= ALL (SELECT AVG(PREMIUM_AMOUNT) FROM HOME_INSURANCE GROUP BY CUSTOMER_ID);
```

Result:

	customer_id	premium_amount
1	5	18000

Goal: obtain premium amounts that are larger than or equal to all average premium amounts of any customer.

Q3) Co-related subquery

Query:

```

76 --Q3
77 SELECT a.CUSTOMER_ID, a.PREMIUM_AMOUNT
78 FROM HOME_INSURANCE a
79 WHERE a.PREMIUM_AMOUNT > (SELECT AVG(b.PREMIUM_AMOUNT) PERSONALAVG FROM HOME_INSURANCE b WHERE a.CUSTOMER_ID = b.CUSTOMER_ID);|
81

```

Result:

	customer_id	premium_amount
1	4	6000
2	6	7000
3	7	7000
4	8	17000

Goal: obtain premium amounts that are larger than the average premium amount of the same customer .

Q4) SET operator query

Query:

```

82 --Q4
83 select CUSTOMER_ID, PREMIUM_AMOUNT
84 from AUTO_INSURANCE
85 where PREMIUM_AMOUNT > (select AVG(PREMIUM_AMOUNT) from AUTO_INSURANCE)
86 INTERSECT
87 select CUSTOMER_ID, PREMIUM_AMOUNT
88 from AUTO_INSURANCE
89 where PREMIUM_AMOUNT < (select MAX(PREMIUM_AMOUNT) from AUTO_INSURANCE)
90 order by PREMIUM_AMOUNT desc;|
92

```

Result:

	customer_id	premium_amount
1	14	4900
2	7	4700
3	10	4500
4	14	4200

Goal: list all id and premium amount of customer who bought auto insurance and whose premium amount is greater than average premium amount but doesn't have the highest premium amount

Q4) Query with any analytical function or in line view or WITH clause

Query:

```

93
94 --Q5
95 WITH TOTAL AS
96 (select CUSTOMER_ID, INSURANCE_ID, PREMIUM_AMOUNT
97 from AUTO_INSURANCE
98 where INSURANCE_STATUS='C')
99 UNION
100 select CUSTOMER_ID, INSURANCE_ID, PREMIUM_AMOUNT
101 from HOME_INSURANCE
102 where INSURANCE_STATUS='C')
103 select a.FIRST_NAME, a.LAST_NAME, b.PREMIUM_AMOUNT|
104 from CUSTOMER a, TOTAL b
105 where a.CUSTOMER_ID=b.CUSTOMER_ID and b.PREMIUM_AMOUNT=(select MAX(PREMIUM_AMOUNT) from TOTAL);
106

```

Result:

	first_name	last_name	premium_amount
1	TAYLOR	SWIFT	18000

Goal: list first name, last name and premium amount of the customer who has the highest premium amount among all insurances including different types of insurance.