

Final Project 2

CS-GY 6083 – B

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Relational Model

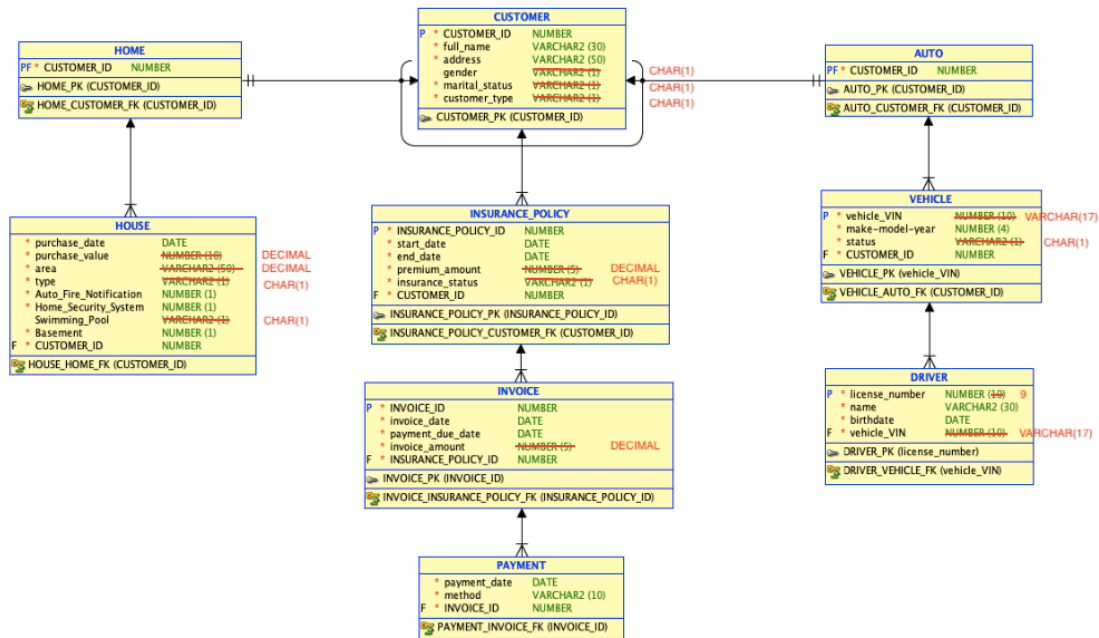
DDL Code

Features

Assumptions

Learning Outcome

Relational Model



Some changes are made in part 2.

DDL Code

```

CREATE TABLE customer (
  customer_id NUMBER NOT NULL,
  full_name VARCHAR2(30) NOT NULL,
  address VARCHAR2(50) NOT NULL,
  gender CHAR(1),
  marital_status CHAR(1) NOT NULL,
  customer_type CHAR(1) NOT NULL
);
  
```

```

ALTER TABLE customer
  ADD CONSTRAINT ch_inh_customer CHECK ( customer_type IN (
    'A',
    'H'
  ));
  
```

COMMENT ON COLUMN customer.gender IS
 "M", or "F" representing "Male" or "Female" respectively';

COMMENT ON COLUMN customer.marital_status IS
 "M", "S", or "W", representing "Married", "Single", and "Widow/Widower" respectively';

COMMENT ON COLUMN customer.customer_type IS
 "A" represents Automobile Insurance customer and "H" represents Home insurance customer';

```
ALTER TABLE customer ADD CONSTRAINT customer_pk PRIMARY KEY ( customer_id );
```

```
CREATE TABLE auto (  
    customer_id NUMBER NOT NULL  
);
```

```
ALTER TABLE auto ADD CONSTRAINT auto_pk PRIMARY KEY ( customer_id );
```

```
CREATE TABLE driver (  
    license_number    NUMBER(9) NOT NULL,  
    name              VARCHAR2(30) NOT NULL,  
    birthdate         DATE NOT NULL,  
    vehicle_vin       VARCHAR2(17) NOT NULL  
);
```

```
ALTER TABLE driver ADD CONSTRAINT driver_pk PRIMARY KEY ( license_number );
```

```
CREATE TABLE home (  
    customer_id NUMBER NOT NULL  
);
```

```
ALTER TABLE home ADD CONSTRAINT home_pk PRIMARY KEY ( customer_id );
```

```
CREATE TABLE house (  
    purchase_date      DATE NOT NULL,  
    purchase_value     DECIMAL NOT NULL,  
    area               DECIMAL NOT NULL,  
    type                CHAR(1) NOT NULL,  
    auto_fire_notification NUMBER(1) NOT NULL,  
    home_security_system NUMBER(1) NOT NULL,  
    swimming_pool      CHAR(1),  
    basement            NUMBER(1) NOT NULL,  
    customer_id        NUMBER NOT NULL  
);
```

```
COMMENT ON COLUMN house.type IS  
'S,M,C,T representing Single family, Multi Family, Condominium, Town house respectively';
```

```
COMMENT ON COLUMN house.auto_fire_notification IS  
'1--yes  
0--no';
```

```
COMMENT ON COLUMN house.home_security_system IS  
'1--yes  
0--no';
```

```
COMMENT ON COLUMN house.swimming_pool IS  
'U--underground  
O--overground  
I--indoor  
M--multiple  
null--no';
```

```
COMMENT ON COLUMN house.basement IS  
'1--yes  
0--no';
```

```
CREATE TABLE insurance_policy (  
    insurance_policy_id NUMBER NOT NULL,  
    start_date           DATE NOT NULL,  
    end_date             DATE NOT NULL,
```

```

    premium_amount    DECIMAL NOT NULL,
    insurance_status   CHAR(1) NOT NULL,
    customer_id        NUMBER NOT NULL
);

```

COMMENT ON COLUMN insurance_policy.insurance_status IS

'If home insurance policy term is current, status column should have value "C", and if it is expired, it should have value "P";

```

ALTER TABLE insurance_policy ADD CONSTRAINT insurance_policy_pk PRIMARY KEY (
insurance_policy_id );

```

```

CREATE TABLE invoice (
    invoice_id          NUMBER NOT NULL,
    invoice_date        DATE NOT NULL,
    payment_due_date    DATE NOT NULL,
    invoice_amount      DECIMAL NOT NULL,
    insurance_policy_id NUMBER NOT NULL
);

```

```

ALTER TABLE invoice ADD CONSTRAINT invoice_pk PRIMARY KEY ( invoice_id );

```

```

CREATE TABLE payment (
    payment_date    DATE NOT NULL,
    method          VARCHAR2(10) NOT NULL,
    invoice_id      NUMBER NOT NULL
);

```

COMMENT ON COLUMN payment.method IS

"PayPal", "Credit", "Debit", "Check";

```

CREATE TABLE vehicle (
    vehicle_vin        VARCHAR2(17) NOT NULL,
    "make-model-year"  NUMBER(4) NOT NULL,
    status             CHAR(1) NOT NULL,
    customer_id        NUMBER NOT NULL
);

```

COMMENT ON COLUMN vehicle.vehicle_vin IS

'vehicle identification number';

COMMENT ON COLUMN vehicle.status IS

"L", "F", or "O" representing "Leased", "Financed", "and Owned";

```

ALTER TABLE vehicle ADD CONSTRAINT vehicle_pk PRIMARY KEY ( vehicle_vin );

```

```

ALTER TABLE auto
    ADD CONSTRAINT auto_customer_fk FOREIGN KEY ( customer_id )
    REFERENCES customer ( customer_id );

```

```

ALTER TABLE driver
    ADD CONSTRAINT driver_vehicle_fk FOREIGN KEY ( vehicle_vin )
    REFERENCES vehicle ( vehicle_vin );

```

```

ALTER TABLE home
    ADD CONSTRAINT home_customer_fk FOREIGN KEY ( customer_id )
    REFERENCES customer ( customer_id );

```

```

ALTER TABLE house
    ADD CONSTRAINT house_home_fk FOREIGN KEY ( customer_id )
    REFERENCES home ( customer_id );

```

```

ALTER TABLE insurance_policy
ADD CONSTRAINT insurance_policy_customer_fk FOREIGN KEY ( customer_id )
REFERENCES customer ( customer_id );

ALTER TABLE invoice
ADD CONSTRAINT invoice_insurance_policy_fk FOREIGN KEY ( insurance_policy_id )
REFERENCES insurance_policy ( insurance_policy_id );

ALTER TABLE payment
ADD CONSTRAINT payment_invoice_fk FOREIGN KEY ( invoice_id )
REFERENCES invoice ( invoice_id );

ALTER TABLE vehicle
ADD CONSTRAINT vehicle_auto_fk FOREIGN KEY ( customer_id )
REFERENCES auto ( customer_id );

```

Development Environment

Programming/scripting languages: Python

Database: SQLite

Code Editor: Visual Studio Code

Designing Tool: Flask Web Framework

Main Python Packages:

1. flask
2. flask-wtf
3. email-validator
4. flask-sqlalchemy
5. flask-bcrypt
6. flask-login

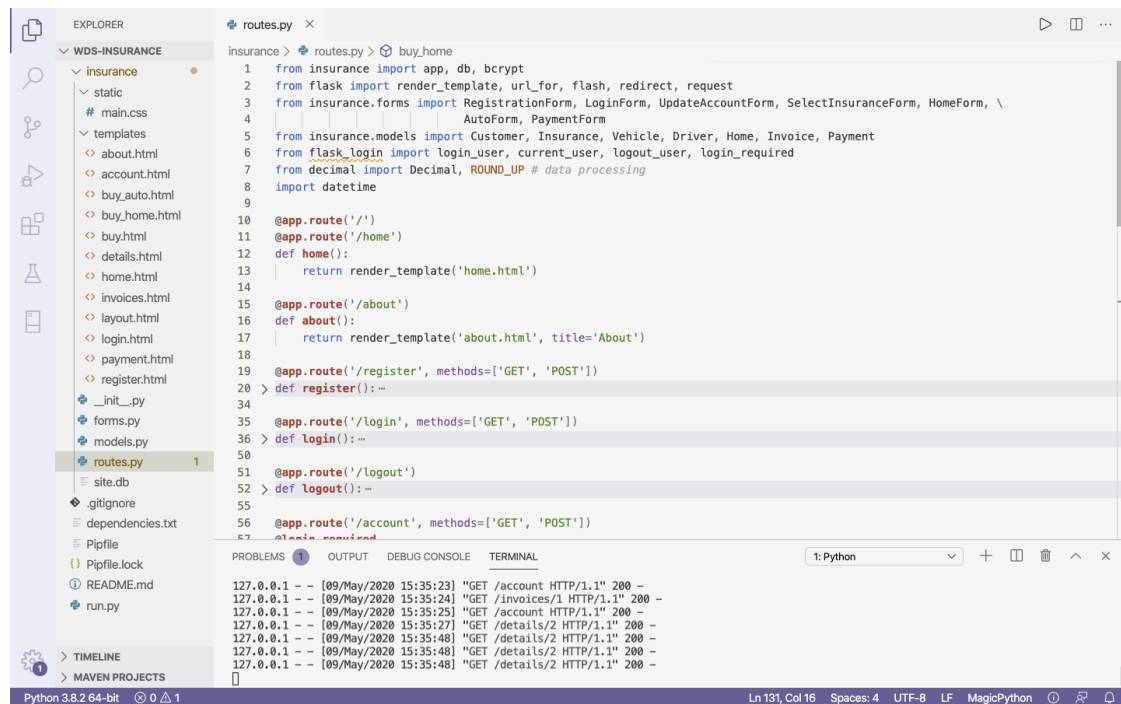


Fig1. Workspace

Features

We Do Secure

Home

About

Login

Sign up

Insurance Services

Choose your ideal insurance type.

Auto

\$139.99 / mo

Liability
Collision & Comprehensive
Uninsured / Underinsured Motorist
Medical Payments
Personal Injury Protection (PIP)

Home

\$127.10 / mo

Home Property
Personal Possession
Medical Payments
Additional Living Expenses
Protection Away From Home

Buy Now

Fig2. Home Page

Feature1: User Register, Login & Logout

[We Do Secure](#) [Home](#) [About](#)

Login [Sign up](#)

Join Today

Full Name

Address

Gender

Marital Status

Email

Password

Confirm Password

[Sign up](#)

Already Have An Account? [Sign In](#)

Fig3. Register Page

[We Do Secure](#) [Home](#) [About](#)

Login [Sign up](#)

Sign In

Email

Password

[Login](#)

Need An Account? [Sign Up Now](#)

Fig4. Login Page

Feature2: Customer Account Page (Dispaly and Update Customer Info, Display Customer's Insurance Info...)

We Do Secure

Home

About

Account

Buy

Logout

You have been logged in!

demo

Gender: Male

Marital status: Married

Address: 1

Email: demo@123.com

Insurance:

#	Type	Start Date	End Date	Premium	Status	Details	Invoices
1	Home	2020-05-09	2020-08-07	\$921.30	Current	More	Check
2	Auto	2020-05-09	2020-08-07	\$569.97	Current	More	Check

Account Info

Address

1

Marital Status

Married

Email

demo@123.com

Update

Fig5. Account Page

Feature3: Buy Page (Select Auto or Home Insurance, Populate and Submit Vehicle, Driver or Home Info...)

We Do Secure

[Home](#)

[About](#)

Account

Buy

Logout

Choose one or two

Insurance Type

Auto

\$139.99 / mo

Liability
Collision & Comprehensive
Uninsured / Underinsured Motorist
Medical Payments
Personal Injury Protection (PIP)

Home

\$127.10 / mo

Home Property
Personal Possession
Medical Payments
Additional Living Expenses
Protection Away From Home

Auto

Home

Next

Fig6. Buy Page

We Do Secure

[Home](#)

[About](#)

Account

Buy

Logout

Insurance Details

Vehicle Info

[Remove Vehicle](#)

Vehicle VIN

Vehicle make-model-year

Status

Leased

Driver 1

[Remove Driver](#)

Driver's license number

Driver's Name

Birthdate

mm/dd/yyyy

[Add Driver](#)

[Add Vehicle](#)

Start 90-day Auto Insurance!

Fig6(a). Buy Page (Auto)

We Do Secure

[Home](#)

[About](#)

Account

Buy

Logout

Insurance Details

House Info

[Remove House](#)

Purchase date

mm/dd/yyyy

Purchase value

Home area in Sq. Ft

Type

Single family

Swimming Pool

Underground

Auto Fire Notification

Home Security System

Basement

[Add House](#)

Start 90-day Home Insurance!

Fig6(b). Buy Page (Home)

Feature4: Dynamic Forms (Add and Remove Vehicle & Driver or Home Forms in One Page)

We Do Secure

[Home](#)

[About](#)

Account

Buy

Logout

Insurance Details

Vehicle Info

[Remove Vehicle](#)

Vehicle VIN

Vehicle make-model-year

Status

Leased

Driver 1

[Remove Driver](#)

Driver's license number

Driver's Name

Birthdate

mm/dd/yyyy

Driver 2

[Remove Driver](#)

Driver's license number

Driver's Name

Birthdate

mm/dd/yyyy

[Add Driver](#)

Vehicle Info

[Remove Vehicle](#)

Vehicle VIN

Vehicle make-model-year

Status

Fig7(a). Dynamic Form (Auto)

We Do Secure

Home

About

Account

Buy

Logout

Insurance Details

House Info

Remove House

Purchase date

mm/dd/yyyy

Purchase value

Home area in Sq. Ft

Type

Single family

Swimming Pool

Underground

Auto Fire Notification

Home Security System

Basement

House Info

Remove House

Purchase date

mm/dd/yyyy

Purchase value

Home area in Sq. Ft

Type

Fig7(b). Dynamic Form (Home)

Feature5: Info Page (Display the Vehicle & Driver or Home Details of Individual Insurance ---- By Clicking 'More' in the Details Column at the Account Page(Fig5))

Vehicle 1

Vehicle VIN: 8888888888887777

Make model year: 1999

Status: Leased

#	License Number	Name	Birthdate
Driver 1	000000021	William	2020-05-05

Vehicle 2

Vehicle VIN: 8888888888887777

Make model year: 1998

Status: Financed

#	License Number	Name	Birthdate
Driver 1	000000022	Tom	2020-05-21
Driver 2	000000023	Allen	2020-05-03

Vehicle 3

Vehicle VIN: 5555555555555555

Make model year: 1889

Status: Owened

#	License Number	Name	Birthdate
Driver 1	000000024	Queen	2020-05-07

Fig8(a). Details Info (Auto)

Home 1

Purchase Date: 2020-05-12

Purchase Value: 100.00

Home Area: 200.00

Home Type: Condominium

Auto Fire Notification	Home Security System	Swimming Pool	Basement
No	No	Underground	No

Home 2

Purchase Date: 2020-05-20

Purchase Value: 1000000.00

Home Area: 20000.00

Home Type: Multi Family

Auto Fire Notification	Home Security System	Swimming Pool	Basement
Yes	Yes	Underground	No

Fig8(b). Details Info (Home)

Feature6: Invoice and Payment (Display Unpaid & Paid Invoice and Make Payment ---- By Clicking 'Check' in the Invoice Column at the Account Page(Fig5))

We Do Secure [Home](#) [About](#)

Account Buy Logout

Invoice

Invoice ID	Invoice Date	Payment Due Date	Invoice Amount	Status	Payment
3	2020-07-08	2020-07-18	307.10	Unpaid	Pay

Paid Invoice

Invoice ID	Invoice Date	Payment Date	Payment Method	Invoice Amount
1	2020-05-09	2020-05-09	Check	307.10
2	2020-06-08	2020-05-09	Debit	307.10

Fig9. Invoice Page

We Do Secure [Home](#) [About](#)

Account Buy Logout

Payment

Payment method

PayPal

Pay now!

Fig10(a). Payment Page

[We Do Secure](#) [Home](#) [About](#) [Account](#) [Buy](#) [Logout](#)

Payment

Payment method

✓ PayPal

Credit

Debit

Check

Fig10(b). Payment Page (Payment Methods)

Assumptions

1. Insurance Duration: 3 months ---- Start from the day it is bought and end at 90 days later.

```
insurance = Insurance(start_date=datetime.date.today(),
                      end_date=datetime.date.today()+datetime.timedelta(days=30*month),
                      status='C', type='A',
                      customer_id=current_user.id) # Lack of premium
```

Fig11. Insurance Code

2. Insurance Premium: Change as different Auto or Home Info.

```
# Set premium
insurance.premium = (139.99 + 20*num_of_vhc + 30*num_of_dvr) * month
```

Fig12(a). Premium for Auto

```

if home.purchase_value >= 10000: ...
if home.home_area >= 10000: ...
if home.fire == 0: ...
if home.security == 0: ...
if home.swimming_pool != None: ...
if home.swimming_pool == 'M': ...
if home.basement == 1: ...

# Set premium
insurance.premium = (127.10 + num_of_ho*50 + add) * month

```

Fig12(b). Premium for Home

3. Invoice Installation Frequency: Monthly

```

# Set monthly invoice
for i in range(month):
    invoice_date = datetime.date.today() + datetime.timedelta(days=i*30)
    invoice = Invoice(invoice_date=invoice_date,
                     payment_due_date=invoice_date+datetime.timedelta(days=10),
                     invoice_amount=insurance.premium/month,
                     status='U')
    insurance.invoices.append(invoice)

```

Fig13. Invoice Code

Learning Outcome

1. Build a full-stack web application using Flask web framework in Python.
2. Front-end techniques (html, CSS...).
3. Back-end techniques (SQLite, JavaScript...).
4. Making forms and form validations by flask-wtf.
5. Making password encryption by flask-bcrypt
6. Create dynamic forms by writing JavaScript.
7. Create SQLite database models by flask-SQLAlchemy.