FINAL PROJECT: Apartment Management System

Team member:

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Port number: 8624

Procedure:

```
# upload through scp
scp -r /Users/jindongdu/Documents/NYU/6083\ database\
systems/hx2163_jd4573_project    jd4573@jedi.poly.edu:~/hx2163_jd4573_project
# login jedi
ssh jd4573@jedi.poly.edu -L 8624:localhost:8624
# create table @jedi
psql -d jd4573_db -a -f hx2163_jd4573_project/code/schema.sql
psql -h localhost -U jd4573 jd4573_db
# import data @jedi
cat hx2163_jd4573_project/data/Buildings.csv | psql -U jd4573 -d jd4573_db -c
"COPY Buildings from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Apartments.csv | psql -U jd4573 -d jd4573_db -c
"COPY Apartments from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Employees.csv | psql -U jd4573 -d jd4573_db -c
"COPY Employees from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/works_at.csv | psql -U jd4573 -d jd4573_db -c
"COPY works_at from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Tenants.csv | psql -U jd4573 -d jd4573_db -c
"COPY Tenants from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Contracts.csv | psql -U jd4573 -d jd4573_db -c
"COPY Contracts from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Cars.csv | psql -U jd4573 -d jd4573_db -c "COPY
Cars from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Payments.csv | psql -U jd4573 -d jd4573_db -c
"COPY Payments from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Paid.csv | psql -U jd4573 -d jd4573_db -c "COPY
Paid from STDIN CSV HEADER"
cat hx2163_jd4573_project/data/Late_Fees.csv | psql -U jd4573 -d jd4573_db -c
"COPY Late_Fees from STDIN CSV HEADER"
# port forwarding and run the streamlit app
cd hx2163_jd4573_project/code/
streamlit run project.py --server.address=localhost --server.port=8624
```

Description of our Application:

We designed an apartment management database system. The main two entries are Apartments and Tenants. These two entries are connected by Contracts entry. The main usage of this application is to help Apartment companies to manage the tenant information and check whether tenants have made the monthly payment on time. Moreover, the employee at the front desk can check whether the car parked in front of the front door is the tenant's, to make sure they don’t pull the tenant's car.

Entity Sets:

Buildings:{ building_id, building_name, number_of_apartments }
Apartments: {apartment_id,number_of_bedrooms,sqrt_feet,price,building_id}
Employees: {employee_id,first_name,last_name,gender,work_from,work_to}
Tenants: {SSN,first_name,last_name,gender,contact_number,email}
Contracts: {contract_id,employee_id,tenant_ssn,apartment_id,start_date,end_date,deposit}
Payments: {payment_id,contract_id,payment_amount,payment_date}
Cars: {SSN,plate_number,model,make}
Late_Fees: {late_id,late_fee,payment_id}

Relationship Set:

Works_at: {building_id,employee_id}
Paid: {contract_id,payment_id}

Business Rules:

Building:
Each building must have some apartment units.

Apartment:
Each apartment belongs to one building.

Employees:
Each employee works at some building.

Contracts:
Each contract is created by exactly one employee,
Each employee can create 0,1 or multiple contracts.

Tenants:
Each contract is signed by exactly one tenant.
Each tenant must be signed on some contracts.

Cars:
Some tenants have cars, this is a weak entity.

Payments:
Each contract has multiple payments.

LateFees:
This is a weak entity to payments, it may or may not have late fees.

Relational Schema:

```
drop table if exists Buildings cascade;
drop table if exists Apartments cascade;
drop table if exists Employees cascade;
drop table if exists works_at cascade;
drop table if exists Tenants cascade;
drop table if exists Contracts cascade;
drop table if exists Cars cascade;
drop table if exists Payments cascade;
drop table if exists Paid cascade;
drop table if exists Late_Fees cascade;


create table Buildings(
    building_id             integer primary key,
    building_name           varchar(128),
    number_of_apartments    integer
);

create table Apartments(
    apartment_id        integer primary key,
    number_of_bedrooms  integer,
    sqrt_feet           float,
    price               float,
    building_id         integer not null,
    foreign key (building_id) references Buildings(building_id)
);




create table Employees (
    employee_id         integer primary key,
    first_name          varchar(128),
    last_name           varchar(128),
    gender              varchar(1),
    work_from           date,
    work_to             date
);


create table works_at(
    building_id         integer,
    employee_id         integer,
    primary key(building_id, employee_id),
    foreign key(employee_id) references Employees(employee_id),
    foreign key(building_id) references Buildings(building_id)
);

create table Tenants (
    SSN                 varchar(11) primary key,
    first_name          varchar(128),
    last_name           varchar(128),
    gender              varchar(1),
    contact_number      varchar(10),
    email               varchar(128)
);

create table Contracts (
    contract_id         integer primary key,
    employee_id         integer not null,
    tenant_SSN          varchar(11) not null unique,
    apartment_id        integer not null unique,
    start_date          date not null,
    end_date            date not null,
    deposit             float,
    foreign key (employee_id) references Employees(employee_id),
    foreign key (tenant_SSN) references Tenants(SSN)
);


create table Cars(
    SSN                 varchar(11) not null,
    plate_number        varchar(128),
    model               varchar(128),
    make                varchar(128),
    primary key(SSN,plate_number),
    foreign key (SSN) references Tenants(SSN) on delete cascade
);


create table Payments(
    payment_id          integer primary key,
    contract_id         integer,
    payment_amount      float,
    payment_date        date,
    foreign key (contract_id) references Contracts(contract_id)
);

create table Paid(
    contract_id         integer,
    payment_id          integer,
    primary key (contract_id,payment_id),
    foreign key (contract_id) references Contracts(contract_id),
    foreign key (payment_id) references Payments(payment_id)
);

create table Late_Fees(
    late_id             integer,
    late_fee            float,
    payment_id          integer not null,
    primary key(late_id,payment_id),
    foreign key (payment_id) references Payments(payment_id) on delete
cascade
);
```

SQL query :

Q1a: Query Tenants by First and Last Name

Input : tenants's first and last name

```
SELECT *
FROM tenants
WHERE first_name = '{tenant_first}'
AND last_name = '{tenant_last}';
```

Q1b: Query Tenants by SSN

Input : tenants's SSN

```
SELECt *
FROM tenants
WHERE ssn = '{tenant_ssn}';
```

Q2: Check the Car's Owner whether is a tenant:

Input: plate_number

```
SELECT T.first_name, T.last_name, T.contact_number
FROM Tenants T, Cars C
WHERE T.ssn = C.ssn
AND C.plate_number = '{plate_number}'
```

Q3: Find tenants name and contact number who live in the specific apartment,

Sort results by tenant's first name, with ties broken by tenant's last name.

Input: apartment number

```
select T.first_name, T.last_name, T.contact_number, A.apartment_id
from Tenants T, Apartments A, Contracts C
where T.ssn = C.tenant_SSN
AND C.apartment_id = A.apartment_id
AND A.apartment_id = 'apartment number'
ORDER BY T.first_name, T.last_name;
```

Q4: Find number of tenants who live in the same building, Sort results by building name.

```
select B.building_id ,count(B.building_id) AS Num_people
from Contracts C, Buildings B, Apartments A
WHERE C.apartment_id = A.apartment_id
AND A.building_id = B.building_id
Group BY B.building_id
Order BY B.building_name;
```

Q5: Find all the female employees who are on active duty and work more than 1 year Sort results by employees first name, with ties broken by employees last name.

Input: 365

```
Select CurrentEmployees.first_name, CurrentEmployees.last_name,
CurrentEmployees.workingDay
FROM(
    select E.first_name, E.last_name, TRUNC(DATE_PART('day',
CURRENT_DATE::timestamp - E.work_from::timestamp)) AS workingDay
    FROM Employees E
    WHERE E.work_to IS NOT NULL
    AND E.gender = 'F'
) AS CurrentEmployees
WHERE CurrentEmployees.workingDay >= 365
ORDER BY CurrentEmployees.first_name, CurrentEmployees.last_name;
```

Q6: Find total payment and fees for specific tenants.

Input: tenant's SSN

```
SELECT T.first_name, T.last_name, SUM(P.payment_amount) AS total_payment,
Fee_table.total_fee
FROM Payments P, Tenants T, Contracts C,
(
    SELECT P.contract_id, SUM(L.late_fee) AS total_fee
    FROM Late_Fees L, Paid P
    WHERE L.payment_id = P.payment_id
    GROUP BY contract_id
) AS Fee_table
WHERE T.SSN = C.tenant_ssn
AND P.contract_id = C.contract_id
AND Fee_table.contract_id = P.contract_id
AND T.SSN = 'SSN'
GROUP BY T.SSN, Fee_table.total_fee;
```

Q7: Find all tenants who have cars and live in building 2, Sort results by tenant's first name, with ties broken by tenant's last name and then by plate number.

Input: building_id

```
SELECT T.first_name, T.last_name, Cars.plate_number
FROM Tenants T, Cars, Contracts C,
(
    Select C.contract_id
    From Contracts C, Buildings B, Apartments A
    WHERE C.apartment_id = A.apartment_id
    AND A.building_id = B.building_id
    AND B.building_id = '2'
) AS B2Contracts
WHERE T.SSN = C.tenant_ssn
AND C.contract_id = B2Contracts.contract_id
AND T.SSN = Cars.SSN
ORDER BY T.first_name, T.last_name, Cars.plate_number;
```

Q8: Find number of empty apartments in each building, Sort results by building name.

Input: Yes

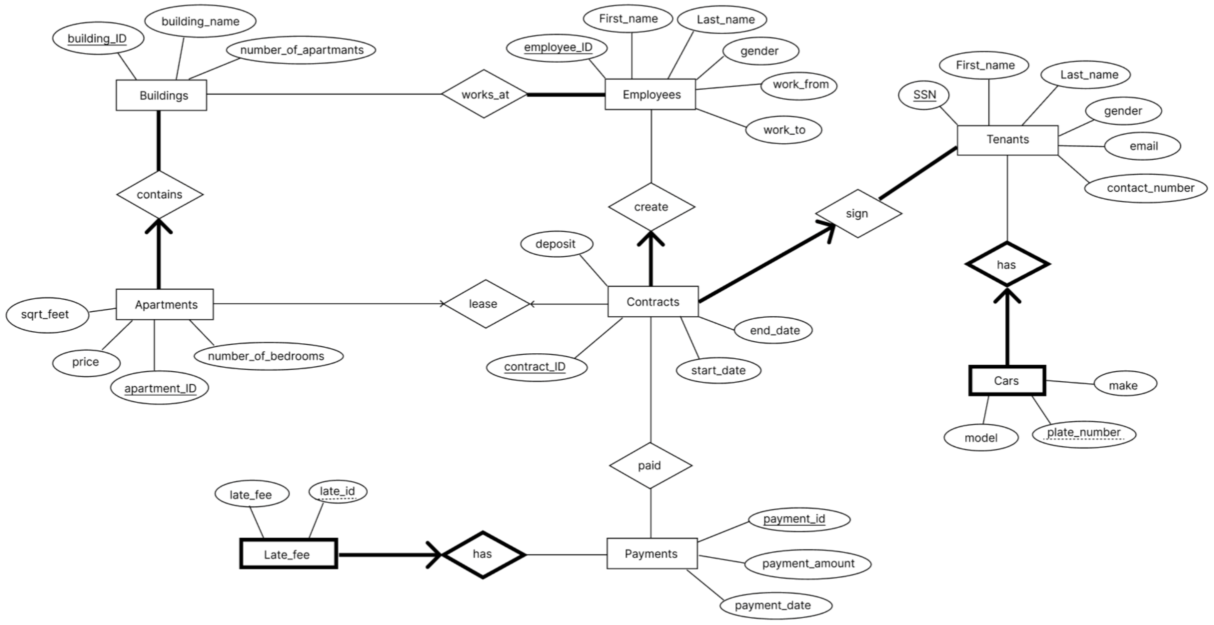
```
SELECT B.building_name, (B.number_of_apartments -
ApartmentsLeft.rented_room) AS empty_apartments
FROM Buildings B,
(
    Select A.building_id, count(*) AS rented_room
    From Contracts C, Apartments A
    WHERE C.apartment_id = A.apartment_id
    AND C.end_date > CURRENT_DATE
    GROUP BY A.building_id
) AS ApartmentsLeft
WHERE B.building_id = ApartmentsLeft.building_id
ORDER BY B.building_name;
```

Q9: List pairs of tenants from the Tenants table s.t. One of them had cars and the other did not. Sort results by Tenant_has_car, with ties broken by Tenant_has_no_car.

Input: Show

```
Select  (T1.first_name  ,  T1.last_name)  as  Tenant_has_car,  (T2.first_name  ,
T2.last_name)  as  Tenant_has_no_car
FROM Tenants T1, Tenants T2, Cars C,
(
    Select (T.first_name, T.last_name) as Nocar_tenant,T.SSN
    FROM Tenants T
    EXCEPT
    SELECT (T.first_name, T.last_name) as Has_car, T.SSN
    FROM Tenants T, Cars C
    WHERE T.SSN = C.SSN
) AS NoCar
WHERE T1.SSN = C.SSN
AND T2.SSN = NoCar.SSN
GROUP BY Tenant_has_car,Tenant_has_no_car
ORDER BY Tenant_has_car,Tenant_has_no_car;
```

ER Diagram:


building_ID
building_name
number_of_apartmants
Buildings
works_at
employee_ID
First_name
Last_name
gender
work_from
work_to
Employees
contains
create
sign
SSN
First_name
Last_name
gender
email
contact_number
Tenants
has
deposit
sqrt_feet
Apartments
lease
Contracts
price
number_of_bedrooms
apartment_ID
contract_ID
start_date
end_date
Cars
make
model
plate_number
paid
late_fee
late_id
Late_fee
has
Payments
payment_id
payment_amount
payment_date