CS1555 Recitation 5 Solution
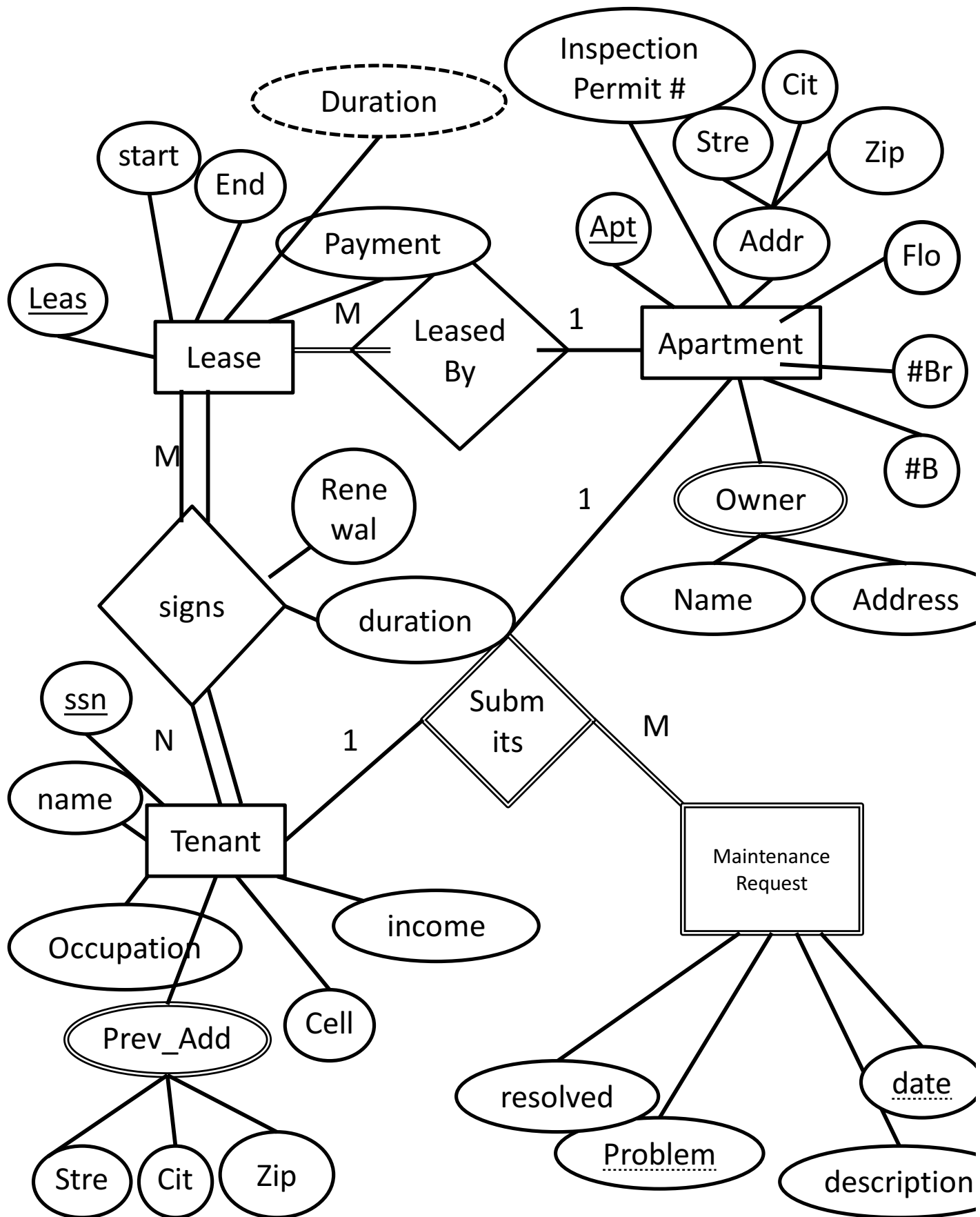
Objective:
PART 1: to practice ER diagrams and transforming them to relational schemas

Part 1: ER Diagrams

Create an ER Diagram for a rental management company that rents apartments. Each apartment has an address (street address, city, zipcode), apt_number, floor, last inspection permit number, number of bedrooms and number of bathrooms. Each apartment also has owners. We keep the owner's name and address only. The apartments are rented to tenants who are required to sign leases. Each lease has a lease_no, duration, start-date, end-date, and monthly payment. When the tenants renew the lease, we keep track of the renewal date and the duration of the renewal. We keep track of all the apartments a tenant has rented from the company before. Tenants have ssns, names, occupation, previous address(es), cell phone numbers, and monthly income. A tenant could submit a maintenance request for the apartment where something broke. A maintenance request should have request_date, problem, description and whether it has been resolved.

NOTE: this is a more complex example that brings into ER diagram weak entities and identifying relashionships

Entity-Relationship Diagram

Duration (dashed ellipse)

Lease entity
- start
- End
- Leas (key)
- Payment

Leased By relationship: Lease (M) — Apartment (1)

Apartment entity
- Inspection Permit #
  - Stre
  - Cit
  - Zip
  - Addr
- Apt (key)
- Flo
- #Br
- #B
- Owner (multivalued/composite)
  - Name
  - Address

signs relationship
- Rene wal
- duration
- Lease (M) — Tenant (N)

Tenant entity
- ssn (key)
- name
- Occupation
- Prev_Add (multivalued)
  - Stre
  - Cit
  - Zip
- Cell
- income

Submits relationship (identifying): Tenant (1) — Maintenance Request (M)

Maintenance Request (weak entity)
- resolved
- Problem (partial key)
- date
- description

2. Transform the ER diagram from part 1 into relational schemas

Entities:
1. Apartment (address(street address, city, zipcode), <u>apt_no</u>, floor, n_bedrooms, n_bathrooms, inspection_permit_no, {Owner(name, address)})
2. Lease (<u>lease_no</u>, duration, start-date, end-date, monthly payment)
3. Tenant (<u>ssn</u>, name, occupation, {previous address(street, city, zipcode)}, cell_no, income)
4. Maintenance Request (<u>date, problem</u>, description, resolved) – weak entity

Relationships:
1. Leased By <Lease, Apartment> M:1, TOTAL/PARTIAL
2. Signs < Lease, Tenant> M:N, TOTAL/TOTAL, renewal_date, duration
3. Submits <Tenant, Apartment, MaintenanceRequest> 1:1:M PARTIAL/PARTIAL/TOTAL

The resulting schemas after mapping:

APARTMENT (<u>apt_no</u>, floor, n_bedrooms, n_bathrooms, inspection_permit_no, street address, city, zipcode)

LEASE (<u>lease_no</u>, start-date, end-date, monthly payment, apt_no)
FK (apt_no) → APARTMENT (apt_no)

TENANT (<u>ssn</u>, name, occupation, cell_no, income)

MAINTENANCE_REQUEST (<u>date, problem, apt_no, ssn</u>, description, resolved)
FK (apt_no) → APARTMENT (apt_no)
FK (ssn) → TENANT (ssn)

TENANT_SIGNATURE (<u>renewal_date, lease_no, ssn</u>, duration)
FK (lease_no) → LEASE (lease_no)
FK (ssn) → TENANT (ssn)

OWNER (<u>name, address, apt_no</u>)
FK (apt_no) → APARTMENT (apt_no)

TENANT_PREV_ADDR (<u>ssn, street address, city, zipcode</u>)
FK (ssn) → TENANT (ssn)