CIS*3530 Data Base Systems and Concepts - Assignment 1
Write-Up README

Due: Oct 9 2020 11:59:59
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Brief Outline - How to Read my Submission:

- Each solution to the 4 questions is on a single page and exported as a PNG
- Each PNG shows the ER diagram, assumptions in yellow sticky notes and relational model transformation (with notes if applicable) in blue sticky notes
    - Q4 is kinda crammed because of this, and I will add the assumptions and/or relational model solution here instead because there's no space left

- I tried to structure my ER diagram so you always read it left-right and/or top-bottom (avoiding right-left and bottom-up as much as possible)
    - Sometimes go slightly askew from uniformity and use diagonal connections
    - In Q4 this was broken slightly (eg. distribution of generalization, ie. supertypes physically after subtypes and going left and/or upwards)

Assumptions General Structure:

The grader probably only needs to look at the first chunk to understand what I did and why, but I left all my other work (my thought process) as additional assumptions "for the record" in case it's not clear enough. None of these assumptions intend to conflict with things from the question, and if any do, it is a wording error. Each of the below bullets represents a "chunk" of assumptions in a yellow sticky note:

- Disclaimer about any additional things or logical equivalences
- Cardinality and participation - shown via 0 or 1, (exactly) 1 / single, 0+, or 1+
- Strong/weak entity-related assumptions, existence dependency, if an entity called for another entity to be stored as data but instead is represented by a relationship
    - Appears in that general order within the chunk, but may be mixed in
    - Also has points related to specialization and generalization mixed in
- Redundant assumptions covered by first thing for the most part - relate to participation and cardinality
    - Note: Q3 solution has a separated sticky note with this part
    - Note: Q4 combined this with above point
- Assumptions regarding attribute uniqueness, primary keys, partial keys
- Sometimes I had an additional small section clarifying some logical things of how entities relate

Relational Model Transformation (from my ER diagram) General Structure:

- How each point is started also represents what it was created from:
  “dash, space” - entity, “dash, space x2” - subtype entity, “dash” - relationship
- Relation structure itself:
  - Exception: from M:M relationship just has all primary keys from both sides, usually in a grouping rather than a random order
  - Attributes originating from the original location are usually grouped
  - Primary key(s) originating from the thing itself go first, then other attributes
    - Foreign key(s), whether a primary key or not, go in front of the existing list of attributes
      - Eg. (etc. added in front), 1:N relationship attributes, inherited key(s) from strong entity, attributes

Q4 Assumptions

- Below I have copy-pasted the yellow sticky note of assumptions:

Assumptions:
contract = insurance policy, broker agency = insurance company = insurance broker

- A fee payment is paid and tracked for a **single** contract
- A contract tracks **0+** fee payments
- A contract is bought and represented by a **single** customer
- A customer buys **1+** contracts
- A contract is sold by a **single** broker agency
- A broker agency sells **0+** contracts
- A home insures a **single** house
- A house is insured by a **single** home contract
- An auto contract insures **1+** vehicles
- An auto contract insures **1+** drivers
- A vehicle is insured by a **single** auto contract
- A driver is insured by a **single** auto contract
- A life contract insures a **single** person
- A person is insured by at most (**0 or 1**) life contracts
- A person is a client of **1+** broker agencies
- A broker agency has **0+** clients

- A fee payment is made to, tracked by, and stored in a contract, so it cannot exist without a contract
- Each fee payment is tracked by a contract, but a contract may not have any fee payments (eg. new contract)
- Each contract is bought by a customer, and a customer can buy multiple contracts, but must buy at least 1 to exist in records
- Each contract is sold by a broker agency, and a broker agency may not have sold any contracts (eg. new agency) or it already sold multiple
--> 3 types of contracts: home, auto, and life (note: eff-date = effective date, exp-date = expiry date)
- Every home contract insures 1 house, and a home contract must be created in order for a house to exist in insurance records
- Every auto contract insures at least 1 vehicle and 1 driver (if not more if both or either), and an auto contract must be created in order for a vehicle and driver to exist in insurance records
--> Houses and vehicles are both insurable assets
- Every life contract insures 1 person, and a person can be insured by 1 life contract or not at all (because can exist in insurance records without buying a life contract, eg. they are a customer, and/or bought an auto contract)

--> Person can be a driver and/or customer as well
- Every person must be a client of at least 1 broker agency to exist in insurance records, but a broker agency may not have any people/clients (eg. new agency) or they could have multiple people as clients
- The data for a contract about customer info is represented by the relationship Contract BOUGHT BY Customer
- The data for a contract fee payment is represented by the relationship Fee Payment TRACKED BY Contract
- The data for home contract about insured house info is represented by the relationship Home INSURES House
- The data for auto contract about insured vehicle(s) info is represented by the relationship Auto INSURES DRIVER OF Vehicle
- The data for auto contract about insured driver(s) info is represented by the relationship Auto INSURES VEHICLE OF Driver

- Assume a fee payment's date-time is unique enough for partial key (and definitely unique with related contract policy number)
- Assume a contract's policy number is unique
- Assume a broker agency's agency name + office address is unique (in case of multiple agencies with same names)
- Assume an insured assets picture is unique (because it is a photo someone took of the house or car and not a generic image)
- Assume a person's SIN is unique

- Since a client is a customer, driver, or person, but a person is a client and customer and driver are both people, it means that a client is a person, who may be a customer and/or a driver in terms of what they're buying or being insured for
- Notice that vehicle and house are both insurable assets with share attributes

- Note: names aren't general (person vs place), neither are phone/fax numbers (because the context of how they are used doesn't make sense to be used in each other's roles, etc.), but address (house vs office) are general in the sense that both are insurable assets/buildings/houses