ENSF 608 Fall 2023
Instructor: Syed Tauhid Shah

Assignment 1: Entity Relationship Diagram

Objective:
The objective of this assignment is to apply your understanding of entity-relationship and enhanced entity-relationship modelling concepts.

Due Date:
Monday, October 2nd, 2023, by 11:59 PM.

Submission Guidelines:

- This assignment is to be completed individually. Collaborative discussions are encouraged, but the final submission should be your own original work.
- Submit your answers in a single PDF document to the Assignment 1 Solutions section on the course's D2L page.
- Name your file as: Lastname_Firstname_Assignment1.pdf.
- You can choose to handwrite or type a solution. Diagrams can be drawn manually or with software tools. If you choose to handwrite, ensure that your submission is clear and legible. Scanned or photographed handwritten work is acceptable.

Weighting: This assignment is out of 25 marks and is worth 12.5% of your overall grade.

Starlight Academy, a newly established school for grades 7-12, needs a database to streamline their student and faculty information. They have laid out the following requirements:

"Students form the backbone of our academy. Upon admission, each student is allocated a unique Student Number. We document their first name, last name, date of birth (month, day, year), and the grade they're entering. For our junior high students (grades 7 to 9), we need to know their homeroom assignment. For senior high students (grades 10 to 12), we must register their chosen academic track (e.g., Science, Arts, Business). Since our academy promotes parent-teacher engagement, we need to register parent/guardian details as well. This includes their first name, last name, one or more phone numbers, residential address, and primary email.

It's crucial to be aware of any medical conditions (allergies) our students might have. Therefore, we maintain records of any medical conditions and the recommended immediate response (treatment protocols) if an issue arises. For urgent situations, we also gather the details of an emergency contact, which includes their first name, last name, and primary phone number. This contact might differ from the student's parent or guardian.

Our faculty is a blend of experienced educators and fresh talent. Every teacher might handle multiple grades. Along with capturing their first name, last name, and the title they prefer (e.g., Dr., Mr., Ms.), we also record the grades they're assigned to and their unique Faculty ID. Some teachers take on the role of grade coordinators, overseeing academic delivery and mentoring other teachers in their respective grades. These grade coordinators work closely with the school management to ensure academic excellence."

Please let us know if you have any questions about these requirements. We are looking forward to seeing your solution!

Assignment Questions

Based on the requirements narrative above, design and draw an EER diagram for the described application. Your solution must include the following:

Design Explanation (5 marks)

- Explain your design process and state any assumptions that you have made. What decisions did you make and why? Include the following information:
    - Choose one entity type and describe why its key attribute is unique.
    - Choose one relationship and how it relates the participating entity types.
    - Explain how at least one attribute can be derived from other attributes.

A 5/5 solution will be well-organized, clearly address all the points listed, and outline the main decisions when designing the EER model. The design explanation should be approximately half a page or less in length.

Technical Criteria (20 marks total)

- (16 marks) Your EER diagram must include at least 70% of the following components (i.e. Of the 22 numbered components below, at least 16 different types of components should be identifiable in your model).
    - Entities:
        1. Entity Type(s)
        2. Weak Entity Type(s)
    - o Relationships:
        3. Relationship Type(s)
        4. Identifying Relationship Type(s)
    - o Attributes:
        5. Simple Attribute(s)
        6. Key Attribute(s)
        7. Multivalued Attribute(s)
        8. Composite Attribute(s)
        9. Derived Attribute(s)
        10. Partial Key Attribute(s)
    - Participation Constraints:
        11. Total Participation(s)
        12. Partial Participation(s)

    - Cardinality Constraints (not Min/Max notation):
        13. 1:1 Cardinality(ies)
        14. 1:N Cardinality(ies)
        15. N:1 Cardinality(ies)
        16. M:N Cardinality(ies)
    - Specialization/Generalization (with constraints shown)
        17. Disjoint & Total
        18. Disjoint & Partial
        19. Overlapping & Total
        20. Overlapping & Partial
    - Attribute Inheritance
        21. Evidence that attributes are inherited, not duplicated
- (1 mark) All key attributes must be identified
- (1 mark) Relationships should be marked with cardinality/participation constraints
- (1 mark) Specializations and generalizations should be marked with
- disjoint/overlapping/total/partial constraints
- (1 mark) Your diagram must be clear, organized, and readable
- You may add any EER diagram components not listed above

Marks will be distributed as outlined above. Points will be taken off for inaccuracies in translating between the narrative and the EER model.