ENSF 608 – Fall 2021

Lab 1 – Friday, October 01

Student Name: Bhavyai Gupta

Submission date: October 01, 2021

Design Explanation

## Assumptions

**Student and Parent/Guardian**

* Students must have at least one parent/guardian and may have multiple parents/guardians.
* A parent/guardian could be registered for many students. For example, siblings may have same parents/guardians.

**Student and Emergency Contact**

* A student must have only one emergency contact, who would be the first one to get contacted in case of emergencies.
* A particular emergency contact could be registered for many students. For example, siblings may have same emergency contact.
* Only the primary phone number is stored for the emergency contact.

**Student and Grade**

* A student can be only in one grade.
* A grade can have many registered students.

**Grade and Teachers**

* A grade can be taught by multiple teachers. For example, different teachers for different subjects.
* A teacher can teach multiple grades. For example, a teacher teaching music to all students in all grades.

**Teacher and Lead Teachers**

* A lead teachers can lead many teachers, while simultaneously teaching the students.
* A teacher can only be led by at most one teacher.

## Entity and Key Attribute

The Teacher entity type has a unique attribute “Certificate\_ID”. The certificate identification is provided by an authorized federal organization that uniquely identifies the certificate holder.

## Relationship and Participating Entity Types

The “REGISTERS\_FOR” relationship has participating entity types Student and Grade. Every student is registered in a grade. A grade has at least one registered student.

## Derived Attribute

The No\_of\_Students attribute can be derived by counting the number of students registered for a grade. This attribute needs not to be stored in the database.

# Technical Criteria

Entities

1. Entity Type(s) – example Student
2. Weak Entity Type(s) – example Emergency\_Contact

Relationships:

1. Relationship Type(s) – example REGISTERS\_FOR
2. Identifying Relationship Type(s) – example GUARDIAN\_OF

Attributes:

1. Simple Attribute(s) – example Email\_Address
2. Key Attribute(s) – example Certificate\_ID
3. Multivalued Attribute(s) – example Can\_Teach
4. Composite Attribute(s) – example Name
5. Derived Attribute(s) – example No\_of\_Students
6. Partial Key Attribute(s) – example Phone\_Number

Participation Constraints:

1. Total Participation(s) – example Grade -> TAUGHT\_BY
2. Partial Participation(s) – example Teacher -> LEADS

Cardinality Constraints (not Min/Max notation):

1. 1:1 Cardinality(ies)
2. 1:N Cardinality(ies) – example REGISTERS\_FOR
3. N:1 Cardinality(ies) – example GETS\_CONTACTED
4. M:N Cardinality(ies) – example TAUGHT\_BY

Specialization/Generalization (with constraints shown)

1. Disjoint & Total – example Grade superclass
2. Disjoint & Partial
3. Overlapping & Total
4. Overlapping & Partial

Attribute Inheritance

1. Evidence that attributes are inherited, not duplicated – example Grade\_Level

Categories (Union Type)

1. Union Type

# Key Attributes

1. Student (ID)
2. Parent (Name)
3. Emergency\_Contact (Phone\_Number)
4. Grade (Grade\_Level)
5. Teacher (Certificate\_ID)

# Cardinality/Participation Constraints in Relationship

Marked in the diagram

# Disjoint Constraint labels

Marked in the diagram

# Diagram

Diagram is legible