ENSF 608 – Fall 2021

Lab 1 – Friday, October 01

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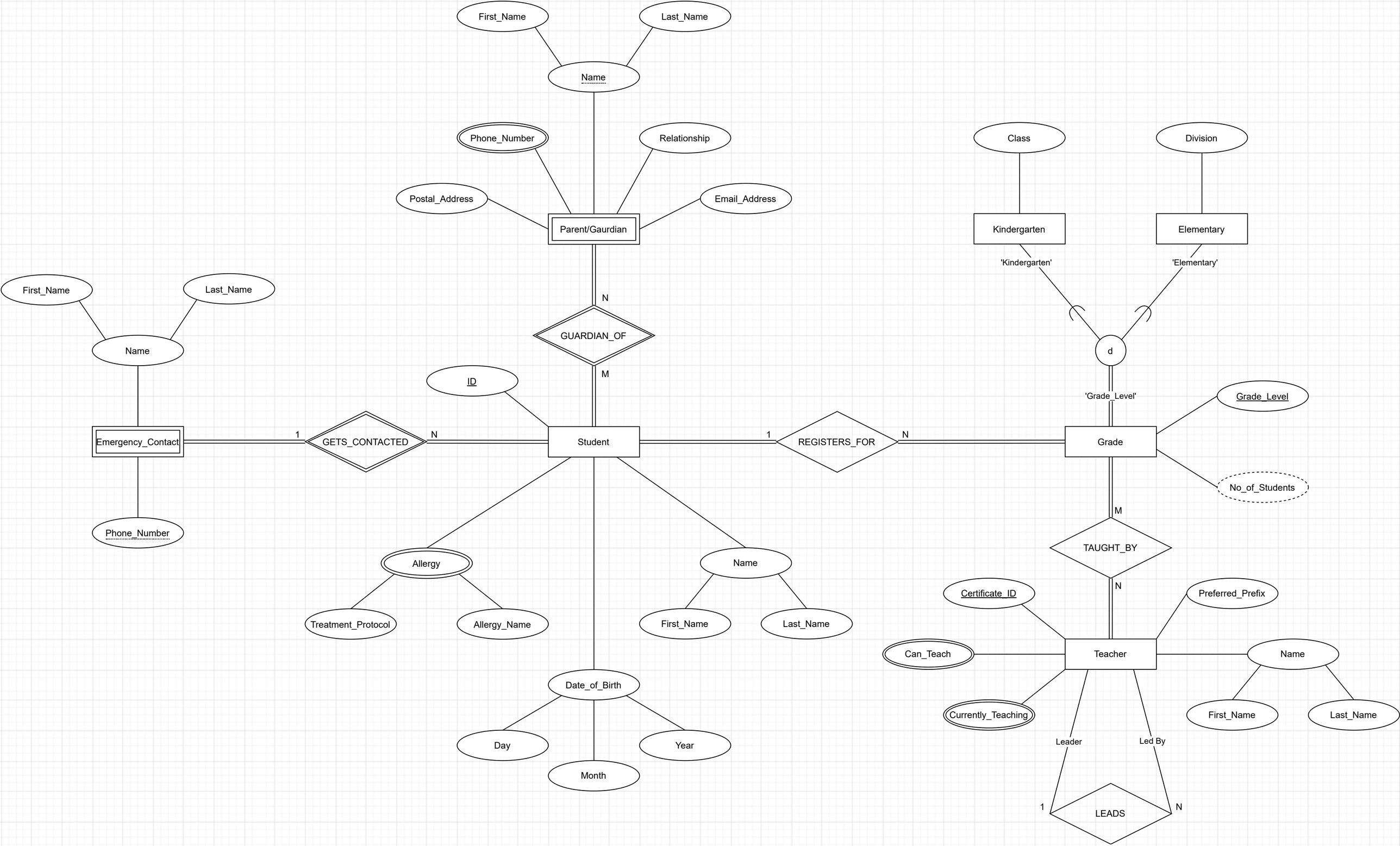
First_Name
Last_Name
Name
Phone_Number
Relationship
Postal_Address
Email_Address
Parent/Gaurdian
N
GUARDIAN_OF
M
First_Name
Last_Name
Name
Emergency_Contact
1
GETS_CONTACTED
N
Student
1
REGISTERS_FOR
N
Phone_Number
ID
Allergy
Treatment_Protocol
Allergy_Name
Name
First_Name
Last_Name
Date_of_Birth
Day
Month
Year
Class
Division
Kindergarten
Elementary
'Kindergarten'
'Elementary'
d
'Grade_Level'
Grade_Level
Grade
No_of_Students
M
TAUGHT_BY
N
Certificate_ID
Preferred_Prefix
Can_Teach
Teacher
Name
Currently_Teaching
First_Name
Last_Name
Leader
Led By
1
LEADS
N

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:

3. Relationship Type(s) – example REGISTERS_FOR
4. Identifying Relationship Type(s) – example GUARDIAN_OF

Attributes:

5. Simple Attribute(s) – example Email_Address
6. Key Attribute(s) – example Certificate_ID
7. Multivalued Attribute(s) – example Can_Teach
8. Composite Attribute(s) – example Name
9. Derived Attribute(s) – example No_of_Students
10. Partial Key Attribute(s) – example Phone_Number

Participation Constraints:

11. Total Participation(s) – example Grade -> TAUGHT_BY
12. Partial Participation(s) – example Teacher -> LEADS

Cardinality Constraints (not Min/Max notation):

13. 1:1 Cardinality(ies)
14. 1:N Cardinality(ies) – example REGISTERS_FOR
15. N:1 Cardinality(ies) – example GETS_CONTACTED
16. M:N Cardinality(ies) – example TAUGHT_BY

Specialization/Generalization (with constraints shown)

17. Disjoint & Total – example Grade superclass
18. Disjoint & Partial
19. Overlapping & Total
20. Overlapping & Partial

Attribute Inheritance

21. Evidence that attributes are inherited, not duplicated – example Grade_Level

Categories (Union Type)

22. 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