INTRODUCTION TO COMPUTER DATABASE

# ASSIGNMENT-1

# SCENARIO: 3

SECTION: 322

PROFESSOR: MALEK EL KOUZI

SUBMITTED BY:

SHIJUN LI

SAMARVEER SINGH TOOR

PRANAV BATRA

## INTRODUCTION

The design of a relational database in third normal form (3nF) for Dead Prime Minister High School (DPHMS) is described in this document. The database will help in running the school by keeping track of and organizing student information and information about legal guardians, enrollment, disciplinary actions, results of standardized testing, extracurricular activities, and plans for life after high school. In order to reduce duplicate data and guarantee data consistency, the database will be constructed using 3NF.

ENTITY-DESCRIPTION

The ERD for DPHMS database includes the following entities and relationships

**Student-** This entity contains the basic personal data of a student enrolled in DPMHS, including student id, name, address, birth date, gender, identity of legal guardian(s), enrollment and enrollment dates.

**Legal-Guardian-** This entity represents a student's legal guardian(s) and contains their id, name, address, birthdate, gender, and home phone number.

**Enrollments -** A student's enrollment in a specific academic year is represented by this entity, which also includes the courses they are enrolled in, their homeroom teacher and location, their grades and GPA for each course, and the academic year as a whole.

**Course enrolled in**-This entity represents the courses offered at DPMHS and contains the course name,grade for each course and ID.

**Disciplinary action-**: This is an example of a disciplinary action that has been taken against a student. It includes the student id, student's name, the incident date, type of incident, and the disciplinary action that has been taken.

**Standardized testing result**- This is an example of a student's standardized test result and includes the student's id, the test name, the test date, and the test results.

**Extracurricular** **Activities**- This entry indicates a student's involvement in extracurricular activities and includes their activity number, name of student, the club or sports team name, the academic year, and student ID and activity name combination.

**Post-high school plans**- these outline a student's post-secondary education goals and include their id, the colleges and universities they applied to, the date of their application, the outcome of their application (accepted, rejected, or placed on a waitlist), and the post-secondary institution they ultimately selected.

**Homeroom**- this entity is used to match with the relations with enrollments,and need to create a new table for it

**Grades for each course-** This indicates the grades of student for each course this includes id, grades, gpa for each grading period.

**Academic year-** This entity includes id,year name.

**Homeroom Teacher-** This entity represents the teacher in a homeroom which includes id, teacher name.

**BUSINESS RULES**

***STUDENTS***

* Every student needs a different Student\_ID.
* Every student needs a name, address, birthdate, and gender.
* Every student needs at least one legal guardian.
* Every student needs a date when they started attending, and this date must be before or the same as the date when they stopped attending.

***LEGAL-GUARDIAN***

* Every legal guardian needs a different Legal\_Guardian\_ID.
* Every legal guardian needs a name, address, birthdate, and gender.
* Every legal guardian must take care of at least one student.
* Every legal guardian must have a phone number at home.

***ENROLLMENT***

* Every enrollment needs a different Enrollment\_ID.
* Every enrollment needs to be linked with a unique Student\_ID.
* Every enrollment needs to be linked with a unique Academic\_Year.
* Every enrollment needs to have a main teacher and a place.
* Every enrollment needs to have at least one course registered.

***COURSE***

* Every course needs a unique Course\_ID.
* Every course must have a unique Course\_Name.

***DISCIPLINARY ACTION***

* Every disciplinary action needs its own Incident\_ID.
* Each disciplinary action must be linked to a unique Student\_ID.
* Every disciplinary action must have a date, type, and the action taken as punishment.

***STANDARDIZED TESTING RESULT***

* Every standardized test needs its own Test\_Result\_ID.
* Each standardized test must be connected to a unique Student\_ID.
* Every standardized test must include a date, the name of the test, and the score or result obtained.

***EXTRACURRICULAR ACTIVITIES***

* Every extracurricular activity needs its own Activity\_ID.
* Each extracurricular activity must be linked to a unique Student\_ID.
* Every extracurricular activity must include the name of the club or sports team participated in and the academic year when it happened

***POST-HIGH SCHOOL PLANS***

* Every plan for after high school needs its own Application\_ID.
* Each plan must be linked to a unique Student\_ID.
* Every plan must include applying to at least one college or post-secondary education program.
* Every plan must have a date when the application was submitted and the outcome (accepted, rejected, or waitlisted).
* Every plan must involve selecting a specific college or post-secondary education option.

**UNKNOWNS**

***STUDENTS***

* Do we need to include certain information like street and city addresses?
* Do we need to add more details about students, like their ethnicity or complexion?

***LEGAL-GUARDIAN***

* Do we have to include certain parts of an address like street, city, state, and zip code?
* What's the longest a name can be?
* How will we link legal guardians to students, by their names, an ID, or something else?
* Do we need to add more information about legal guardians, like their relationship to the student or their occupation?

***ENROLLMENT***

* What's the longest a homeroom teacher and location can be?
* How will we connect courses to each enrollment, by course ID, name, or something else?

***COURSE***

* Is there a maximum or minimum length for the course name?
* Do we need to include more information for each course, like a description or prerequisites?

***DISCIPLINARY ACTION***

* How will we connect disciplinary actions to each student, by their ID, name, or another identifier?
* Do we need to include more details for disciplinary actions, like how severe the offense was or how many times it occurred?

***STANDARDIZED TESTING RESULT***

* What kinds of standardized tests will we use, like SAT or TOEFL?
* Do we need to add more information for each standardized test, like where it was taken or the specific version?

***EXTRA CURRICULAR ACTIVITY***

* How will we link extracurricular activities to each student, by their ID or name?
* Do we need to include any more details about extracurricular activities?

***POST-HIGH SCHOOL PLANS***

* How will we connect post-high school plans to each student, by their ID or name?
* Do we need to include more information about post-high school plans, like the potential undergraduate program or scholarship details?

**ASSUMPTION**

* Each student has either one legal guardian or a group of legal guardians who live together.
* Each student is assigned to only one homeroom class.
* Every course offered by the school is linked to a particular location.
* Grades for each course are determined using four grading periods every school year.
* GPA is figured out by averaging the grades from each course, giving more weight to some courses.
* Every disciplinary action taken by the school is connected to a particular student.
* Each standardized test taken by a student is connected to a specific test name.
* Extracurricular activities are tied to a particular school year.
* Post-high school plans are linked to individual students.

**CONCEPTUAL DIAGRAM**

CANDIDATE KEYS

***Student***

Student\_ID

Name and Birth\_Date

***Legal\_Guardian***

Legal\_Guardian ID number

Name and Birth\_Date combination

***Enrollments***

Enrollment\_ID number

Student\_ID and Academic\_Year

***Course***

Course ID number

Name

***Disciplinary actions***

Incident\_ID number

Student\_ID and incident date combination

***Standardized testing results***

Test\_Result\_ID number

Student\_ID and test date combination

***Extracurricular activities***

Activity\_ID number

Student ID and activity name combination

***Post high school plans***

Application ID number

Student ID and college/post-secondary education chosen combination

1. Every student can have more than one legal guardian, and each legal guardian can be responsible for multiple students. This relationship goes both ways.
2. Every student can be enrolled in multiple courses, and each enrollment is linked to only one student. This is a one-way relationship.
3. Each enrollment is tied to a specific academic year, and an academic year can have many enrollments. This relationship favors the academic year.
4. Each enrollment has one homeroom teacher, and a homeroom teacher can handle multiple enrollments. This relationship is more about the homeroom teacher.
5. Each homeroom location hosts multiple enrollments, and each enrollment belongs to one homeroom location. The homeroom location holds the key in this relationship.
6. Courses can have multiple enrollments, and an enrollment can involve multiple courses. Both sides are interconnected.
7. Each course can have various grades, and a grade is linked to one course. The connection is stronger towards the course.
8. A grading period encompasses several grades, while each grade belongs to one grading period. This link is more about the grading period.
9. An academic year spans across multiple grading periods, and a grading period can cover several academic years. This relationship involves both sides equally.
10. Each student may face multiple disciplinary actions, and each disciplinary action is tied to one student. The focus is more on the student.
11. A standardized test involves multiple students, and each student can take multiple standardized tests. Both sides are interrelated.
12. Extracurricular activities attract participation from multiple students, and each student can join various extracurricular activities. This connection is bidirectional.
13. Each post-high school plan corresponds to a single student, and a student can have multiple post-high school plans. The emphasis is on the student.