

Database Design Document

Student Record-keeping Database Management System (SRDMS)

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CP363 database

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Revision History

Date	Version	Description	Arthur(F+L)
Nov6	0.3	Discussed ERD and Identified all entities.	ZL, JZ, RZ, XL
Nov12	0.5	Added all attributes in ERD and revised some entities.	ZL
Nov13	0.7	Created all tables and posted them in the terminal. Revised ERD and update table.	ZL
Nov17	1.0	Checked ERD diagrams and tables and refined ERD and all tables. Created relational schema	ZL, JZ
Nov19	1.3	Create all data for each table.	RZ, XL
Nov20	1.5	Refined data and tested all data through sample tests.	ZL, JZ
No23	1.6	Add purpose of tables in 2.3	JZ
Dec3	2.0	Colored ERD and refined relation schema Add relation model in 2.1.3 and 2.2 and write section 4	ZL, JZ
Dec9	2.2	Final check report content and add apa format	ZL, JZ

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1. Introduction

1.1 object

The Student Record-keeping Database Management System (SRDMS) creates a relational database based on mySQL. It is able to record all student-related information in any specific universities.

1.2 Requirements analysis

Management decisions need to be based on information of the system. When student information needs to be processed, it is necessary to create a database management system that will collect and process the available information. Collecting different information and compiling it into an easily accessible database is the goal of SRDMS.

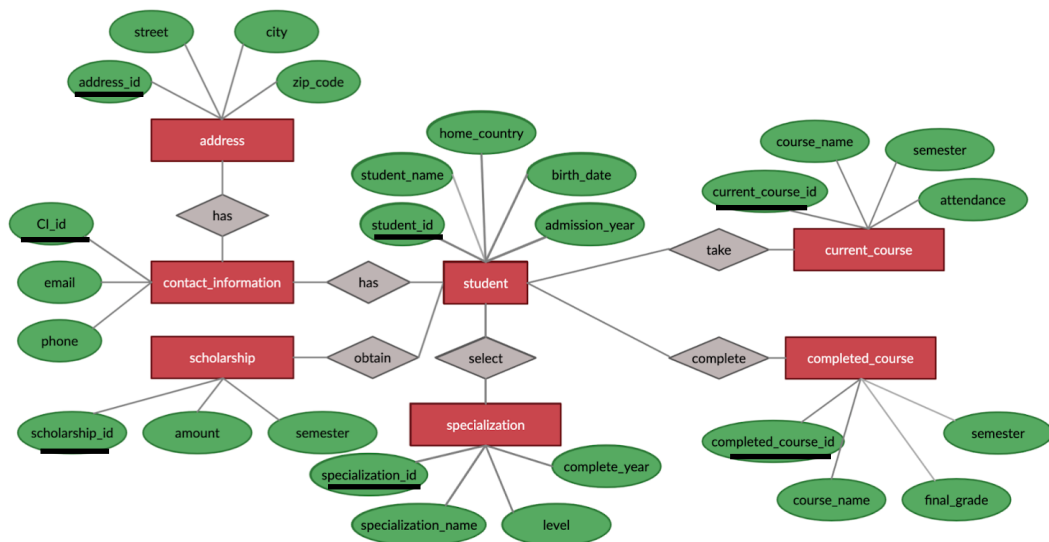
2. Relational Database design

2.1 conceptual diagram

This section shows all diagrams in SRMDS and discusses relations between entities.

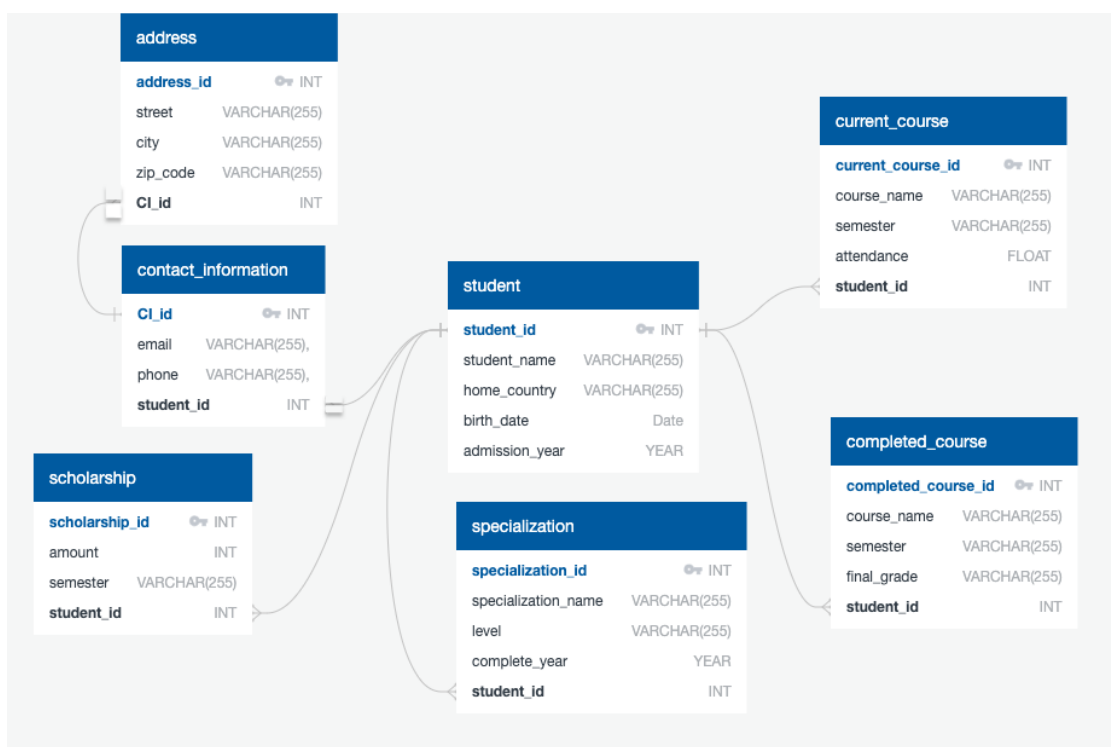
2.1.1 Entity relationship diagram (ERD)

ERD is a diagram that shows the relationships of entity sets stored in a database. (Shaun Gao, 2021)



2.1.2 Relational Schema (RS)

Relational schema is a set of relational tables and associated items that are related to one another. It has specific data types for attribute and primary key(PK), foreign key(FK) for each table. (Shaun Gao, 2021)



2.2 Entity relationship Description

Student has contact information, student entity obtains scholarship, students select specialization, student complete completed course, students take current course and contact information has address. The relationships between student and contact information and between contact information and address are in a one-to-one pattern. All other relationships are in a one-to-many pattern. That is, each student will have 0 or more specialization, scholarships, current courses and completed courses. The University only needs one address and contact information per student.

2.3 Purpose of entity/object

There are seven relative entities created. This database is created before it imports any data. The student entity contains student information. The specialization entity contains information about the student's chosen major and minor. The complete_course entity contains all student completed courses. The current_course entity contains all student courses this semester. The scholarship entity contains student rewards in semester. The contact_information and address entity is contacts for each student.

2.4 Purpose of table

2.4.1 Purpose of student table

This table stores basic information about the student. student_id is unique, each student has only one student id. The student_name is the student's own name, including first name, last name and even midname. The home_country is the student's hometown, which can distinguish

international students. The birth_date is the student's date of birth, which can determine the student's age. The admission_year is the year of entrance of students.

2.4.2 Purpose of contact_information table

This table stores the contact information of students. This table stores the student's contact information. The CI_id, which is also called contact_information_id, is the primary key for this table. The email records the email address provided by each student. phone records the student's contact phone number. The student_id is foreign key here referenced from the student table to correspond to each student.

2.4.3 Purpose of address table

This table stores the address details in the contact information. The address_id is the primary key of this table. This table records the street, city, and zip code of the student's address respectively. The CI_id is foreign key here referenced from the contact_information table.

2.4.4 Purpose of scholarship table

This table stores the scholarship that students gain. The scholarship_id is the primary key of this table, and each scholarship has a unique scholarship_id for easy querying. The amount records the number of scholarships earned by each scholarship_id. The semester records when each scholarship_id was awarded. The student_id is foreign key here referenced from the student table to record the students who received the award.

2.4.5 Purpose of specialization table

This table stores the specializations selected by the student. Specialization_id is the primary key of the table, and each specialization has a unique specialization_id. complete_year records the year in which the student earned the specialization. Specialization_name records the name of the specialization. Level contains a major or a minor varchar type to indicate the type of specialization. The student_id is foreign key here referenced from the student table to record the students who received the specialization.

2.4.6 Purpose of current_course table

This table stores student enrollment for the current semester and will be added to the completed_course table at the end of the semester. current_courses_id is the primary key of the table and records a unique ID for each course. course_name is the name of the course. semester records the current semester. attendance is the percentage of students attending the course. The student_id is foreign key here referenced from the student table to determine the corresponding student.

2.4.7 Purpose of complete_course table

This table stores the courses each course student has already taken. The completed_course_id is the primary key of the table and records the unique id of the completed course. course_name records the name of the course. semester records the semester in which the student completed the course. final_grade records the final grade the student received for the

course. The student_id is foreign key here referenced from the student table to record the students who completed the course.

3.Data Maintain

The data is stored in mySQL 8.0.26 on the local server. This design is to allow easy data entry access and querying to researcher throughout student-related information served by SRDMS.

In further database management, there may be a lot of students completed_course. Here are three cases for further maintenance. First, if a student gets expelled from school, all data reference student_id is removed. Second, when the semester shifts to the next one, data in entity current_course is moved to completed_course. Third, the horizontal partition is allowed completed_course to separate data through course_name. (Shaun Gao, 2021)

4.Conclusion

SRDMS is a relational database based on mySQL. All entities and their attributes and the relationships between the entities designed. Based on these components, The ERD are made and then Schema are drawn. Finally, the Schema exported to the SQL language code and design method for its future maintenance

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