Project Assignment

Due: *Monday Oct 28th at 11:59 PM*

Assignment purpose:

To develop a working relational database for a real-world application. In this project you will be able to learn database design methodology for relational database and create a database which can store data efficiency and retrieve information effectively.

Skills

- Analysis and list clear assumption to work with unclear requirements
- Experience with analysis and design of (DB) software
- Knowledge of DBMS, both in terms of use and implementation/design
- Experience with SQL
- Experience working as part of team

Tasks

You have been asked to design a database system solution for a project. Please access the three projects problem seatmates to learn more about the system requirements

- Study the Projects problem description very well before moving to next step
- The project descriptions can be accessed from here, Project idea 1, Project idea 2, Project idea 3
- You as a team to decide which project option you will work on. ***Choose only one project idea out of the 3 options.*** **You need to email your instructor with the team choice by Wednesday.**

For this Assignment *final submission, please complete the following tasks:*

1. **You will first design** an Enhanced E-R (EER) diagram based upon the database requirements specified. Create an EER schema diagram, documentation report that describes your design choices and states any assumptions.
   As part of this assignment, you should identify any missing or incomplete requirements, and explicitly state them in your documentation. You should also explicitly state any assumptions you made that were not part of the requirements listed above in order to develop a complete diagram.

2. **The second part** of the assignment will be to map the EER schema design to a relational database schema, Identify the primary key(s) and the foreign key(s)and create the tables corresponding to the relational schema using the MySQL DBMS.
   You will add to your report a listing of the CREATE TABLE statements. Specify as many constraints (key, referential integrity) as you can in the relational schema. You

should state the choices you made during the EER-to-relational mapping and the reasons for your choices.

What you turn in should include

- **Due by Wednesday Oct. 23th.**
  - Email from the team to identify the project idea that has been chosen by the team.

- **Due by Monday Oct. 28th**
  - Report
    - EER diagrams for your designs as well as documentation that describes any assumptions you made, and the reasons for your design choices. Draw the EER diagrams using the notation in the textbook. You can use any drawing tool for drawing your diagrams.
    - List of MySQL CREATE TABLE statements. You should state the choices you made during the EER-to-relational mapping and the reasons for your choices.
  - MySQL script (.sql file) for all the create table statements.

The files that you turn in should be submitted via Canvas by midnight of each due date as well as a printed hardcopy for the documentation to your instructor.

Project teams: Each project can be done in a team of 3 persons. Siblings preferred to work in different teams.

Late penalty: -5% per day with a maximum of 2 late days.

CS331- Project Assignment
Problem Description
Project 1
International Student Information System

Problem Description

The International Student office at Bellevue College is interested in developing a database to maintain information about the international students. The database will keep information about the courses the students have taken, their visa status, their on-campus jobs, etc. The International Student office is interested in creating a new database to carry this information because there are certain rules and regulations that apply to international students only, and therefore using the university's database would be inconvenient. The following are some of the rules and regulations that are specific to international students: (a) international undergraduate students should take at least 12 credit hours per semester; (b) international graduate students should take at least 9 credit hours per semester; (c) the I-20 should not be expired; (d) international students can work up to 20 hours per week; (e) international students should be working on-campus. They would need special permission from USCIS (US Citizenship and Immigration Services) to work off campus.

Database Design

We present the main entity types of this database. For each entity type, we provide some of the corresponding attributes. Use this information in order to: (a) Build an Enhanced E-R diagram; (b) Transform the Enhanced E-R diagram to a relational database. Identify the primary key(s) and the foreign key(s) for each relation. Draw the relational integrality constraints;

1. College: The main attributes are college identification number, name, address, name and address of the dean, etc.
2. Country: The main attributes are name, language, capital city, ethnicity, etc.
3. Course: The main attributes are course identification number, name, number of credits, etc.
4. Department: The main attributes are department identification number, name, address, name and address of the department head, etc.
5. Degree: The main attributes are name, description, etc.
6. Job: The main attributes are job name, job type, hours/week, employer's name, employer's address, employer's telephone number, etc.
7. Regulations and Laws: The main attributes are identification number, name, description, etc. refer to problem description above.
8. Student: The main attributes are social security number, name, birthday, gender, nationality, address, enrollment date, type (graduate or undergraduate student), visa type, major department, college, degree sought, etc. Note the following:
    a. A student has an educational history. The history consists of the name of the schools attended, degree earned, GPA, etc;
    b. The visa status for current students could b: F-1, J-1, etc. The visa status for students who have already graduated could be H-1, OPT (optional practical training), etc;

c. The relationship between student, degree, and college is a "*for the team to define*" relationship since a student may get a dual degree or get minors from different departments;
d. The relationship between student and country is a "*for the team to define*" relationship since a student may have dual citizenship.

Application Development

The following are some of the queries, forms, and reports one can create in order to increase the functionality of the database:

Side note: *you will not be asked to implement all of the following items during milestone 2 Project Part B that is due later in the quarter, you will be assigned a specific set of queries to implement.*

Queries:

1. The following queries help to retrieve information about undergraduate students:
    a. List the social security number, name, address, major department, and college for all the undergraduate students.
    b. Create a query that prompts for the name of a country and returns a list consisting of the social security numbers, names and addresses of the undergraduate students from this country.
    c. Create a query that prompts for the name of a college and returns a list with the social security numbers and names of the undergraduate students enrolled in this college.
    d. List the social security numbers, names, and nationalities of the undergraduate students holding a J-1 visa.
    e. List the social security numbers, names, and addresses of undergraduate students who are currently working. For each student, report the number of working hours per week.
    f. Create a query that prompts for the social security number of a student and returns that student's educational history (the name of the schools attended, degree earned, GPA, etc.).
2. Create the same queries as the ones descried in part (1) to retrieve information about the international graduate students.
3. Present the name of the country that has the majority of the international students.
4. List the countries that have at least one representative (graduate or undergraduate student) in this university.
5. List the number of graduate and undergraduate students enrolled in this university each year for the last ten years.
6. Present the names of the college and department with the highest enrollment of international students.
7. Present the overall average GPA earned so far by undergraduate and graduate international students.
8. Present the average GPA earned so far by undergraduate and graduate international students. Group this information by country of citizenship.

Forms:

1. Create a user sign-in form together with a registration form for new users.

2. Create the following data entry forms that are used for database administrative functions: students, courses, departments, jobs, degrees, etc. These forms allow the user to add, update, and delete information about students, courses, departments, jobs, degrees, etc.
3. Create a form that presents academic information and contact information of the international students. The form should present the following academic information for each student: social security number, name, date of birth, gender, educational history, current education, and courses taken. The contact information consists of the following: student's address, e-mail, current phone number, permanent address and permanent phone number.
4. Create a form that presents detailed information about the courses that an international student is taking currently. Insert in this form a combo box to allow the user to choose the social security number of a student. Insert a textbox that presents the name of the selected student. Insert a subform that lists the identification number, name, and corresponding credit hours of the courses that the selected student is currently taking. Insert a textbox that presents the total number of credit hours the student is currently taking. In case that this number is fewer than 12 credit hours for an undergraduate student or fewer than 9 credit hours for a graduate student, display a message notifying the user that the student is enrolled for fewer than the required number of credits.
5. Create a form that presents information about the employment of an international student. Insert a combo box that allows the user to select the social security number of a student. Insert a textbox that presents the name of the selected student. Insert a subform that presents information about the current employment of the student. The subform should present the following: job type, employer's name, employer's telephone number, and employer's address. Insert a textbox that presents the total number of working hours per week.
6. Create a form that allows the user to browse through the regulations and laws related to international students. Create a subform that presents detailed descriptions of the selected regulation/law.

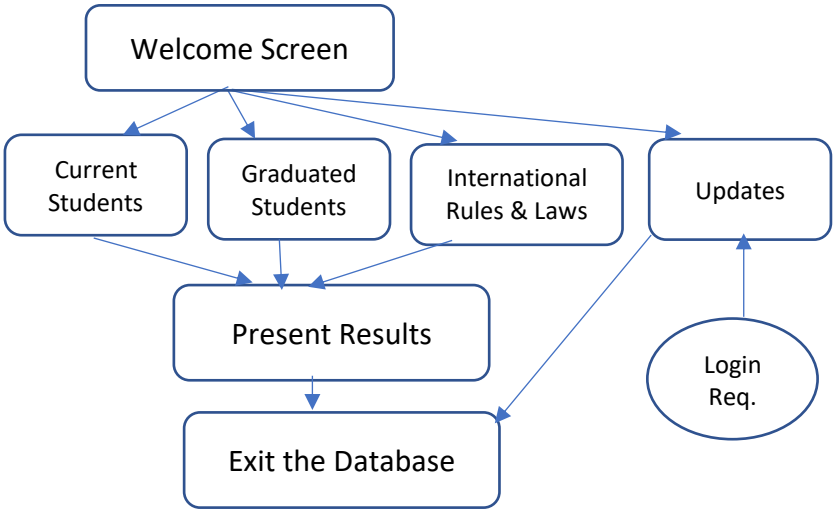
Reports

1. Report the following information for all the undergraduate international students: social security number, name, address, nationality, major department, college, GPA, and total number of credits earned so far. Group this information by nationality. Within each group, sort the information in descending order of credit hours earned.
2. Report the following information for all the graduate international students: social security number, name, address, nationality, major department, college, GPA, and total number of credits earned so far. Group this information by nationality. Within each group, sort the information in descending order of credit hours earned.
3. Report the following information about the international students who have already graduated: social security number, name, current visa type, job title, and the name and phone number of their current employer.
4. Report the following information about the students who will be graduating this coming spring: social security number, name, degree earned, name of the major department, college, enrollment date, graduation date, and GPA.
5. Report the following information about the students enrolled in the current semester: social security number, name, and a list of the courses the student is currently taking. For each course, present the following: course identification number, name, name of the department that is offering the course, and the number of credits. Calculate the total number of credits each student is taking in the current semester.

6. Report the following information about the current employment of the international students: job title, employer's name, employer's address, and the total number of working hours per week. Group the information by students' social security number and name.
7. Report the following information about the visa status of each international student: visa type and staring date and expiration date of the visa. Group this information by student social security number and name.

Java Application Development

This database application can be used by the employees of the International Student office, the database administrator, etc. In the following figure we present a tentative layout of the system.



Graduated Students: The user browses this part of the database to learn about the following:

(a) academic information,
(b) contact information,
(c) visa status, and
(d) current employment of the international students who have already graduated.

International Rules & Laws: The user browses this part of the database to learn about rules and laws concerning international students. For example, there are restrictions about the following: the total number of required credit hours per semester, the total number of working hours per semester, etc.

Update: The update form requires an administrator login name and password. This form allows the user to add/delete/update the information kept in this database about students, departments, regulations, etc.