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Database theory
2DV513

Assignment 3 - Tasks

Note 1 : I'm sorry about my english.
Note 2 : The E/R diagrams are realised with draw.io, it's an open source.

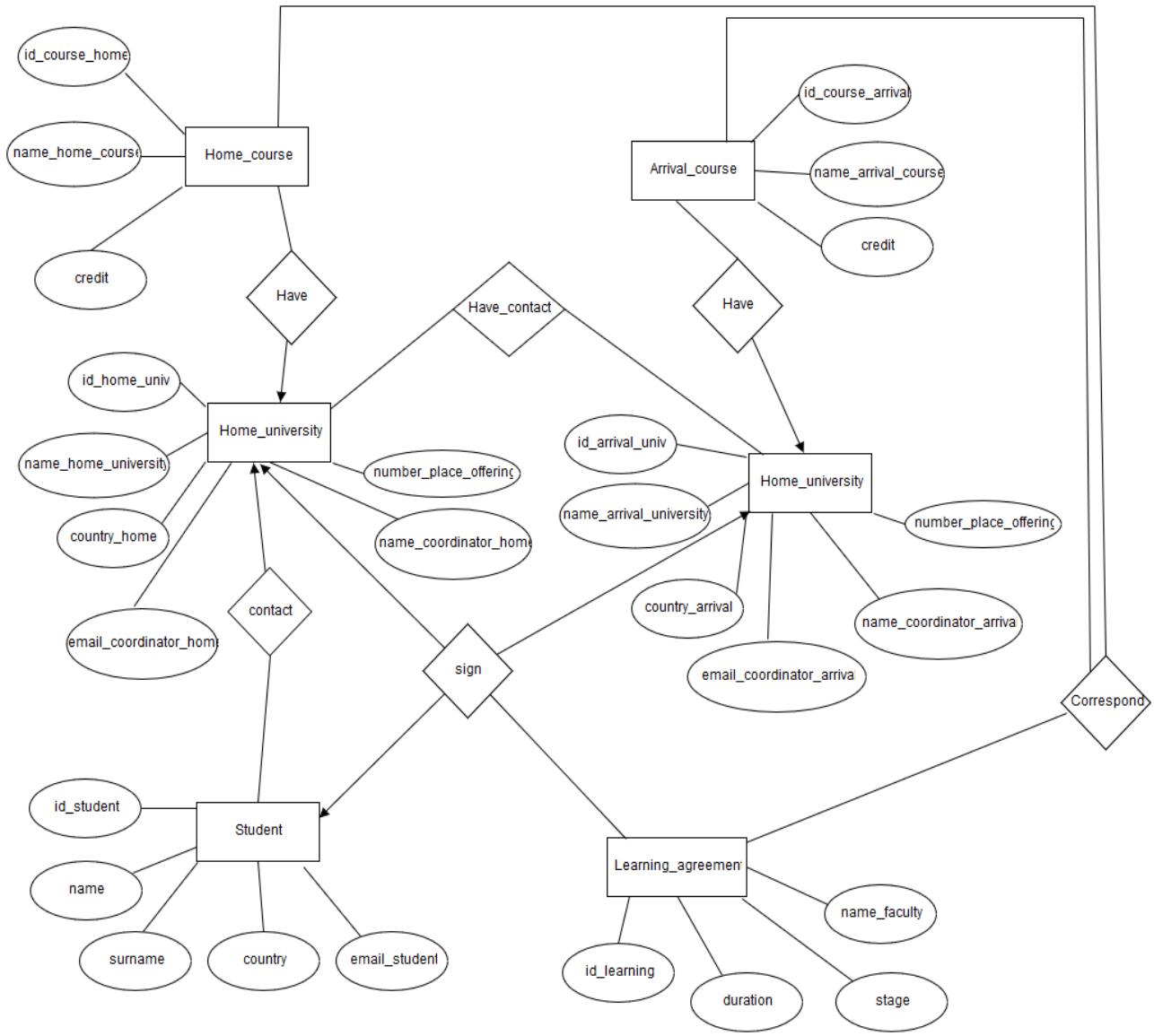
Task 1. Idea

Come up with an idea for your project. Describe what problem it solves, who the main user(s) will be, and why your idea is a good fit for them and the problem. Describe the main features that your application must have to be complete.

So the idea for my project is to provide more information for people who wants to make an Erasmus exchanges, when I wanted to make my Erasmus I didn't know who contact or the people who made an Erasmus exchanges to have information about what I need to do, how I should prepare my travel to the country, etc, so with this application people will be able to find all information they need to know. The main user(s) is the student who wants make an Erasmus Exchanges because I think this is a really good opportunity to discover another way to live/study in a different country, with my application you will be able to know which person made an Erasmus exchanges, have their email to contact them, even the email of the international office in a special university. I think (and this is my personal opinion) that we(the student who wants make an Erasmus exchanges) are very badly informed about where we can make an Erasmus exchanges, what we should do, etc. With my application you will be able to have a lot of information the contact that your university have with another university so you can realise your Erasmus exchanges.
I choose this project because (again in my opinion), it's really hard to find course that we wanna take, and with this model we are able to see what other student choose as course, so it can be really helpful.

Task 2. Logical model

Design a data model for your project and present it as an E/R diagram. Make sure to include important attributes and relationships. Discuss and motivate your design.



Explication :

A student take a contact with his home university to ask information, his home university have contact with other university so they can make an Erasmus exchanges.
To realise an Erasmus exchanges you must have a learning agreement, this is a document who take all information about the exchanges, his duration in month, which course you will take, both university and the student who will realise his erasmus exchanges must sign this document, the learning agreement contain the course taking in his home university and in his arrival university, that why I add a Correspond relation between Learning agreement, Home course and Arrival Course, a learning agreement is specific to both university/student, but university can sign multiple assignment, for multiple student.
I know it's a bit more complicated in the reality but this design permit to have a lot information about a special student who made an Erasmus exchange, also which university have contact with others. With this model, you can know which course a student from a special university took, and maybe it's a beginning to start a exchanges student.

Task 3 : Design in SQL

Translate your design to collections in SQL. Discuss and motivate how you translated entities and relationships.

```
CREATE TABLE IF NOT EXISTS Home_university
(id_home_univ INTEGER PRIMARY KEY,
 name_home_university TEXT NOT NULL,
 country_home TEXT NOT NULL,
 number_place_offering_home INTEGER,
 name_coordinator_home TEXT NOT NULL,
 email_coordinator_home TEXT NOT NULL)
```

Note : The table Home_unversity have a primary key, her name, country, the number of place they offering for an Erasmus exchanges, the name and the email of the coordinator who handle the erasmus exchanges so we can contact him/her if we have any question.

```
CREATE TABLE IF NOT EXISTS Arrival_university
(id_arrival_univ INTEGER PRIMARY KEY,
 name_arrival_university TEXT NOT NULL,
 country_arrival TEXT NOT NULL,
 number_place_offering_arrival INTEGER,
 name_coordinator_arrival TEXT,
 email_coordinator_arrival TEXT)
```

Note : The table Arrival_unversity have a primary key, her name, country, the number of place they offering for an Erasmus exchanges, the name and the email of the coordinator who handle the erasmus exchanges so we can contact him/her if we have any question.

```
CREATE TABLE IF NOT EXISTS Student
(id_student INTEGER PRIMARY KEY,
 name TEXT NOT NULL,
 surname TEXT NOT NULL,
 country TEXT NOT NULL,
 email_student TEXT NOT NULL,
 university_id INTEGER NOT NULL,
 FOREIGN KEY(university_id) REFERENCES Home_university(id_home_univ))
```

Note : The table Student have a primary key, his name, surname, country, his/her email so we can contact him/her if we have any question. Also a foreign key who are the resul from the arrow between Student and Home_university.

```
CREATE TABLE IF NOT EXISTS Home_course
(id_course_home TEXT PRIMARY KEY,
 name_home_course TEXT,
 credit DECIMAL NOT NULL,
 university_id INTEGER,
 FOREIGN KEY(university_id) REFERENCES Home_university(id_home_univ))
```

Note : The table Home_course have a primary key, his name, credit. Also a foreign key who are the resul from the arrow between Home_course and Home_university, so we can know which university teaching this special course.

```
CREATE TABLE IF NOT EXISTS Arrival_course
(id_course_arrival TEXT PRIMARY KEY,
 name_arrival_course TEXT,
 credit DECIMAL NOT NULL,
 university_id INTEGER,
 FOREIGN KEY(university_id) REFERENCES Arrival_university(id_arrival_univ))
```

Note : The table Arrival_course have a primary key, his name, credit. Also a foreign key who are the resul from the arrow between Arrival_course and Arrival_university, so we can know which university teaching this special course.

```
CREATE TABLE IF NOT EXISTS Learning_agreement
(id_learning INTEGER PRIMARY KEY,
 student_id INTEGER,
 home_university_id INTEGER,
 arrival_university_id INTEGER,
 duration INTEGER,
 stage BOOLEAN,
 name_faculty TEXT NOT NULL,
 FOREIGN KEY(student_id) REFERENCES Student(id_student),
 FOREIGN KEY(home_university_id) REFERENCES Home_university(id_home_univ),
 FOREIGN KEY(arrival_university_id) REFERENCES Arrival_university (id_arrival_univ))
```

Note : The table Learning_agreement have a primary key, the duration of the erasmus exchanges in month, a boolean stage because you can also do a stage with Erasmus, the name of the Faculty where the student will study. Also three foreign key who are the resul from the arrow between Home_university, Arrival_university, Student and Learning_agreement, this is the main document during an Erasmus exchanges, he have all information about the exchanges.

```
CREATE TABLE IF NOT EXISTS Have_contact
(id_home_univ INTEGER,
 id_arrival_univ INTEGER,
 FOREIGN KEY(id_home_univ) REFERENCES Home_university(id_home_univ),
 FOREIGN KEY(id_arrival_univ) REFERENCES Arrival_university(id_arrival_univ)
```

Note : The table Have_contact is the result between Home_university and Arrival_university, this table contain the information about which university have contact to another university and with which university you can realise an Erasmus exchanges. So this table contain two foreign keys, references to the primary key of the table Home_university and Arrival_university.

```
CREATE TABLE IF NOT EXISTS Correspond
(id_learning_agreement INTEGER,
 id_home_course TEXT,
 id_arrival_course TEXT,
 FOREIGN KEY(id_learning_agreement) REFERENCES Learning_agreement(id_learning),
 FOREIGN KEY(id_home_course) REFERENCES Home_university(id_home_univ),
```

FOREIGN KEY(id_arrival_course) REFERENCES Arrival_university (id_arrival_univ)

Note : The table Correspond is the result between Learning_agreement, Home_course and Arrival_course, this table contain the information about the course that the students should take, so we can find the course he sould take if he stayed in his university and the conversion of this course in his new university.

Task 4 : SQL queries

Create five queries to your SQL design that are needed to implement the functionality of your application. Focus on the more important queries and features of your application (i.e., there is no need to show how you insert documents in your various collections). Explain and motivate each query.

These five queries are almost the answer to all question that a student can ask before going to Erasmus. Even myself I asked those questions and too often without answers.

Question 1 :
I want information about a person who study in a special university and from my own country so I can contact him/her?

SELECT name, surname, email_student FROM Student JOIN Arrival_university ON university_id = id_arrival_univ WHERE name_arrival_university = 'Linnaeus University' AND country = 'France'

Answer :

Colin Frapper colin.frapper@hotmail.fr

Note : this query is about people who wants contact an old Erasmus student from his own country, and in a special university, this example is my own situation, a person from france and study in Linnaeus university.

Question 2 :

I don't know yet which university I wanna take but I'm sure that I wanna make an Erasmus exchanges in the University of Dublin, I wanna know which university offer this opportunity ?

SELECT name_home_university, email_coordinator_home FROM Home_university JOIN Arrival_university ON id_home_univ = id_arrival_univ WHERE name_arrival_university = 'University of Dublin'

Answer :
Name of the university = University of Barcelona
Email of the coordinator = KalidFajardoJuarez@teleworm.us

Note : This query is for person who aren't yet at university but they wanna choose the university according to what they can offer. (The name and the email are completely random it's not the real name/email)

Question 2 bis :
Same as the previous question but I wanna also know the number of the place that the university can have.

SELECT name_home_university, number_place_offering_home FROM Home_university JOIN Arrival_university ON id_home_univ = id_arrival_univ WHERE name_arrival_university = 'University of Dublin'

Answer :
Name of the university = University of Barcelona
Number of place = 30

Note : People also want to know how many a special university offer that's why I add the attribute number_place_offering, so they can know if they can easily make an Erasmus exchanges in this university, at contrary if they have to work hard to get an Erasmus exchanges.

Question 3 :

I wanna know which course took a special user during his Erasmus Exchanges ?

SELECT DISTINCT name_arrival_course FROM Student JOIN Learning_agreement ON id_student = student_id JOIN Correspond ON id_learning = id_learning_agreement JOIN Arrival_course ON id_arrival_course = id_course_arrival WHERE name = 'Colin'"

Answer :
Course = Database theory
Course = Introduction to web programming

Note : This is also a important question that the Erasmus student ask to themselves, which course I should take, so now you know that a special user make his erasmus exchanges, so ou wanna know which course he took. This is very difficult to find exactly the same course as in his home university , I know that if I had this information that would be very useful to me.

Question 4 :

Which person make a stage more than one year and in which faculty ?

SELECT name, surname , email_student,name_faculty FROM Student JOIN Learning_agreement ON id_student = student_id WHERE stage = 'true' AND duration > 12"

Answer :
Person = Paloma Mejia Alejandro Paloma@rrerefe.com Faculty of language

Note : If your plan is to make an Erasmus stage (you can also make a stage with the Erasmus program), more than one year, you wanna speak to someone who already do this and in which faculty.

Question 5 :

I wanna information about the people who are in the same faculty as mine and where they make

their Erasmus ?

SELECT name_arrival_university, country_arrival, email_coordinator_arrival FROM Arrival_university JOIN Learning_agreement ON id_arrival_univ = arrival_university_id WHERE name_faculty ='Faculty of psychology'

Answer :

The university = University of Bordeaux France MargauxRacicot@jourrapide.com

Note : This query is for the people who want make an Erasmus according to a special faculty, with this query you have the information of the university and also the mail of the coordinator so you can contact him to ask question.

Task 5 : Implementation

Write a program that implements your Idea in Task 1 with the design and queries from Task 2–4. You are of course allowed to introduce more queries. Describe the overall structure of your program and how to compile/run it.

The program is written in assignment_3.py in python

How to compile/run it :
I used sqlite3 as a database and python as a language program , so to run it you must install an add from firefox
https://addons.mozilla.org/en/firefox/addon/sqlite-manager/
or you can create a file named assignment_3.db and put in comments the function delete_content().
I also create a html file and write the answer of the queries in a table using BeautifulSoup, it's like a framework to write html in python. To install BeautifulSoup, here is a video https://www.youtube.com/watch?v=FdDakO9fPLw&t=114s, if you don't want use BeautifulSoup/ the html file just let the fonction « help_?x » in comment, also put in comments « from bs4 import BeautifulSoup » in the beginning of the file, and just run the python file.

The structure of my program :

Function :

create_table : function to create the table.

delete_content : delete all the content of all table, you must use it every time you wanna run again the file otherwise it provide an error of primary key when you insert the data so delete the data every time you running the program with the function delete_content.

drop_table : delete all table.

insert_value : I used a json file to insert the data, the information are completely random, it's not the real name/email etc.

sql_question_x : This is to print the question and the answer to the query, in all of this functions, there is a function help_x this is to use BeautifulSoup and the html file.

Conclusion : It was a very interesting project, I'm thinking (maybe) to create a real website where user can put their information in the database, with a form where people can search what they want about the university/student who have made an Erasmus exchanges.