



THE ARAB AMERICAN UNIVERSITY

Introduction to Database System

Term Project (university registration system)

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Introduction:

This project involves designing and building a database system to support course registration at a university. The database will keep track of students, the courses offered, and the registration of students in courses. It will support common functions such as searching for courses, registering for courses, and producing transcripts.

The registration system contains many professors and students and courses. Students will register in these courses that taught by professors.

Each person either student or professors(not both) has a profile containing their name, unique ID, sex, address and birthdate, students has GPA ,professors has salary.

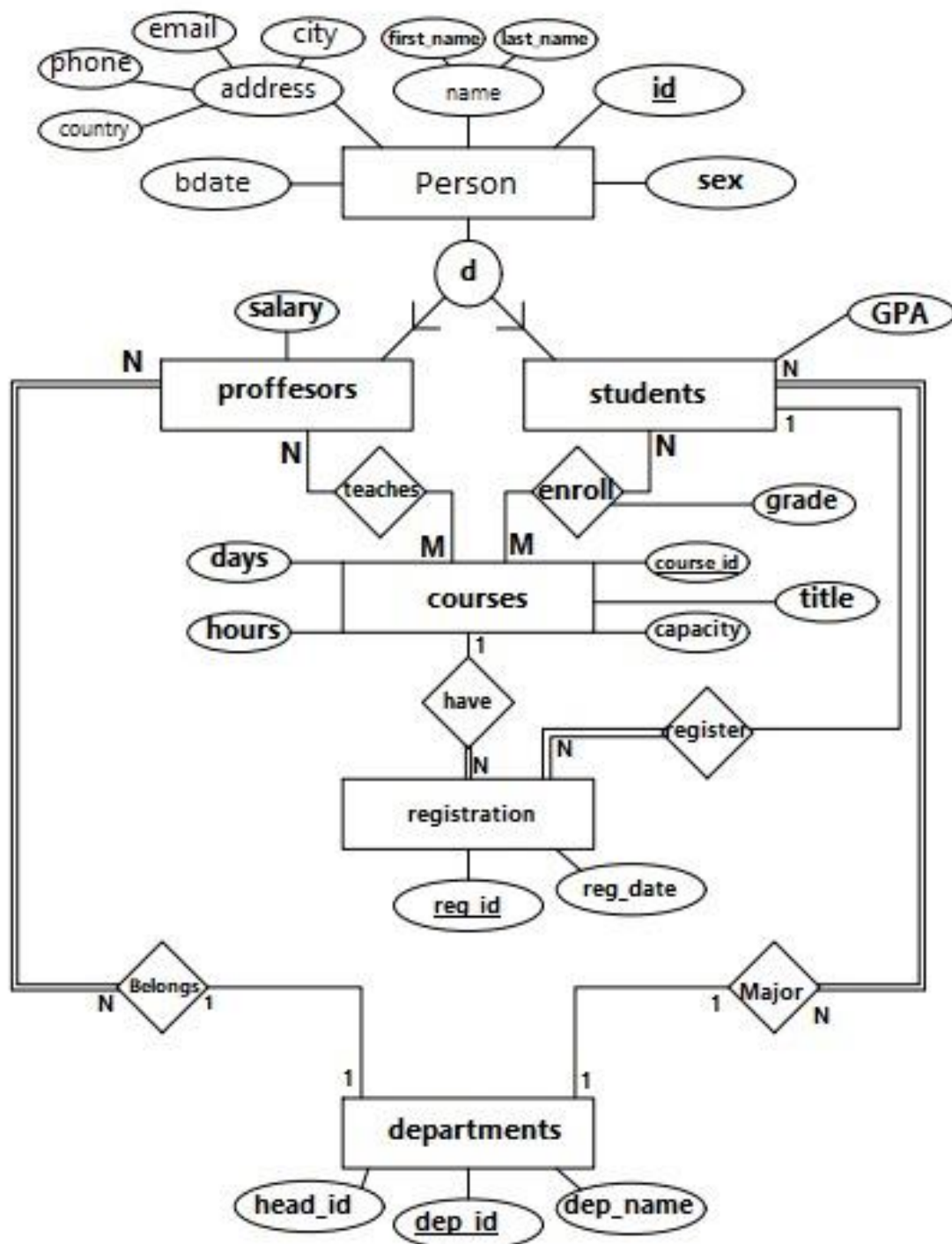
Students and professors belongs to departments, each department has a unique ID , Name and head master ID.

Each course has unique ID, title, capacity of course, The number of hours and number of days a week(2 days or 3 days).

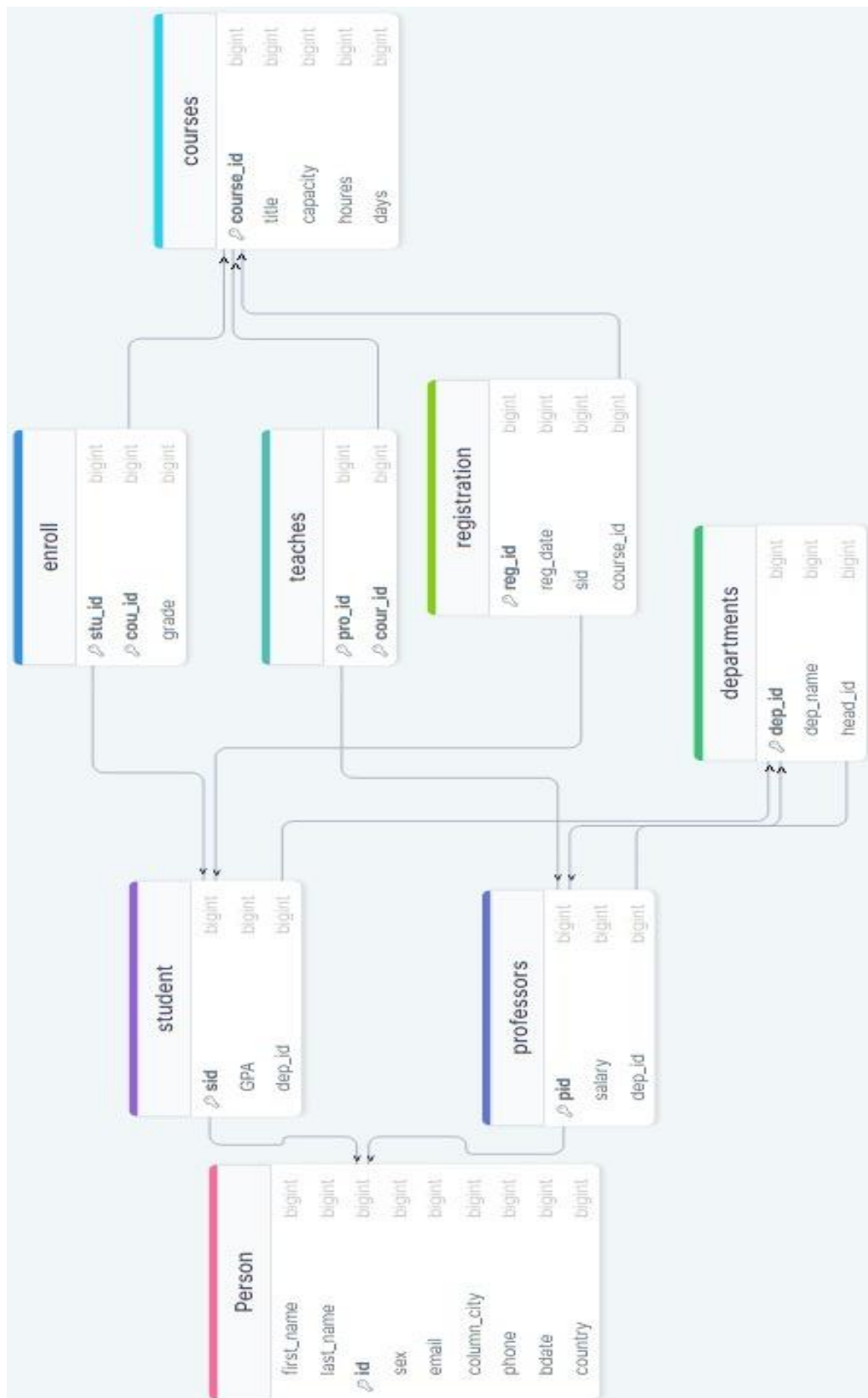
Each student can enroll many courses and has a grade of the course (if he already passed) , each professors can teach many courses.

Each registration operation will has a unique ID and registration date.

EER diagram:



EER Mapping:



person

First_name	Last_name	<u>Id</u>	sex	email	city	phone	bdate
------------	-----------	-----------	-----	-------	------	-------	-------

students

<u>SId</u>	GPA	Dep_id
------------	-----	--------

Professors

<u>PId</u>	salary	Dep_id
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enroll

<u>Stu_id</u>	<u>Cou_id</u>
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Teaches

<u>Pro_id</u>	<u>Cour_id</u>
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Courses

<u>Course_id</u>	title	capacity	hours	days
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Registration

<u>Reg_id</u>	Reg_date	SId	Course_id
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Departments

<u>dep_id</u>	Dep_name
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Create tables:

```
create table person(  
first_name varchar(15) not null,  
last_name varchar(15) not null,  
id number not null,sex char not null,  
email varchar(25) not null,  
city char (15)not null,  
phone char(10)not null,  
bdate date not null,  
country char (15) not null;  
primary key (id));
```

```
create table departments(  
dep_id number not null,  
dep_name char(10) not null,  
Head_id number not null,  
primary key(dep_id));
```

```
alter table departments add constraint dep_per foreign  
key(Head_id) references professors(PID)on delete set null;
```

```
create table courses(  
course_id number not null,  
title char (20)not null,  
capacity number not null,  
houres number not null,  
days number not null,  
primary key(course_id));
```

```
create table students(  
SId number not null,  
GPA number,  
Dep_id,  
Primary key(Sid));
```

```
alter table students add constraint stu_per foreign key(SId)  
references person(ID)on delete cascade;
```

```
alter table students add constraint stu_dep foreign key(dep_id)
references departments(dep_id)on delete set null;
```

```
create table professors (
  PId number not null,
  salary number,
  dep_id number,
  primary key(PId));
```

```
alter table professors add constraint pro_per foreign key(PID)
references person(id)on delete cascade;
```

```
alter table professors add constraint pro_dep foreign key(dep_id)
references departments(dep_id)on delete set null;
```

```
create table registration(
  reg_id number not null,
  reg_date date not null,
  SId number,
  course_id number,
  primary key(reg_id));
```

```
alter table registration add constraint reg_stu foreign key(SId)
references students(SId)on delete cascade;
```

```
alter table registration add constraint reg_cou foreign
key(course_id) references courses(course_id)on delete cascade;
```

```
create table enroll(
  stu_id number,
  cou_id number,
  grade char(2),
  primary key(stu_id,cou_id));
```

```
alter table enroll add constraint en_cou foreign key(cou_id)
references courses(course_id)on delete cascade;
```

```
alter table enroll add constraint en_stu foreign key(stu_id)
references students(SId)on deletescascade;
create table teaches (
pro_id number not null,
cour_id number not null,
primary key(cour_id,pro_id));
```

```
alter table teaches add constraint tea_pro foreign key(pro_id)
references professors(PId)on delete cascade;
```

```
alter table teaches add constraint tea_cou foreign key(cour_id)
references courses(course_id)ondelete cascade;
```


Insert Data

Person data:

insert into person

```
values('ahmad','khalidi',2020662,'m','a.khalidi@hotmail.com','jenin','0542498237','15-2-2002','palestine');
```

insert into person

```
values('omar','salme',2020742,'m','o.salem@hotmail.com','nablus','0546789452','29-4-2002','palestine');
```

insert into person

```
values('ayman','salah',2021231,'m','a.salah@hotmail.com','ramallah','0544124524','13-1-2003','palestine');
```

insert into person

```
values('sara','jaber',2019341,'f','s.jaber@hotmail.com','tubas','0548952654','4-9-2001','palestine');
```

insert into person

```
values('aya','sobhi',2022123,'f','a.sobhi@hotmail.com','jenin','0541231234','6-6-2004','palestine');
```

insert into person

```
values('qais','hashem',2021212,'m','q.hashem@hotmail.com','jenin','0549876543','5-4-2003','palestine');
```

insert into person

```
values('arwa','hammad',2019123,'f','a.sobhi@hotmail.com','alnnasrah','054112379','9-7-2001','palestine');
```

insert into person

```
values('karem','akram',2020987,'m','a.sobhi@hotmail.com','akka','0544491283','17-11-2002','palestine');
```

insert into person

```
values('mohammad','saeed',2022510,'m','a.sobhi@hotmail.com','jerusalem','0543323134','6-9-2004','palestine');
```

```
insert into person
values('jack','michel',2009444,'m','j.michel@hotmail.com','new
york','0514567923','15-11-1990','USA');
```

```
insert into person
values('zaid','qasem',2022321,'m','z.qaswm@hotmail.com','alkhalil'
,'0542987432','19-3-2002','palestine');
```

```
insert into person values('abu
obaida','alqassam',1111,'m','hero@hotmail.com','Gaza','?????????',
'7-10-2023','palestine');
```

```
insert into person
values('yaser','saber',2010119,'m','yaser@hotmail.com','jerusalem','
0549992411','14-12-1985','palestine');
```

```
insert into person
values('amal','motasem',2015002,'f','a.motasem@hotmail.com','yaf
a','0545654789','29-5-1990','palestine');
```

```
insert into person
values('tayseer','salem',2011005,'m','t.salem@hotmail.com','jenin','
0545556667','1-2-1992','palestine');
```

```
insert into person
values('yamen','ali',242424,'m','y.ali@hotmail.com','tulkarm','0545
000222','1-2-1980','palestine');
```

```
insert into person
values('jamal','aysar',2006123,'m','j.aysar@hotmail.com','ramallah','
0544504791','1-4-1982','palestine');
```

```
insert into person
values('saleh','amer',2018002,'m','s.amer@hotmail.com','jenin','054
5459212','9-8-1989','palestine');
```

```
insert into person
values('farah','kamel',2011003,'f','f.kamel@hotmail.com','haifa','05
45459111','12-10-1983','palestine');
```

```
insert into person  
values('majdi','sawalha',2014114,'f','f.kamel@hotmail.com','amman',  
'0531236549','12-3-1985','jordan');
```

courses data:

```
insert into courses values(11,'database',30,3,3);  
  
insert into courses values(22,'c++',30,3,3);  
  
insert into courses values(33,'palestine hestory',50,3,2);  
  
insert into courses values(44,'python',30,3,3);  
  
insert into courses values(55,'Eng drawing',30,3,2);  
  
insert into courses values(66,'lap database',25,1,1);  
  
insert into courses values(77,'english',30,3,3);  
  
insert into courses values(88,'lab electronics',12,1,1);  
  
insert into courses values(99,'math',30,3,3);  
  
insert into courses values(12,'networks design',30,3,2);
```

professors data:

```
insert into professors values(2010119,4250,null);  
  
insert into professors values(2015002,3500,null);  
  
insert into professors values(1111,8450,null);  
  
insert into professors values(2011003,2500,null);  
  
insert into professors values(2018002,2500,null);  
  
insert into professors values(2006123,3500,null);
```

```
insert into professors values(2009444,4500,null);
```

```
insert into professors values(242424,5500,null);
```

```
insert into professors values(2011005,3500,null);
```

```
insert into professors values(2014114,3800,null);
```

we will fill the dep_id later.

students data:

```
insert into students values(2020662,3.1,1111);
```

```
insert into students values(2020742,3,2020);
```

```
insert into students values(2021231,2.7,3030);
```

```
insert into students values(2019,3.6,4040);
```

```
insert into students values(2022123,3.5,5050);
```

```
insert into students values(2022321,3.4,6060);
```

```
insert into students values(2021212,2.5,7070);
```

```
insert into students values(2019123,2.9,8080);
```

```
insert into students values(2020987,3.3,9090);
```

```
insert into students values(2022510,3.6,1000);
```

departments data:

insert into departments values(1010,'CSE',1111);

insert into departments values(2020,'CS',2011005);

insert into departments values(3030,'networks',242424);

insert into departments values(4040,'MM'2011003,);

insert into departments values(5050,'electrical',2010119);

insert into departments values(6060,' Arts',2014114);

insert into departments values(7070,' Languages',2006123);

insert into departments values(8080,' Sciences',2015002);

insert into departments values(9090,'IT',2009444);

insert into departments values(1000,' structural eng',2018002);

filling (appointment) of department heads:using ubdate

update professors set dep_id=1010 where PId=1111;

update professors set dep_id=2020 where PId=2011005;

update professors set dep_id=3030 where PId=242424;

update professors set dep_id=4040 where PId=2011003;

update professors set dep_id=5050 where PId=2010119;

update professors set dep_id=6060 where PId=2014114;

update professors set dep_id=7070 where PId=2006123;

update professors set dep_id=8080 where PId=2015002;

update professors set dep_id=9090 where PId=2009444;

update professors set dep_id=1000 where PId=2018002;

registration data:

insert into registration values(9811,'1-8-2023',2020662,11);

insert into registration values(9822,'2-8-2023',2020742,22);

insert into registration values(9833,'3-8-2023',2021231,33);

insert into registration values(9844,'29-7-2023',2019341,44);

insert into registration values(9855,'10-8-2023',2022123,55);

insert into registration values(9866,'5-9-2023',2022321,66);

insert into registration values(9877,'14-8-2023',2021212,77);

insert into registration values(9888,'2-8-2023',2019123,88);

insert into registration values(9899,'2-9-2023',2020987,99);

insert into registration values(9810,'21-8-1022',2022510,12);

Enroll data:

insert into enroll values(2020662,11,'A+');

insert into enroll values(2020742,22,'B');

```
insert into enroll values(2021231,33,'A');  
  
insert into enroll values(2019341,44,'C');  
  
insert into enroll values(2022123,55,'C+');  
  
insert into enroll values(2022321,66,'B-');  
  
insert into enroll values(2021212,77,'A');  
  
insert into enroll values(2019123,88,'D');  
  
insert into enroll values(2020987,99,'A+');  
  
insert into enroll values(2022510,12,'B');
```

Teaches data:

```
insert into teaches values(2015002,77);  
  
insert into teaches values(1111,11);  
  
insert into teaches values(2011005,22);  
  
insert into teaches values(2014114,33);  
  
insert into teaches values(2011005,44);  
  
insert into teaches values(2018002,55);  
  
insert into teaches values(2011003,66);  
  
insert into teaches values(2006123,77);  
  
insert into teaches values(2010119,88);  
  
insert into teaches values(2009444,99);  
  
insert into teaches values(242424,12);
```

Some queries :

-search for available courses that classes just 2 days in a week:

```
Select * from courses where days=2;
```

-retrieve students informations:

```
select * from person where id=(select SId from students);
```

-display professors that belong to department_id=1010 :

```
select first_name,last_name ,PIId from person join professors on(id=PIId)  
where dep_id=1010;
```

- display the courses and the number of students enrolled or registred in them:

```
select course_id,title,count(*) from courses group by course_id,title;
```

-transcript of courses and grades for a student(2020662):

```
select title,grade from enroll join courses on(course_id=cou_id) where  
SId=2020662;
```

- transcript of courses and grades(if exist) for a student id entered from keyboard:

```
select title,nvl(grade,null) from enroll join courses on (cou_id=course_id)  
where stu_id='&Id';
```

- Registering a student(2020662) in a course:

```
insert into registration values(1234,'1-3-2022',2020662,22,null);
```

- a student withdraws from the course:

```
delete from registration where SId='2020662' and course_id=11;
```

-display all courses that a student(2020662) registered in:

```
select course_id,title,days from courses where course_id=(select  
course_id from registration where SId=2020662);
```


-display students that get a grade same with student_id grade in database
course(cou_id=11):

```
select stu_id,grade from enroll where grade=(select grade from enroll  
where stu_id=2020662) and cou_id=11;
```

-retrieve professors id and courses in which they teach :

```
select t.pro_id,c.title,c.course_id from teaches t join courses c on  
(cour_id=c.course_id);
```

-retrieve courses that a professor id=242424 teach:

```
select cour_id,title from teaches join courses on(cour_id=course_id)  
where PId=424242;
```

-retrieve all students first name and last name along with description and
there courses in which they are registered :

```
select p.first_name||p.last_name NAME,c.title course from person p join  
enroll e on(id=stu_id) join courses c on (cou_id=course_id);
```

-display average students GPA for each department:

```
select avg(GPA),dep_id from students group by dep_id;
```

- Display salary of the professors Ernst in the format '\$99,999.00'

```
select last_name,to_char(salary,'$99,999.00')from person join professors  
on(id=PId);
```

- Display the professors and new salaries based on the department id .

```
select last_name,dep_id,salary,decode  
(dep_id,'CSE',1.1*salary,'CS',1.2*salary,'MM',salary*1.25,  
salary)"new salary" from professors join person on(id=PId);
```

-retrieve number of students that registered in each course:

```
select count(*),course_id,title from registration natural join courses group  
by (course_id,title) ;
```

-display departments that average salary exceeding 3500:

```
select avg(salary),dep_id from professors group by dep_id having  
avg(salary)>3500;
```

conclusion:

we've built a university registration system, we've created a diagram EER for the system, mapped EER into tables with relations to be a schema for our system, implement the schema in MySQL , insert test data into tables and using other instructions , finally Compose queries to interact with the database .