Tecnológico de Monterrey

Proyect

SRS

TC1020EM19 DATABASE
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Abstract

Description

Tec University is the name of the database made in SQL together with Python, HTML+CSS for the subject of Databases of 4th semester students in the Tecnologico de Monterrey Campus Monterrey.

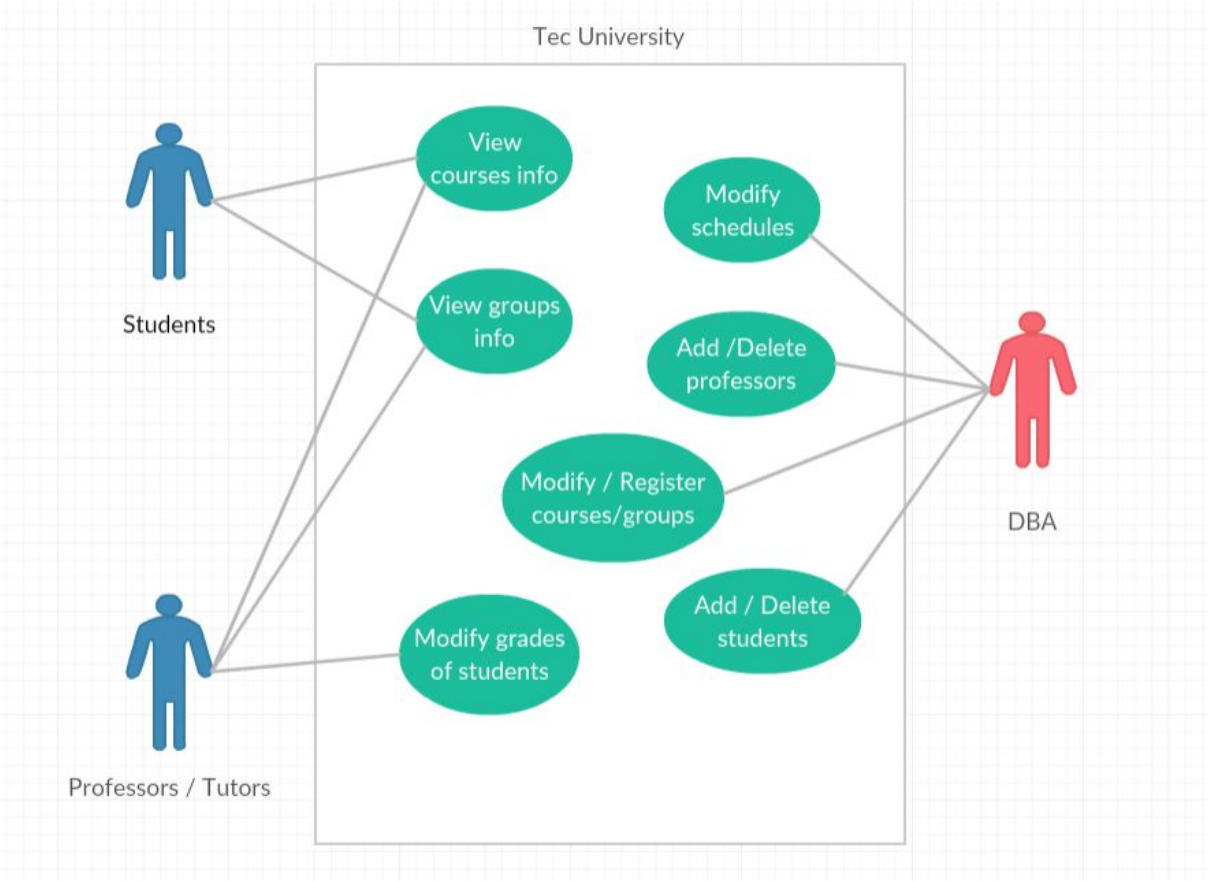
Purpose

The database “Tec University” serves its purpose as a smart storage that manages all the information relevant to the institution, these being Students, Professors and the courses/groups they have signed up to.

Reach

The main goal of this database its to optimize processes of data storage, making it available to any student enrolled on their course , any professor that wants to check up on their students academic history and grade their performances as well as the human resources workers that need the information for many different transactions.

Use Case Diagram



Description

Students interact with this database through the viewing of their courses information , as well as the group they are taking part of on each subject they enrolled in, but they have no other action on the maner, as they cannot change the subject they have already enlisted to, unless it was a mistake made by the IT staff which falls on the Database Administrator´s hands, in which case they will make sure its fixed as quickly as possible.

Professors and tutors can manage their own groups they teach in by modifying the grades of the students enrolled in them as the course progresses. All other change and action is made by the IT staff and directed by the DBA.

System Requirements

In this segment we will go through the specific requirements needed in order to make this database efficient and useful.

Functional Requirements

Business Rules

Anyone enrolled as a student has the right to view the information of the subjects, professors and groups they are being signed up in, however, the control of said information , as well as the maintenance of the database falls in the hands of the DBA and their staff.

Transaction corrections, adjustment and cancellations

All transactions inside the database are final and heavily monitored by the IT staff in case of any issue that may register.

Authentication

Students, Tutors and IT Staff need their personal ID´s and selected way of authentication in order to view and/or modify any sort of data inside the database, and will not be granted access unless proven being part of any of these groups.

Historical Data

In case of a incident that includes data loss at some point in the future, the database should be capable of returning to a stable point in time with most of said data being recovered.

Administrative functions

DBA and IT staff will be granted with the total control and maintenance of the database.

Non Functional Requirement

Performance

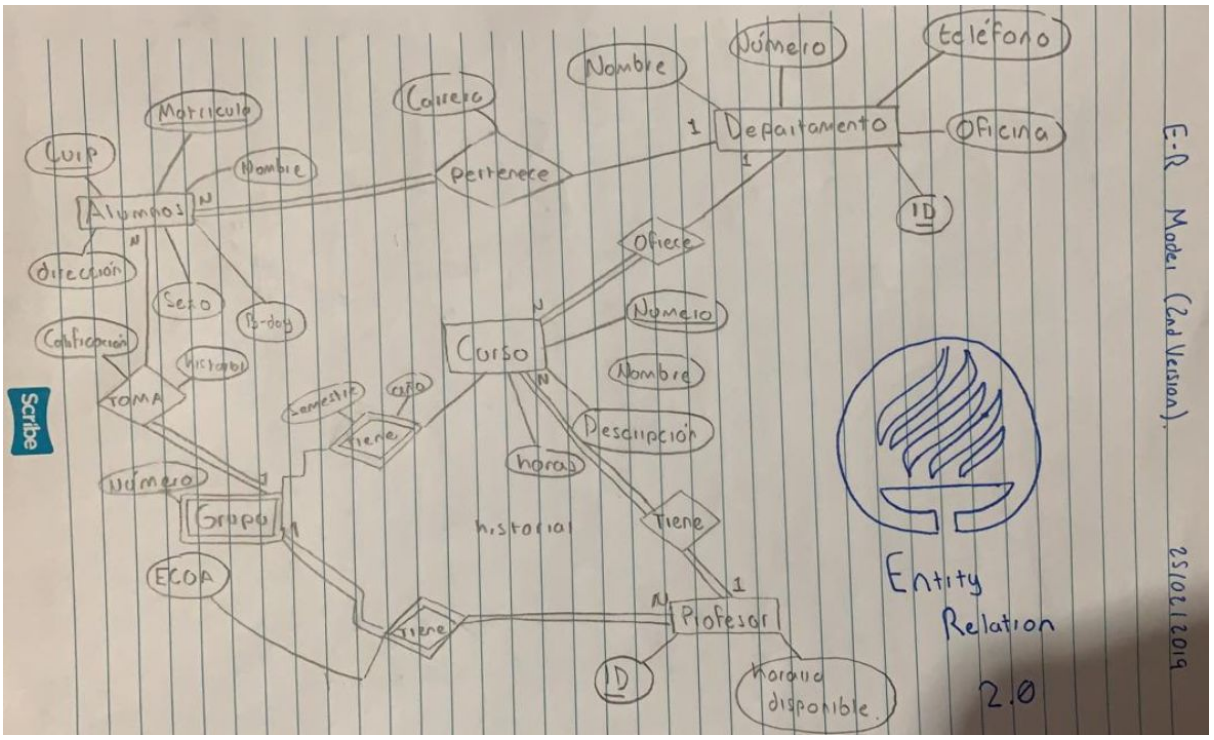
The database is fluid and snappy throughout any device which can handle a web browser can interact with it.

Security

The security systems need database storage as well as the private information of the students , however these editable systems should not be available to them, and vice versa, the information of all users should always be under our privacy policy.

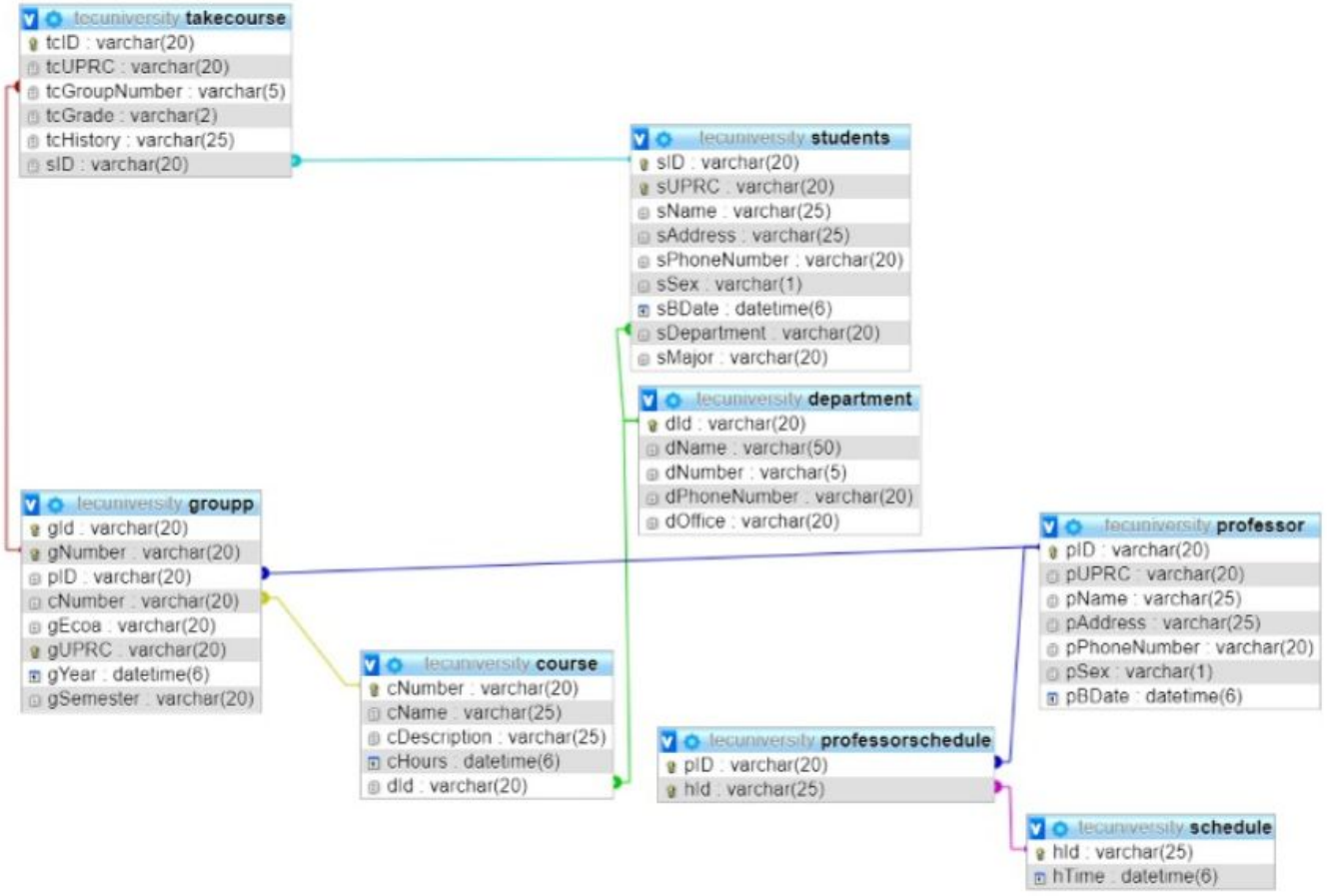
Logical Models

Entity-Relational Model (ERD)



Class Diagram

Relational Model (SQL)



DDL

```
CREATE Database TecUniversity;

  CREATE TABLE Department (
    dId varchar(20) Not Null,
    dName varchar (50) Not Null,
    dNumber varchar(5) Not Null,
    dPhoneNumber varchar(20) Not Null,
    dOffice varchar(20) Not Null,
    primary key(dId)
  ) Engine=InnoDB;

  CREATE TABLE Students (
    sID varchar(20) Not Null,
    sUPRC varchar(20) NOT Null,
    sName varchar(25) Not Null,
    sAddress varchar(25)  Null,
    sPhoneNumber varchar (20) Null,
    sSex varchar (1) Null,
    sBDate datetime(6) Null,
    sDepartment varchar(20) Not Null,
    sMajor varchar(20) Not Null,
    primary key(sID, sUPRC),
    foreign key(sDepartment) references Department(dId)
  ) Engine=InnoDB;

  CREATE TABLE Schedule (
    hId varchar(25) Not Null,
    hTime datetime(6) Not Null,
    primary key(hId)
  ) Engine=InnoDB;

  CREATE TABLE Professor (
    pID varchar(20) Not Null,
    pUPRC varchar(20) NOT Null,
    pName varchar(25) Not Null,
    pAddress varchar(25)  Null,
    pPhoneNumber varchar (20) Null,
    pSex varchar (1) Null,
    pBDate datetime(6) Null,
    primary key(pID)
  ) Engine=InnoDB;
```

```
CREATE TABLE ProfessorSchedule (
   pID varchar(20) Not Null,
   hId varchar(25) Not Null,
   primary key(pId, hId),
   foreign key (pID) references Professor(pId),
   foreign key (hId) references Schedule(hId)
) Engine=InnoDB;

CREATE TABLE Course (
   cNumber varchar(20) Not Null,
   cName varchar(25) Not Null,
   cDescription varchar(25) Not Null,
   cHours datetime(6) Not Null,
   dId varchar(20) Not Null,
   primary key(cNumber),
   foreign key(dId) references Department(dId)
) Engine=InnoDB;

CREATE TABLE Groupp (
   gId varchar(20) Not Null,
   gNumber varchar(20) Not Null,
   pID varchar(20) Not Null,
   cNumber varchar(20) Not Null,
   gEcoa varchar(20) Not Null,
   gUPRC varchar(20) Not Null,
   gYear datetime(6) Not Null,
   gSemester varchar(20) Not Null,
   primary key(gNumber, gId, gUPRC),
   foreign key(pId) references Professor(pId),
   foreign key(cNumber) references Course(cNumber)
) Engine=InnoDB;

create table TakeCourse (
   tcID varchar(20) Not Null,
   tcUPRC varchar(20) Not Null,
   tcGroupNumber varchar(5) Not Null,
   tcGrade varchar(2) Not Null,
   tcHistory varchar(25) Not Null,
   sID varchar(20) Not Null,
   primary key(tcID),
   foreign key(sID) references Students(sID),
   foreign key(tcGroupNumber) references Groupp(gNumber)
) Engine=InnoDB;
```

DML

```
--Department
Insert Into Department values('4521', 'Computer Department', '1','8110236541','100');
Insert Into Department values('4522', 'Chemistry Department', '2','8110236361','200');
Insert Into Department values('4523', 'Electronic Department', '3','8110236251','300');
Insert Into Department values('4524', 'Physics Department', '4','8110236861','400');

--Student
Insert Into Students values('6231', 'CAMD000421HNLRV4', 'David Alonso Cantú', 'Cumbres',
'8115822516', 'M', '2000-04-21', '4521', 'Computer Science');
Insert Into Students values('6232', 'VAGP990301HNLRF3', 'Paco Antonio Vargas', 'San
Pedro', '8112369547', 'M', '1999-06-02', '4522', 'Chemical Engineer');
Insert Into Students values('6233', 'ELTK980401HNLRG6', 'Elvis Tek', 'Santa Catarina',
'8110523698', 'M', '1989-04-18','4523', 'Robotics');
Insert Into Students values('6234', 'MPLO950204HNLRT4', 'María Perez', 'Apodaca',
'8110236984', 'F', '1995-02-04', '4524', 'Physics');

--Schedule
Insert Into Schedule values('1', '0000-00-00 07:30:00.000000');
Insert Into Schedule values('2', '0000-00-00 08:30:00.000000');
Insert Into Schedule values('3', '0000-00-00 09:30:00.000000');
Insert Into Schedule values('4', '0000-00-00 10:30:00.000000');
Insert Into Schedule values('5', '0000-00-00 12:30:00.000000');

--Professor
Insert Into Professor values('4578', 'PEPP541016HASCIP07', 'Pepe Pecas', 'Por aquí',
'4619293210', 'M', '1954-10-16');
Insert Into Professor values('4579', 'ELPLA541016HASCP07', 'Elba Lazo', 'Por ahí',
'8271029291', 'F', '1988-10-16');
Insert Into Professor values('4580', 'PER4541016HASCIP07', 'Pepe Roni', 'Por allá',
'8372918539', 'M', '1990-10-16');
Insert Into Professor values('4581', 'ELPU541016HASCIP07', 'Elsa Pato', 'Por acuyá',
'75831983829', 'F', '1970-10-16');
Insert Into Professor values('4582', 'PEPLA54101HASCIP07', 'Pepe Lotas', 'Hasta Cumbres...',
'9381927492', 'M', '1989-10-16');

--PSchedule
Insert Into ProfessorSchedule values('4578', '1');
Insert Into ProfessorSchedule values('4579', '2');
Insert Into ProfessorSchedule values('4580', '3');
Insert Into ProfessorSchedule values('4581', '4');
Insert Into ProfessorSchedule values('4582', '5');
```

--Course
Insert Into Course values('50', 'Sepultura de Vatos', 'Creación y utilización de Estructura de datos', '0000-00-00 07:30:00.000000', '4521');
Insert Into Course values('51', 'Huevassign', 'Resolucion de problemas de programacion', '0000-00-00 10:30:00.000000', '4522');
Insert Into Course values('52', 'Algorritmos', 'Analisis y diseño de Algirritmos', '0000-00-00 08:30:00.000000', '4521');
Insert Into Course values('53', 'Bases de Gatos', 'Acariciar Gatitos', '0000-00-00 07:30:00.000000', '4521');
Insert Into Course values('54', 'Bases de Gatos', 'Acariciar Gatitos', '0000-00-00 10:30:00.000000', '4521');
Insert Into Course values('55', 'Bases de Gatos', 'Acariciar Gatitos', '0000-00-00 12:00:00.000000', '4521');
Insert Into Course values('56', 'Bases de Gatos', 'Acariciar gatitos', '0000-00-00 13:30:00.000000', '4521');
Insert Into Course values('57', 'Soluciones', 'Realización de soluciones quimicas', '0000-00-00 07:30:00.000000', '4521');
Insert Into Course values('58', 'Destructura de vatos', 'Destrucción de Vatos', '0000-00-00 09:30:00.000000', '4521');
Insert Into Course values('59', 'AI O ES', 'Desarrollo de aplicaciones en AI O ES', '0000-00-00 11:30:00.000000', '4521');
Insert Into Course values('60', 'AI O ES', 'Desarrollo de aplicaciones en AI O ES', '0000-00-00 13:30:00.000000', '4521');
Insert Into Course values('61', 'Tijeritas 3', 'Aprender a cortar con tijeras', '0000-00-00 07:30:00.000000', '4524');

--Group
Insert Into Groupp values('200', '300', '4578', '50', '100', 'PEPP541016HASCIP07', '2018-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('201', '301', '4579', '51', '100', 'ELPLA541016HASCP07', '2018-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('202', '302', '4580', '52', '100', 'PER4541016HASCIP07', '1050-00-00 07:30:00.000000', 'Jan-May');
Insert Into Groupp values('203', '303', '4581', '53', '100', 'LN2KJ25K24B5LK2352', '1020-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('204', '304', '4582', '54', '100', '2322ASMN34NBKNM6B1', '0070-00-00 07:30:00.000000', 'Jan-May');
Insert Into Groupp values('205', '305', '4578', '55', '100', 'PEPP541016HASCIP07', '0070-00-00 07:30:00.000000', 'Jan-May');
Insert Into Groupp values('206', '306', '4579', '56', '100', 'ELPLA541016HASCP07', '0070-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('207', '307', '4580', '57', '100', 'PER4541016HASCIP07', '0070-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('208', '308', '4581', '58', '100', 'LN2KJ25K24B5LK2352', '0070-00-00 07:30:00.000000', 'Jan-May');

```
Insert Into Groupp values('209', '309', '4582', '59', '100', '2322ASMN34NBKNM6B1',
'0070-00-00 07:30:00.000000', 'Aug-Dec');
Insert Into Groupp values('210', '310', '4578', '60', '100', 'PEPP541016HASCIP07',
'0070-00-00 07:30:00.000000', 'Jan-May');
Insert Into Groupp values('211', '311', '4579', '61', '100', 'ELPLA541016HASCP07',
'0070-00-00 07:30:00.000000', 'Aug-Dec');

--TakeCourse
Insert Into TakeCourse values('50000', 'ASDLADDHJ1H5646DF5', '300', '100', 'Aqui no se
que va equis de', '6231');
Insert Into TakeCourse values('50001', 'ASD8F99A8S8DSAH8DF', '301', '100', 'Aqui no se que
va equis de', '6232');
Insert Into TakeCourse values('50002', 'LKJ2KLJ34JK2L3K344', '302', '100', 'Aqui no se que
va equis de', '6233');
Insert Into TakeCourse values('50003', 'JH0JD9FG9SFGSD0FG9', '303', '100', 'Aqui no se que
va equis de', '6231');
Insert Into TakeCourse values('50004', 'LKJ45J6KJ45HK6HK45', '304', '100', 'Aqui no se que
va equis de', '6232');
Insert Into TakeCourse values('50005', 'LKJ45J6KJ45HK6HK45', '305', '100', 'Aqui no se que
va equis de', '6234');
Insert Into TakeCourse values('50006', 'LKJ45J6KJ45HK6HK45', '306', '100', 'Aqui no se que
va equis de', '6234');
Insert Into TakeCourse values('50007', 'LKJ45J6KJ45HK6HK45', '307', '100', 'Aqui no se que
va equis de', '6233');
Insert Into TakeCourse values('50008', 'LKJ45J6KJ45HK6HK45', '308', '100', 'Aqui no se que
va equis de', '6234');
Insert Into TakeCourse values('50009', 'LKJ45J6KJ45HK6HK45', '309', '100', 'Aqui no se que
va equis de', '6231');
Insert Into TakeCourse values('50010', 'LKJ45J6KJ45HK6HK45', '310', '100', 'Aqui no se que
va equis de', '6232');
Insert Into TakeCourse values('50011', 'LKJ45J6KJ45HK6HK45', '311', '100', 'Aqui no se que
va equis de', '6233');
```

Queries

Basic

1. List all students

```
SELECT *
FROM Students
```

2. List all professors

```
SELECT *
FROM Professor
```

3. List all departments

```
SELECT *
FROM Department
```

4. List all courses

```
SELECT *
FROM Courses
```

5. List all groups

```
SELECT *
FROM Students
```

Simple Inputs

1. List of students given his ID and ordered by ID

```
SELECT *
FROM Students
WHERE sID = 'input'
order by sID
```

2. List of departments given the name of the department ordered by department ID

```
SELECT *
FROM Department
WHERE dName = 'input'
 order by dId
```

3. List of teachers given his Id sorted by Id

```
SELECT *
FROM Professor
 WHERE pID = 'input'
 order by pID
```

Complex Inputs

1. Courses per students given the id of a student.

```
SELECT c.cName, s.sName
FROM students s, takecourse tk, course c, groupp g
WHERE s.sID = tk.sID
and tk.tcGroupNumber = g.gNumber
and g.cNumber = c.cNumber
and s.sID = 'input'
order by s.sID
```

2. ID,, name of the teacher and the courses that a teacher has given , given the teacher's id.

```
SELECT p.pID, p.pName, c.cName
FROM professor p, course c, groupp gp
WHERE gp.cNumber = c.cNumber
and gp.pID = p.pID
and p.pID = 'input'
```

3. ID and name of the teacher with the free schedules given by the teacher's id.

```
SELECT p.pID, p.pName, s.hTime
from schedule s, professorschedule ps, professor p
WHERE s.hId = ps.hId
AND ps.pID = p.pID
AND p.pID = 'input'
```

4. Show result of ECOAS with their course number, name, group number, semester and year given by the teacher's id. Ordered by year, semester, course number and group.

```
SELECT g.gEcoa,c.cNumber, c.cName, g.gNumber, g.gSemester, g.gYear
FROM professor p, groupp g, course c
```

```
WHERE p.pID = g.pID
AND g.cNumber = c.cNumber
AND p.pID = 'input'
order by g.gYear, g.gSemester, c.cNumber, g.gID
```

Insert

1. Insert a student
   ```
   INSERT INTO Students (sID, sUPRC, sName, sAddress, sPhoneNumber, sSex,
   sBDate, sDepartment, sMajor) VALUES ('{}', '{}', '{}', '{}', '{}', '{}','{}','{}','{}')
   ```

2. insert a department
   ```
   INSERT INTO Department (dId, dName, dNumber, dPhoneNumber, dOffice)
   VALUES ('{}', '{}', '{}', '{}', '{}')
   ```

3. Insert a teacher
   ```
   INSERT INTO Professor (pID, pUPRC, pName, pAddress, pPhoneNumber, pSex,
   pBDate) VALUES ('{}', '{}', '{}', '{}', '{}', '{}','{}')
   ```

Delete

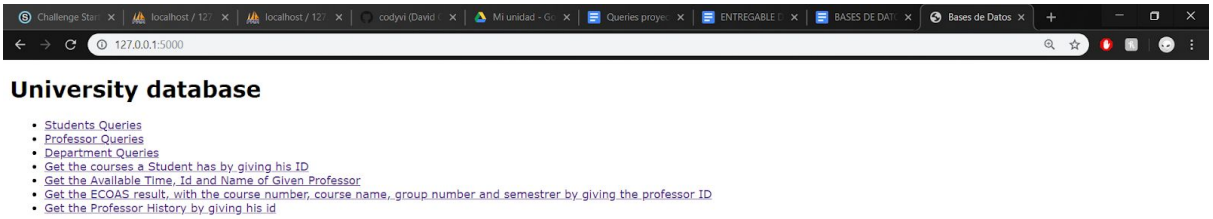
1. Delete a student
   ```
   DELETE FROM Students
   WHERE sID = 'input'
   ```

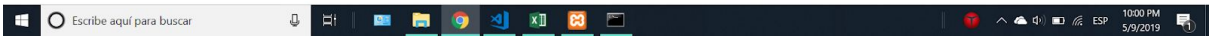
2. Delete a department
   ```
   DELETE FROM Department
   WHERE dId = {}
   ```

3. Delete a teacher
   ```
   DELETE FROM Professor
   WHERE pID = {}
   ```

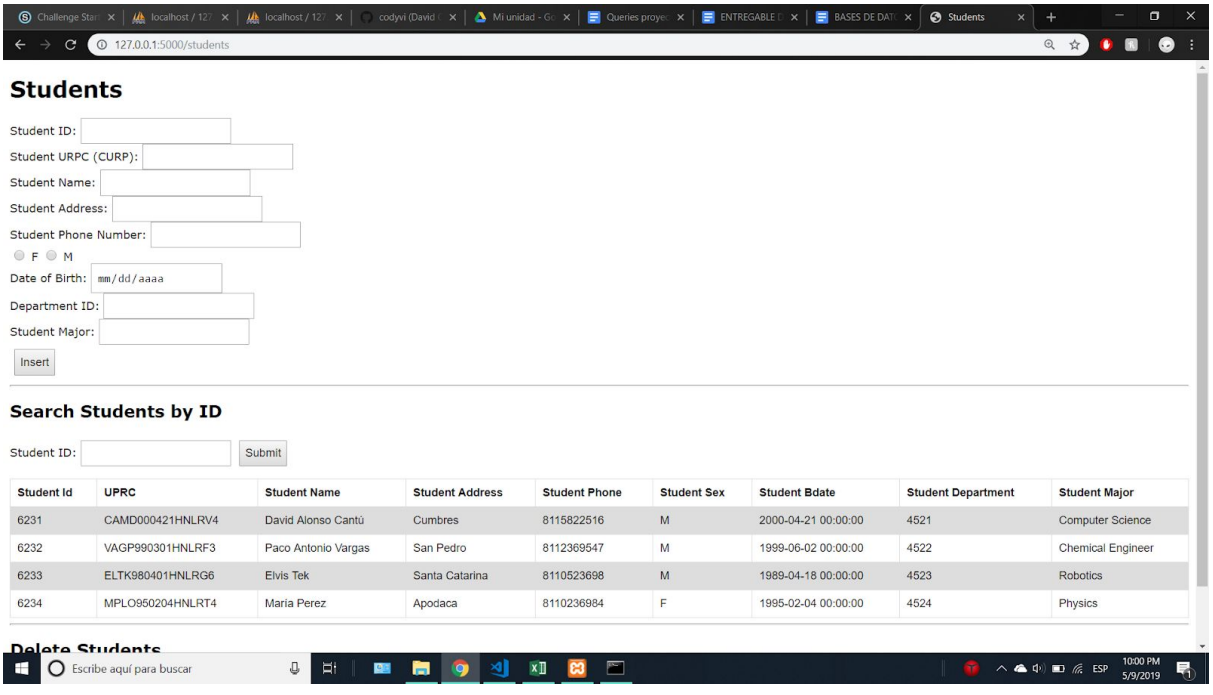
Storyboard

Index Page

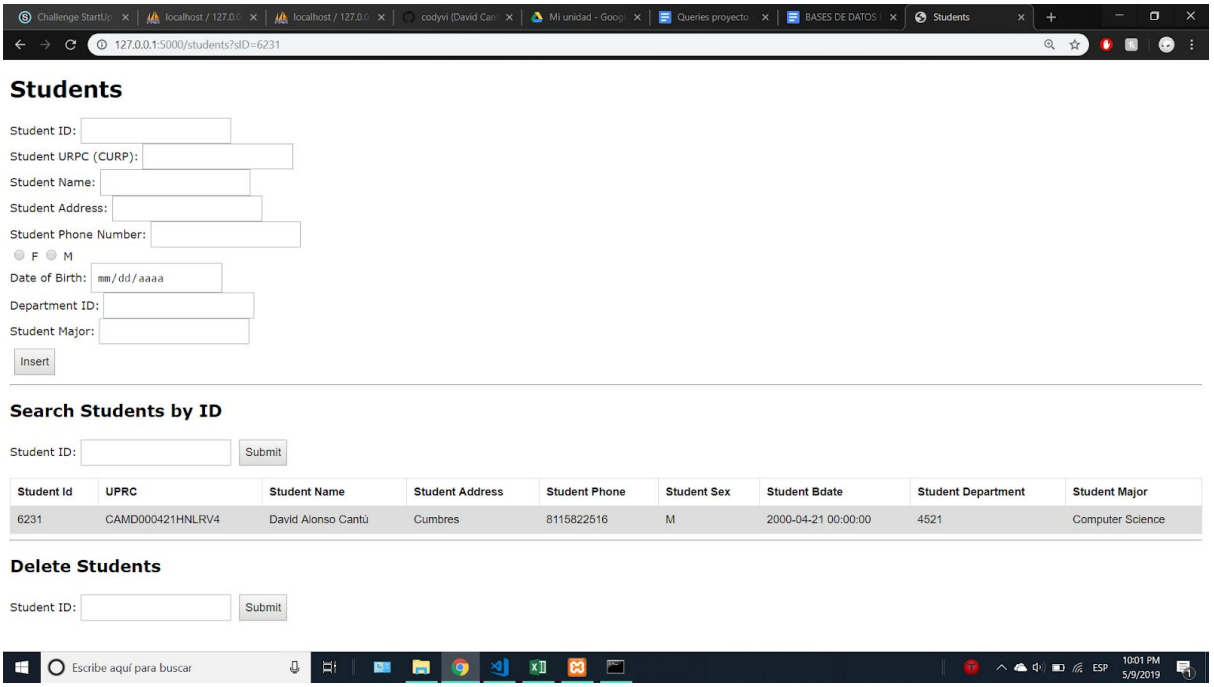




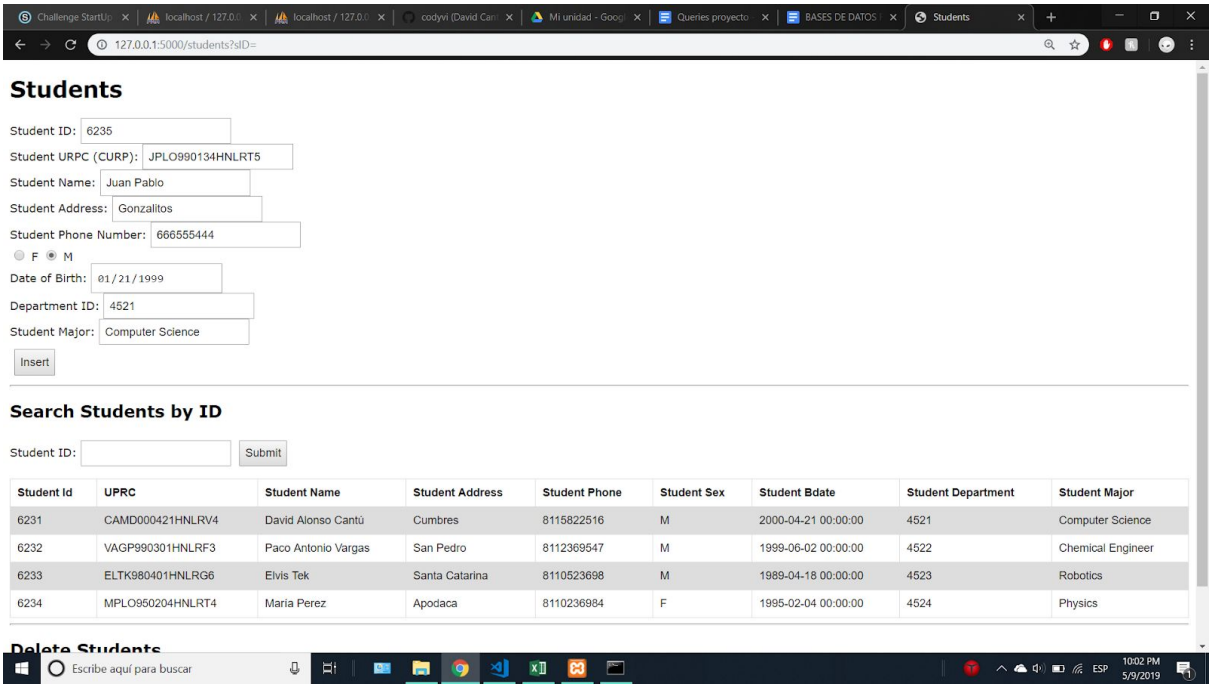
Student Queries (Working List Student)

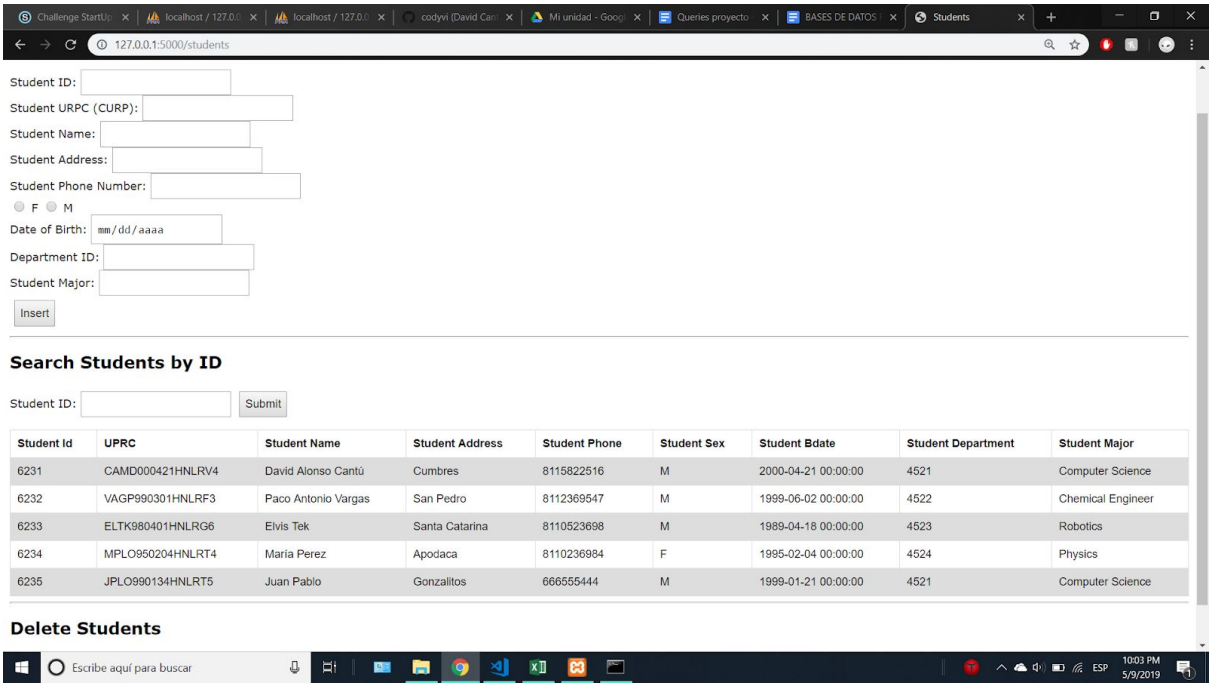


Search by ID query

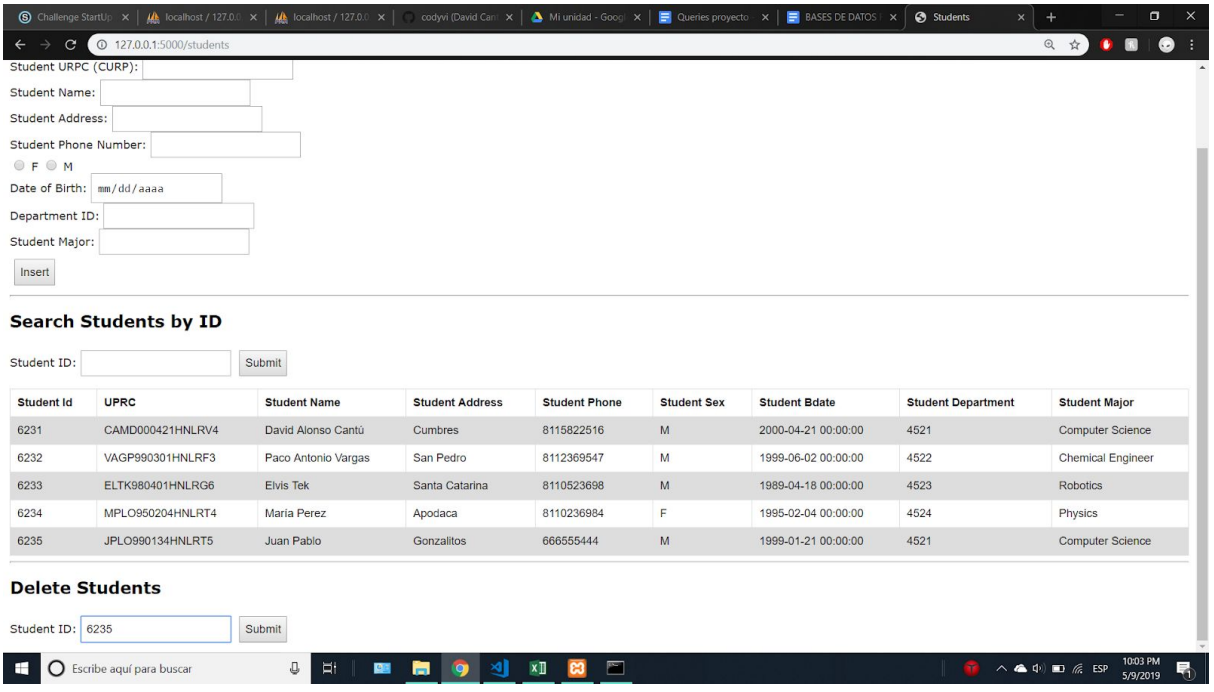


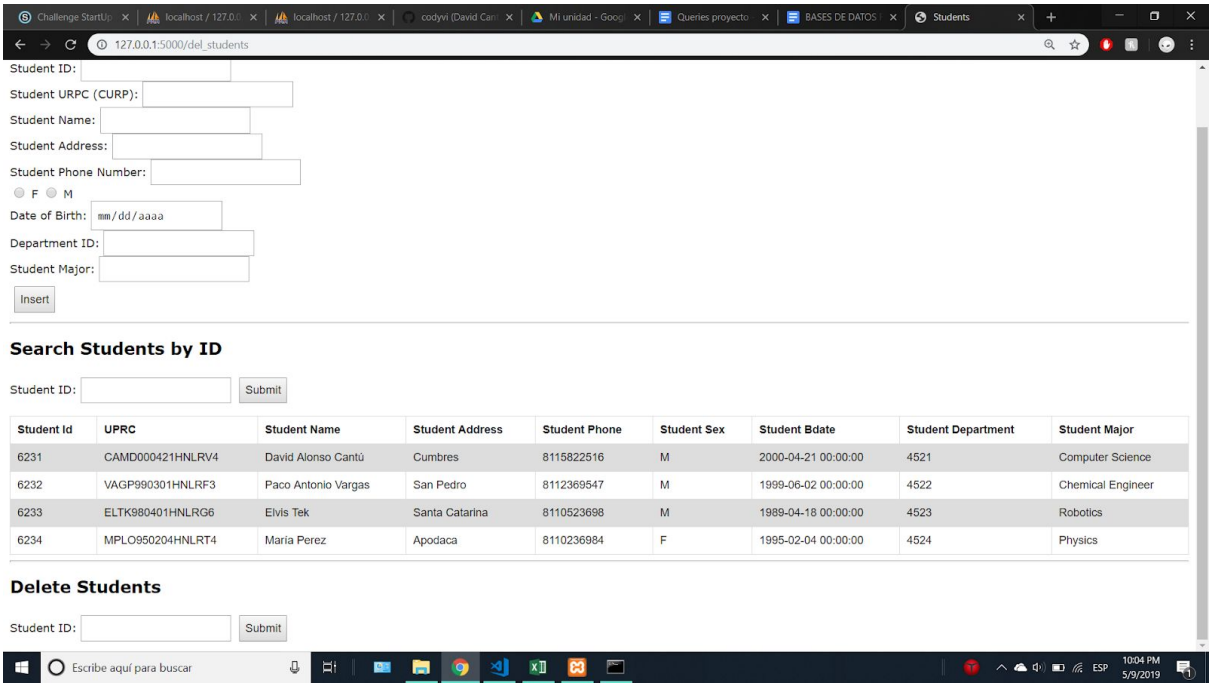
Insert Student



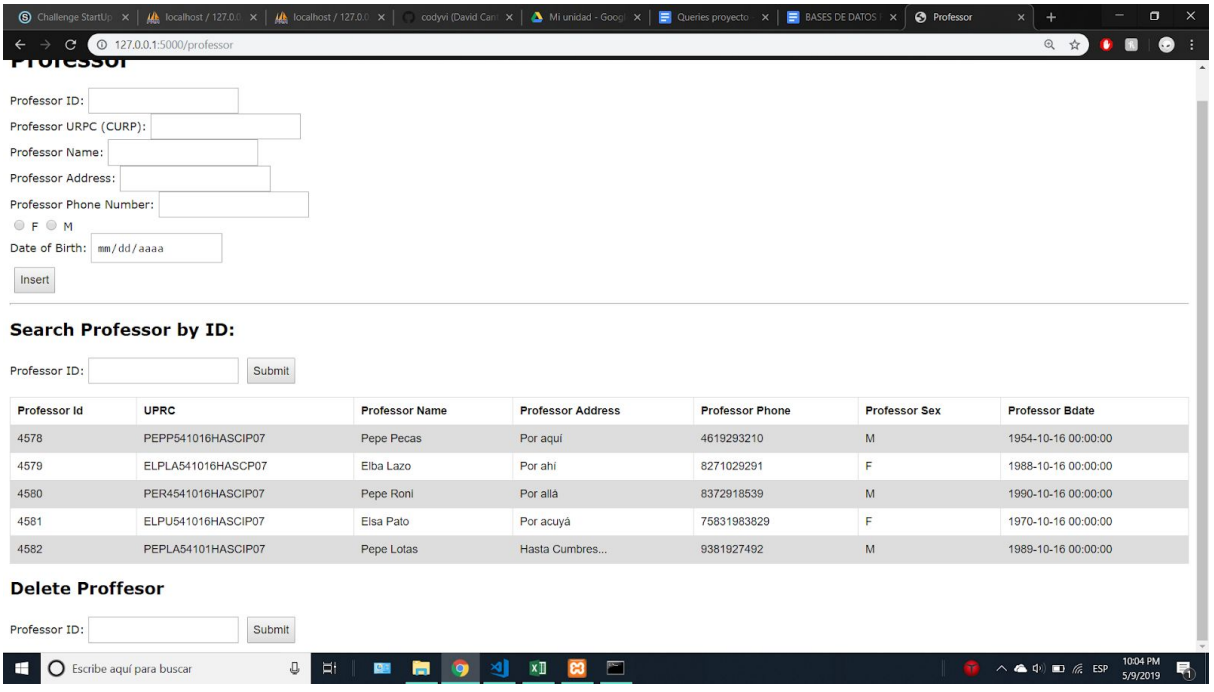


Delete Student

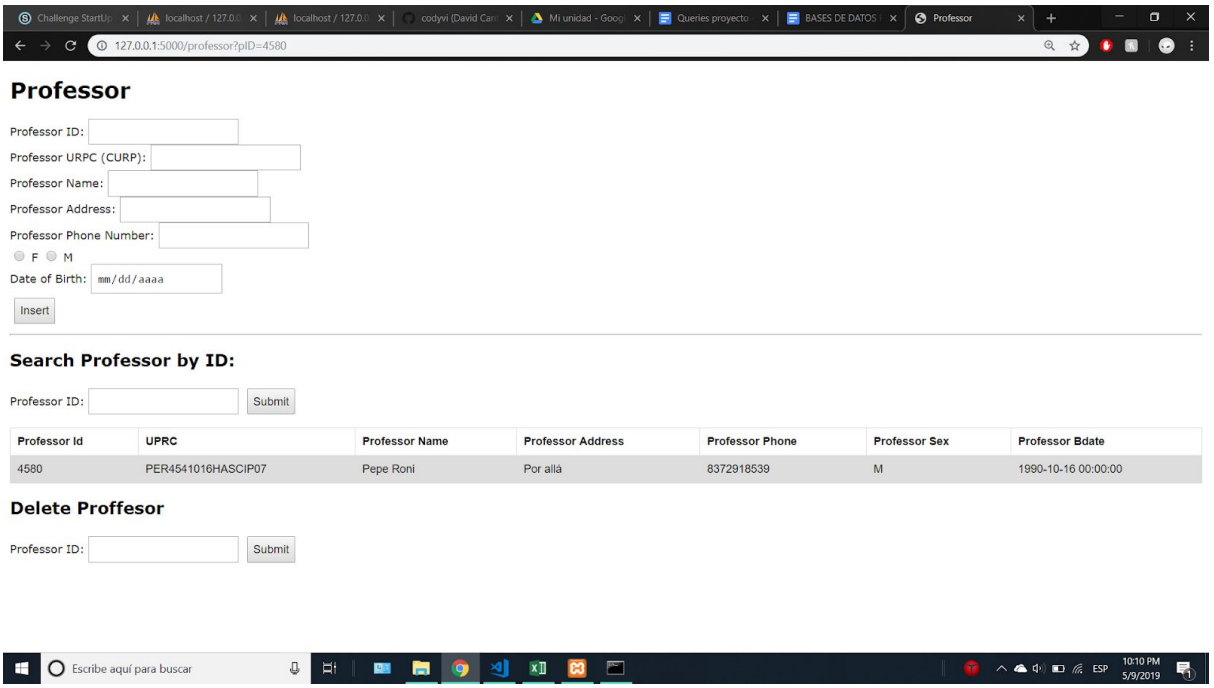




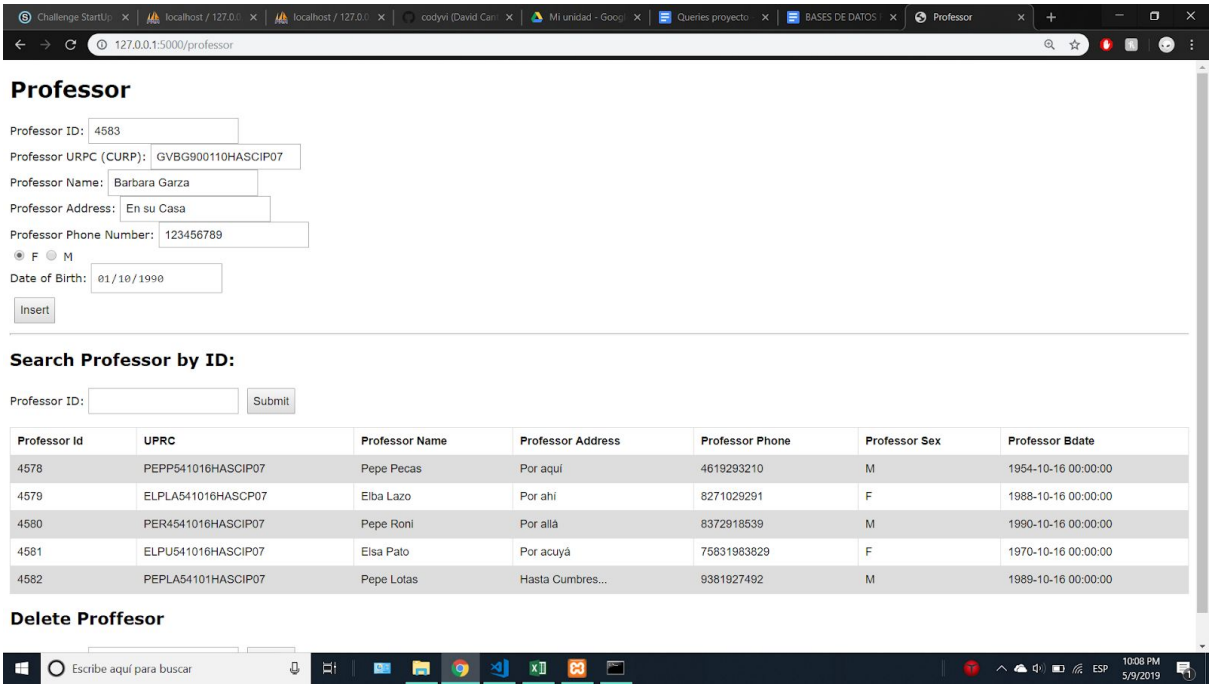
Professor Queries (Working List Professors)

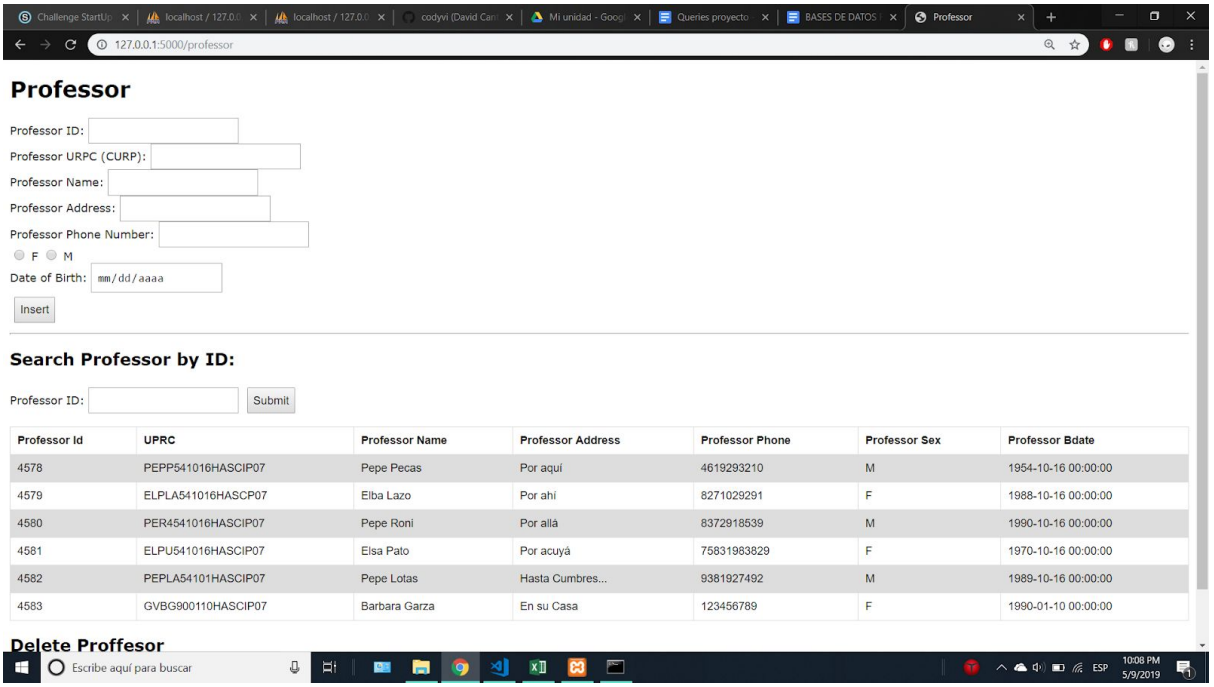


Search by ID Query

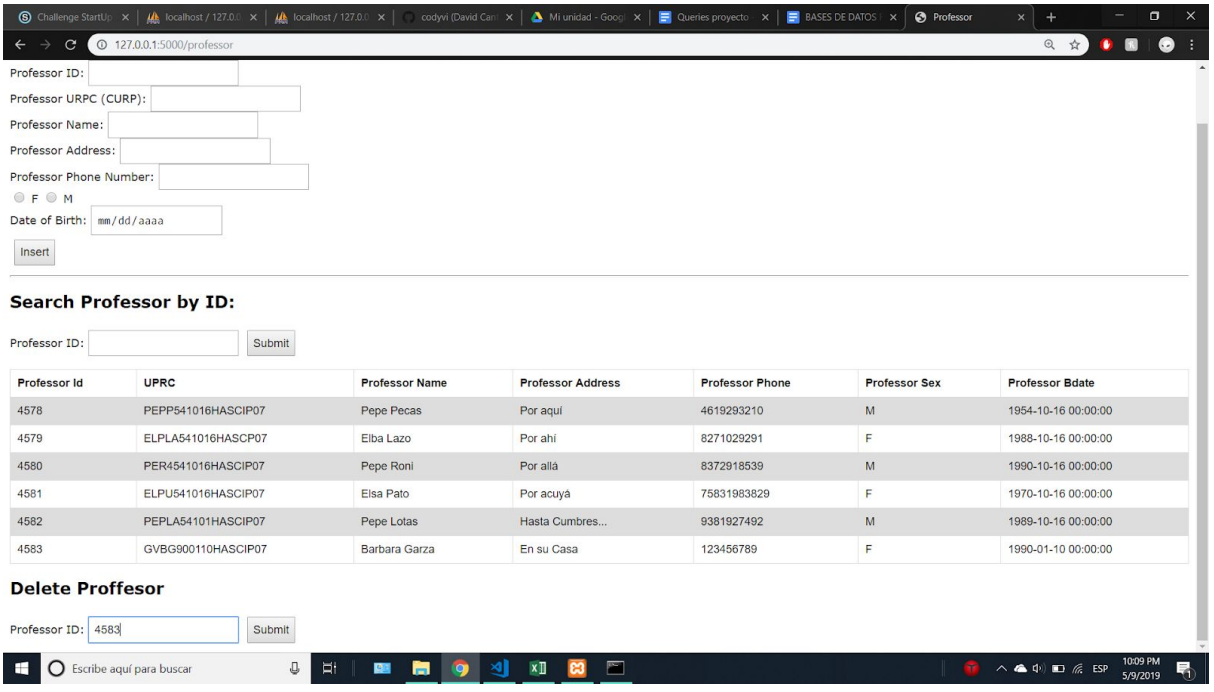


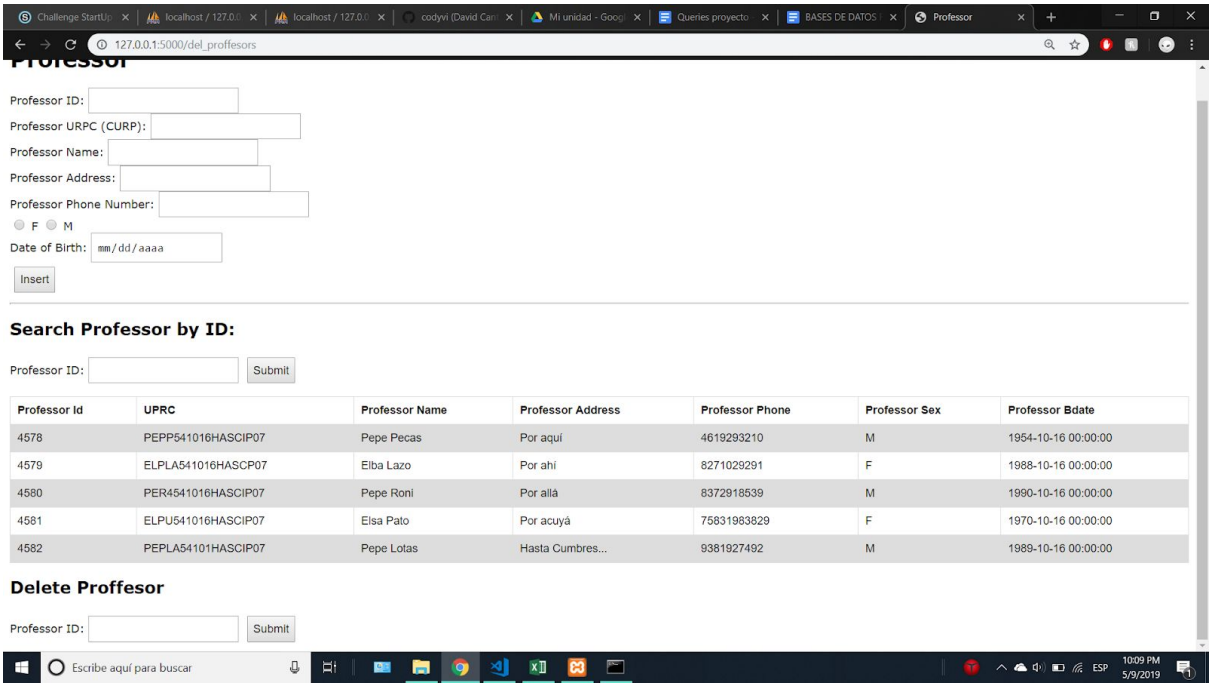
Insert Professor



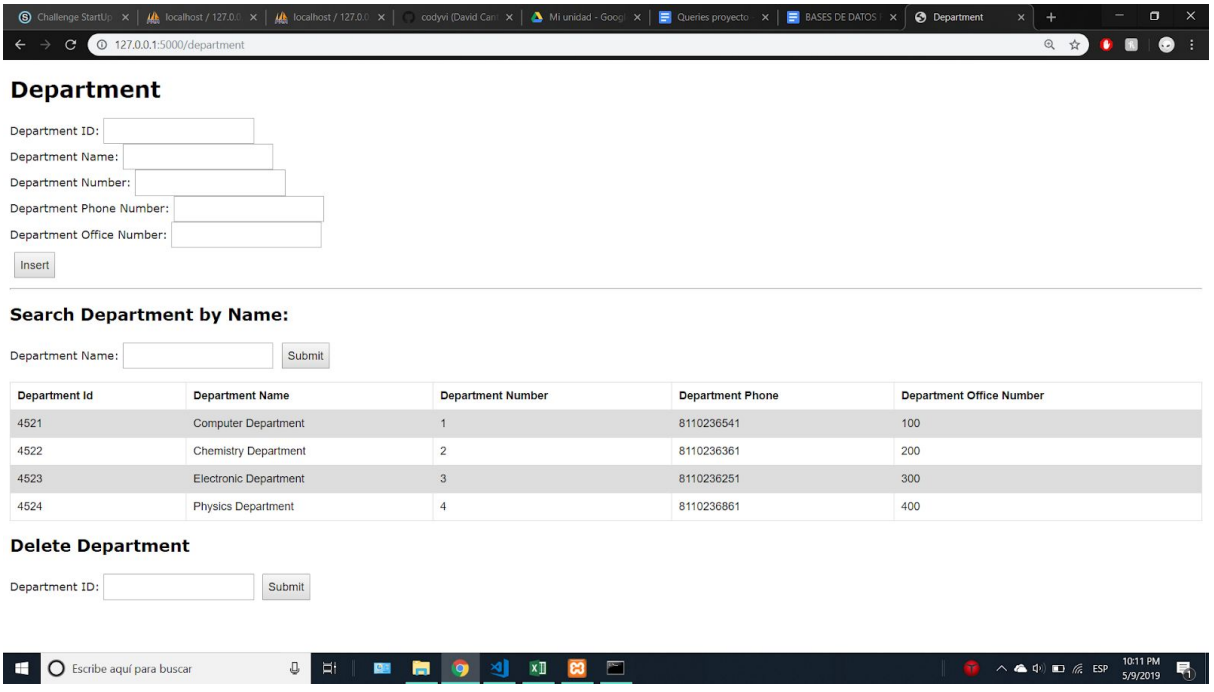


Delete Professor

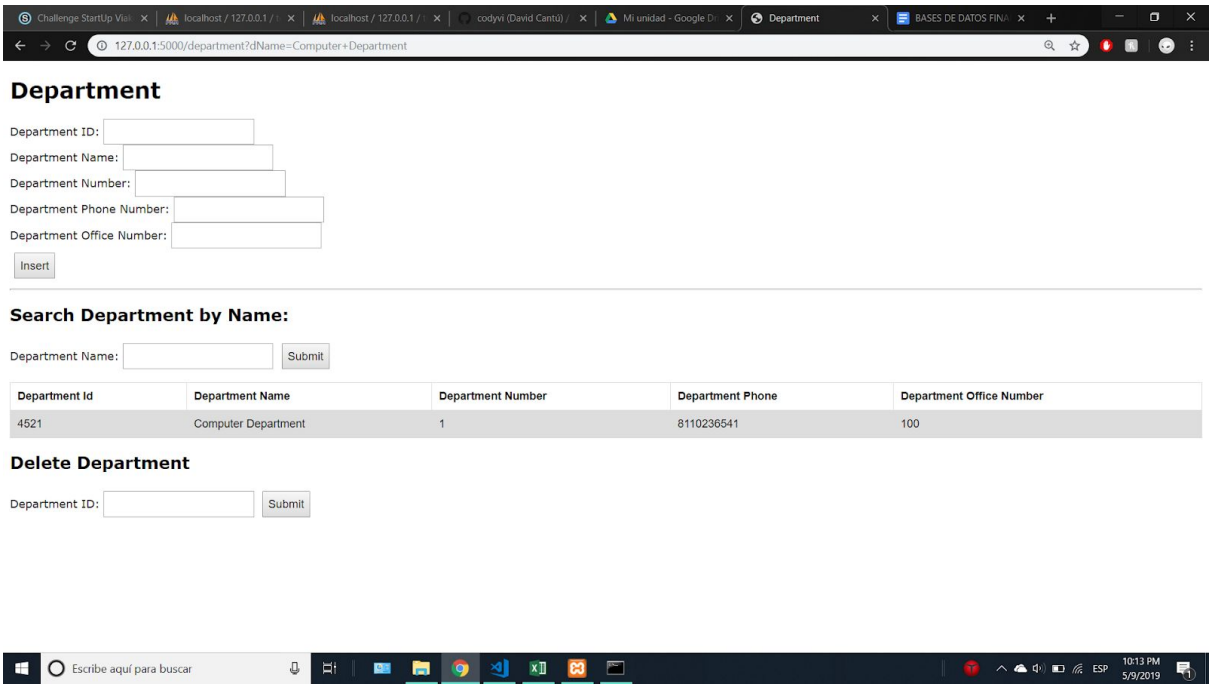




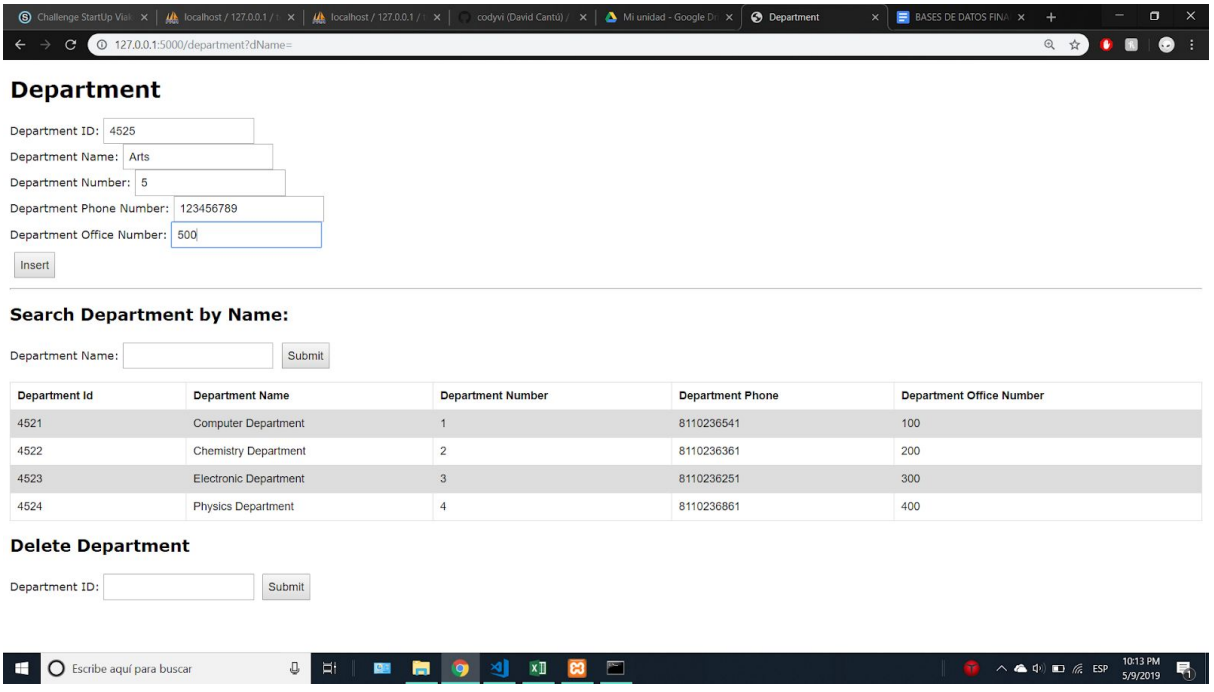
Department Queries (List Department Working)

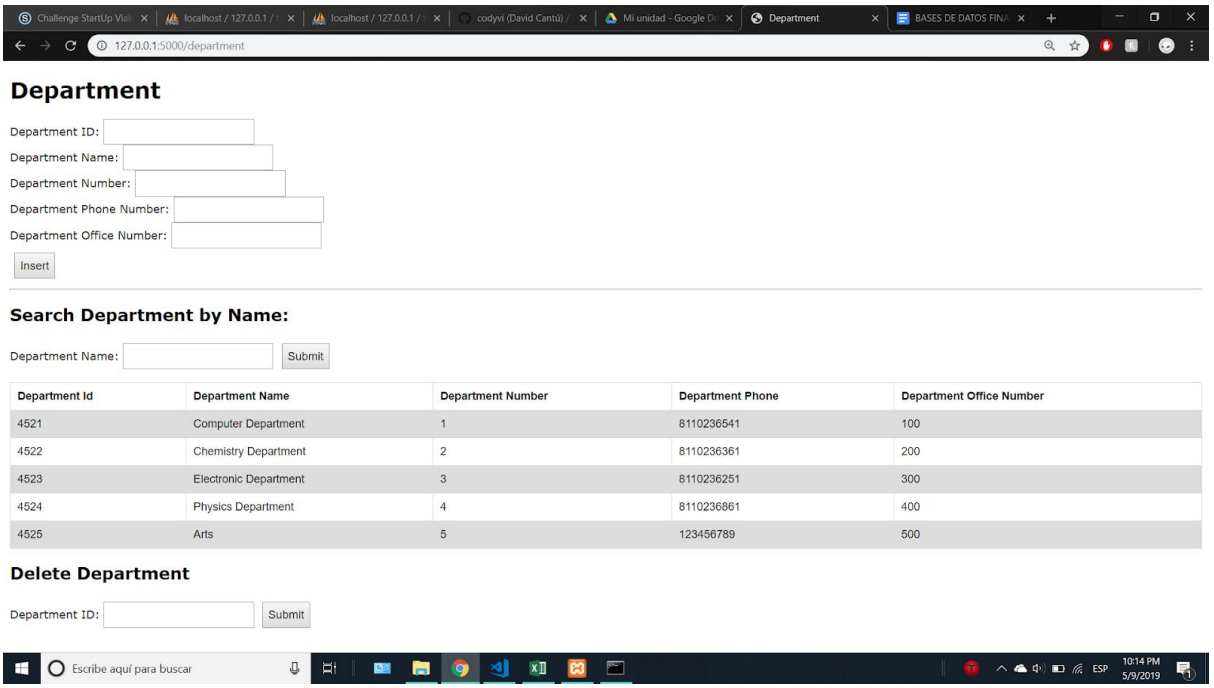


Search by Name

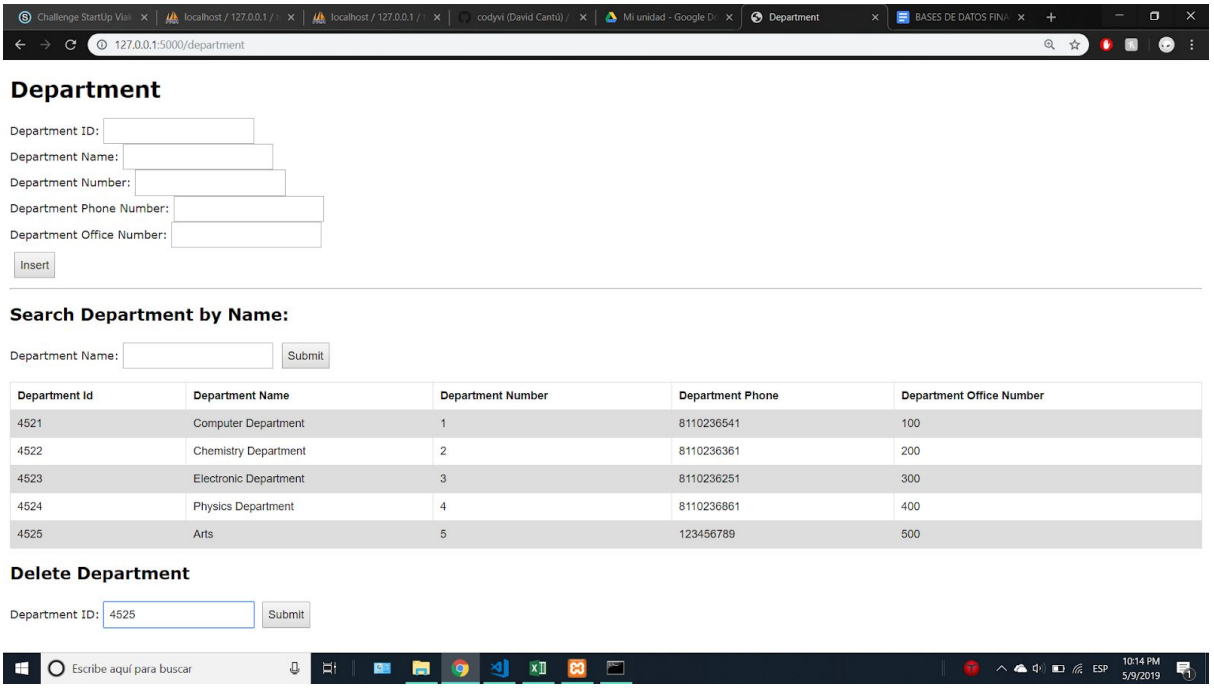


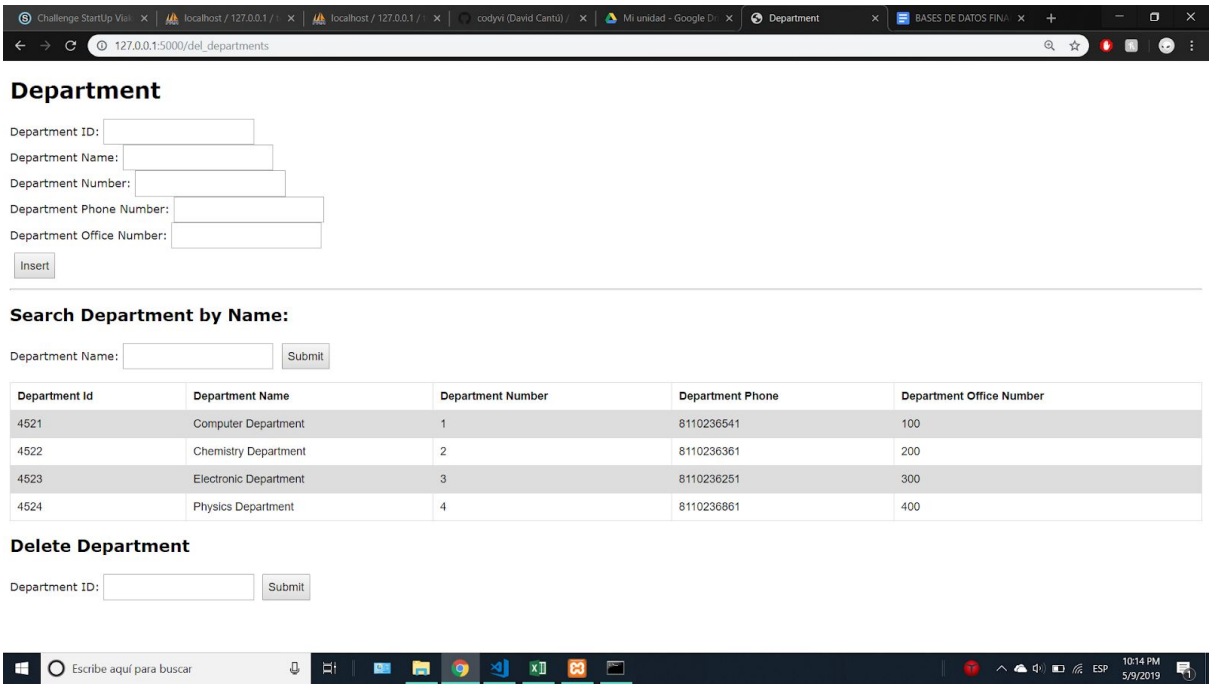
Insert Department



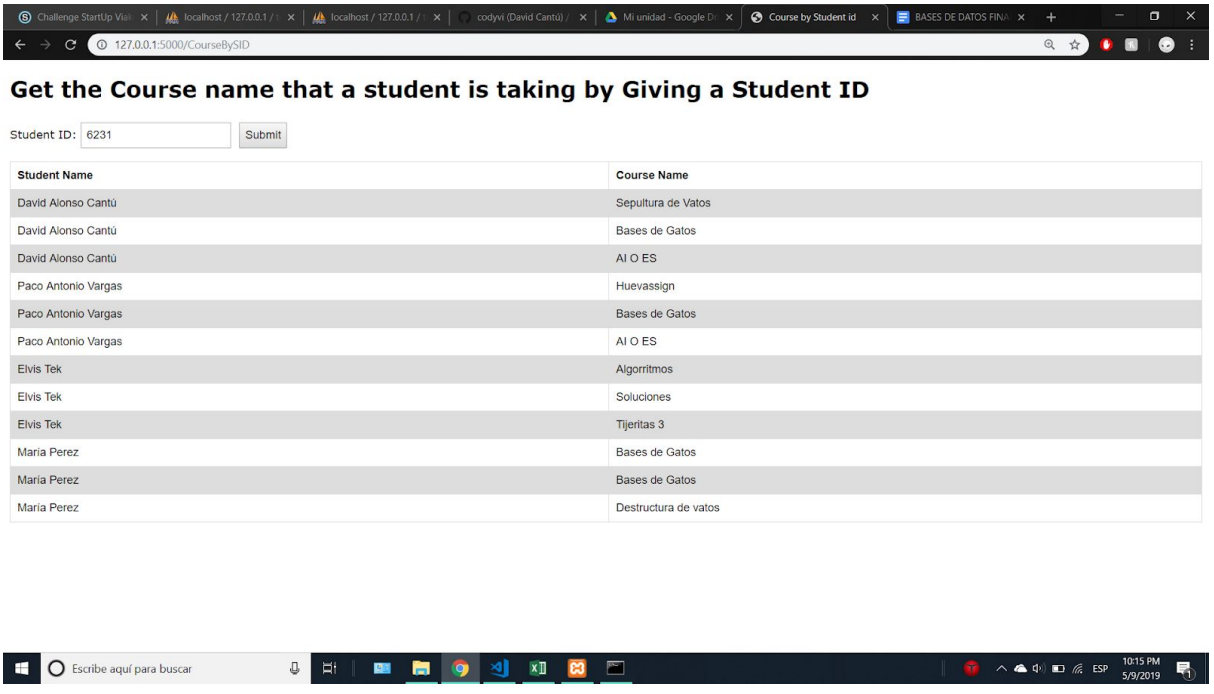


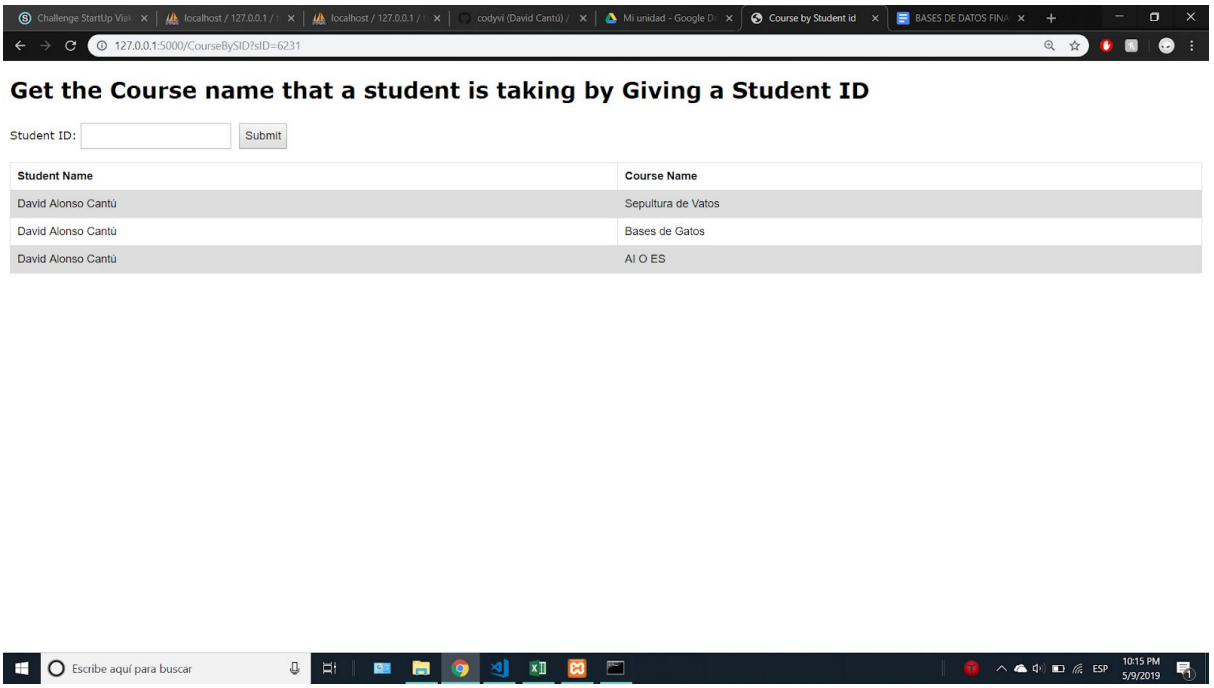
Delete Department



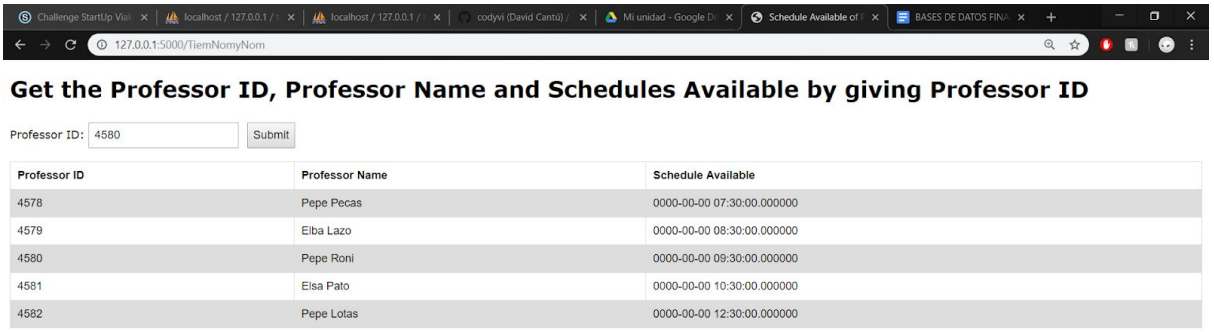


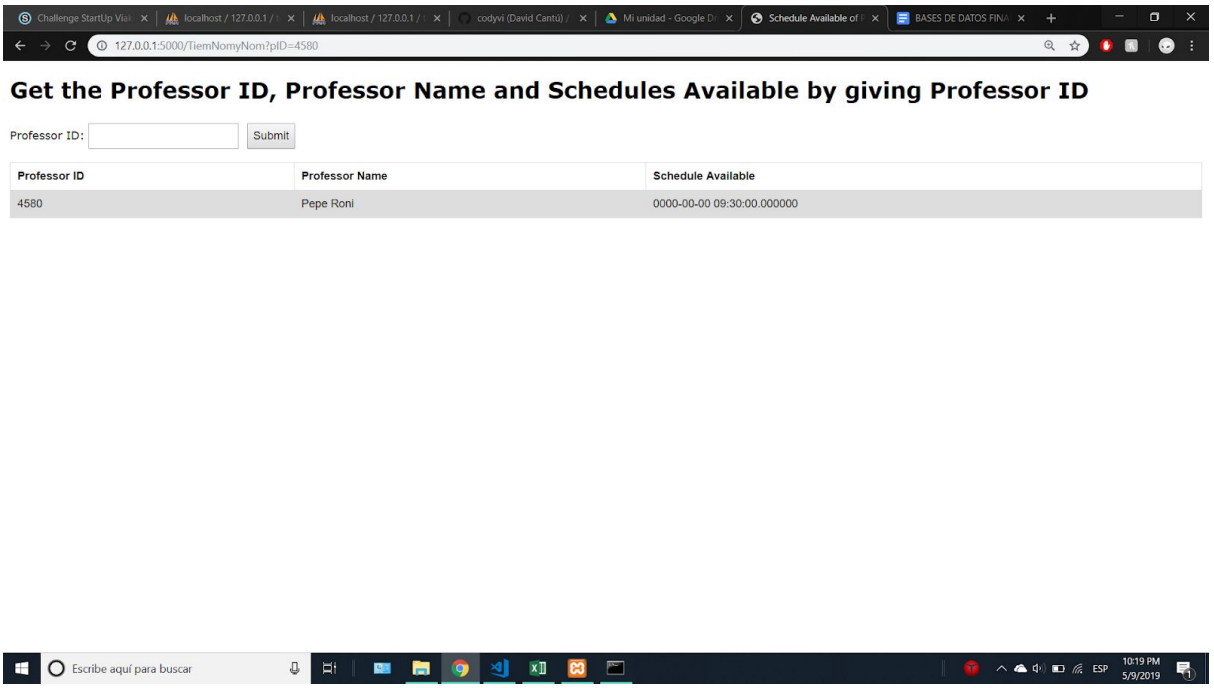
Get the Course name that a student is taking by Giving a Student ID





Get the Professor ID, Professor Name and Schedules Available by giving Professor ID



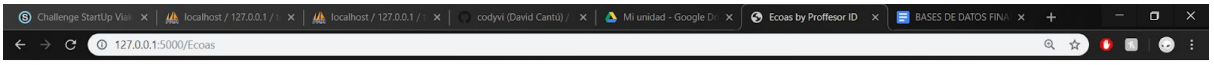


Get the Professor ID, Professor Name and Schedules Available by giving Professor ID

Professor ID: Submit

Professor ID	Professor Name	Schedule Available
4580	Pepe Roni	0000-00-00 09:30:00.000000

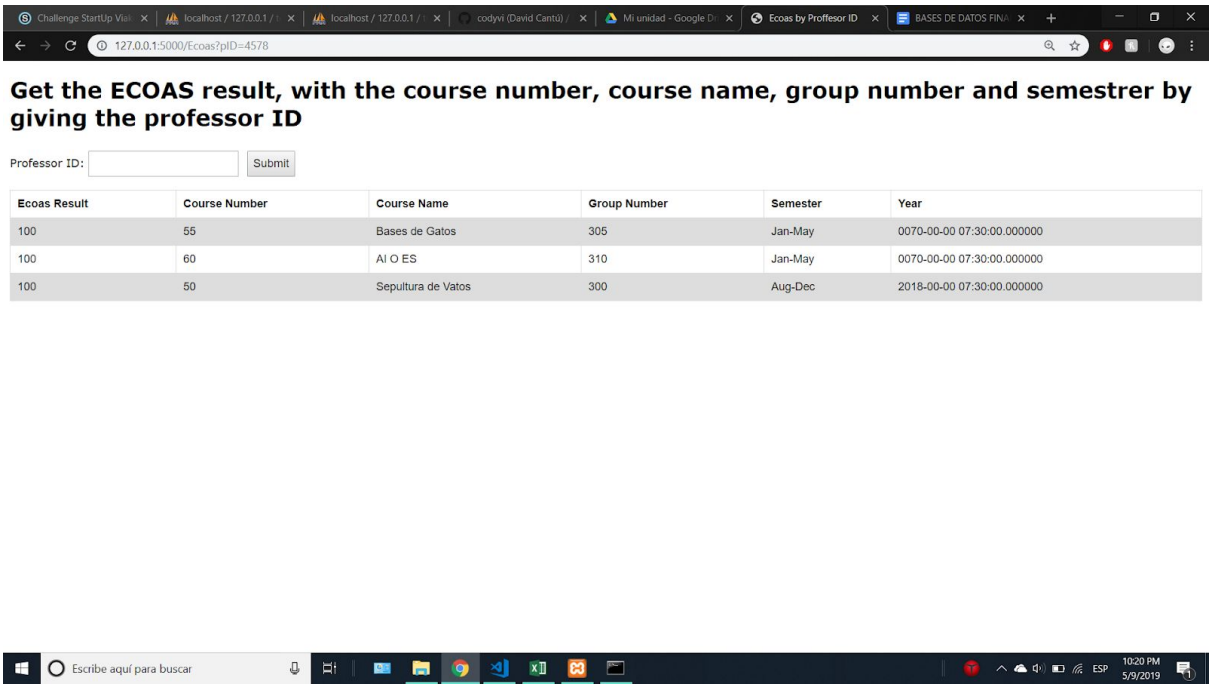
Get the ECOAS result, with the course number, course name, group number and semester by giving the professor ID



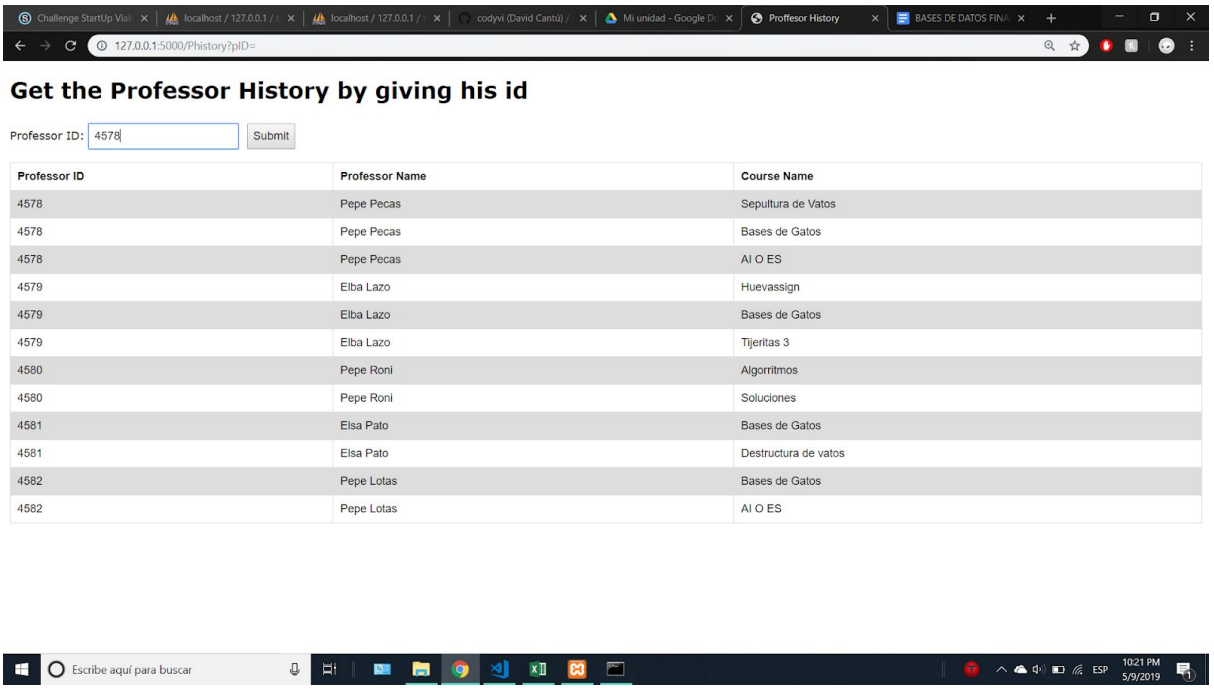
Get the ECOAS result, with the course number, course name, group number and semestrer by giving the professor ID

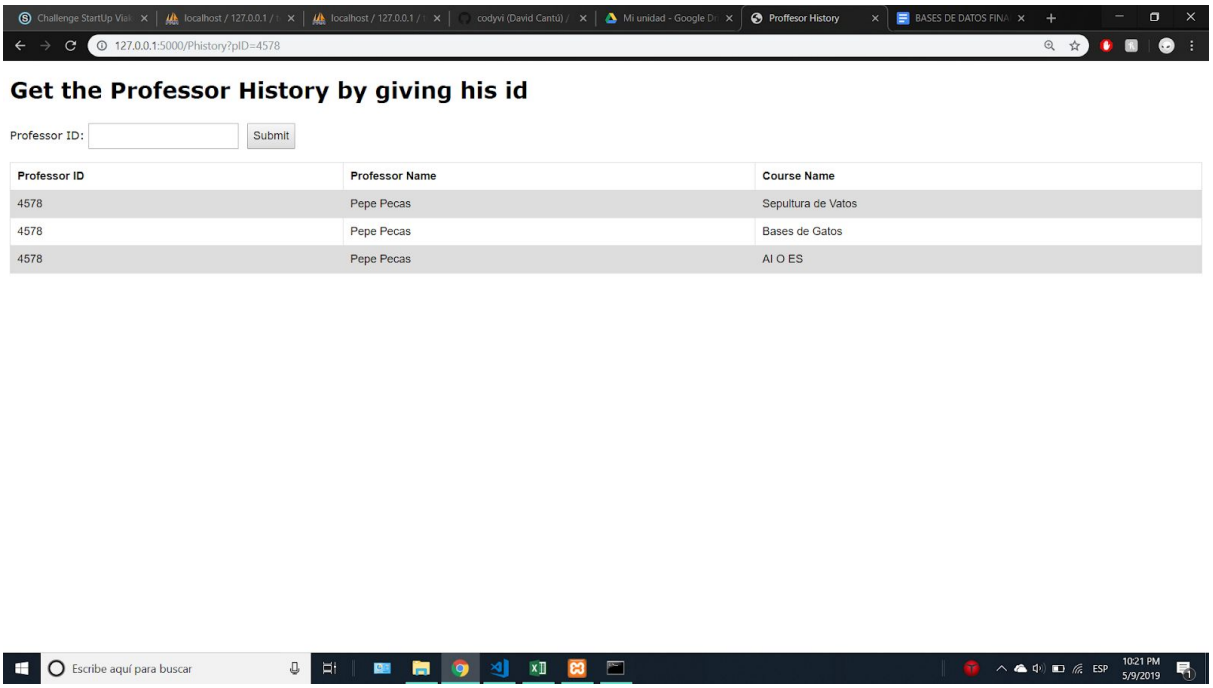
Professor ID: 4578 Submit

Ecoas Result	Course Number	Course Name	Group Number	Semester	Year
100	56	Bases de Gatos	306	Aug-Dec	0070-00-00 07:30:00.000000
100	57	Soluciones	307	Aug-Dec	0070-00-00 07:30:00.000000
100	59	AI O ES	309	Aug-Dec	0070-00-00 07:30:00.000000
100	61	Tijeritas 3	311	Aug-Dec	0070-00-00 07:30:00.000000
100	54	Bases de Gatos	304	Jan-May	0070-00-00 07:30:00.000000
100	55	Bases de Gatos	305	Jan-May	0070-00-00 07:30:00.000000
100	58	Destructura de vatos	308	Jan-May	0070-00-00 07:30:00.000000
100	60	AI O ES	310	Jan-May	0070-00-00 07:30:00.000000
100	53	Bases de Gatos	303	Aug-Dec	1020-00-00 07:30:00.000000
100	52	Algorritmos	302	Jan-May	1050-00-00 07:30:00.000000
100	50	Sepultura de Vatos	300	Aug-Dec	2018-00-00 07:30:00.000000
100	51	Huevassign	301	Aug-Dec	2018-00-00 07:30:00.000000



Get the Professor History by giving his id





Conclusion

Working on this project has given us a perspective on how to work with databases and how to integrate them into a project that involves a web page. As well as to simulate a work environment in which we work using methodologies for software development.

Initially, technological obstacles were encountered that prevented the optimal development of the database. Also, it was complicated to implement our initial database design in SQL, so we had to make slight changes to our design to be able to do it correctly.

Finally, the database was perfectly connected, the creation of the database was done, the inserts and assigned queries were finished without errors and the project concluded successfully.