

# **Database Project**

## **College Management System**

### **Team Members**

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# • The Project's Idea(Main Scenario):

College Management System project is used to keep and maintain the complete record of students , departments , instructors , courses , lectures and lab

when a student join college a record is made , contains some basic information:full name, nationality,gender,DoB,national number,age,address ,e-mail and phone

after that the college generate an id and educational mail to keep with college news , his grades and courses and the record is saved to the database.

A department has instructors , students and special courses are offered information about department is stored on the database : department code , department name , courses , instructors works in and floor number.

A student can major in department after his second year

when a new instructor come to work in college

a new record is made that contains basic information like :full name ,address ,nationality,join date,national number,phone number,marital status,job title,DoB,age and e-mail

the college generate an id and a role and a salary and attendance report is stored to his record

and the record is saved to the database.

The college stores basic information about courses like :unique course\_code course name,credit hours,price,semester,description,R (Compulsory) or E (Elective),start-end date

Labs information like lab id

lecture information be a lecture code that a student when use this code can know lecture information like time , classroom floor and id , instructor name and course name.

A student can choose whatever course to enroll in as long as he meet the requirements passed prerequisite courses .

A instructor is responsible for either teaching course lecture or course lab.

Not all courses provide labs

# • Requirements Phase:

## 1. Inputs:

(member 1,2,3)

The college management system is a big system consists of several subsystems namely:

system Administrator, student system, course management system, department administration, employee system , accounting system , human resource, health care , lab management ,and library system .. etc.

(member 4,5,6)

This system can be used to store student information like attendance, fees, student result, course enrollments, timetable, fee detail and personal information. Etc

(member 1)

Employee information like personal information, salary, attendance, job title and work hours. Etc

(member 4)

Course system has course id , course name , department name , credits ,building , room number and semester.

Each course provides a lecture(s) and maybe provides a lab(s).

a lecture has a unique lecture code, A lecture code is a code by which you can get information about the lecture like course name, instructor name, time, classroom id, classroom floor and time.

(member 3)

System Administrators can be used to store users who can

access all data in the college system and they can create , update or delete from the system database

(member2)

Department administration used to store department information like department students , grades and additional information

Each instructor works in one department and responsible for teaching either lectures or labs not both for different courses.

(member 6)

Accounting system deals with college the budgetary needs of college management and include payrolls and taxes ..etc

(member 5)

Human resource system can be used to deal with employees information , recording training details and managing recruitment

(member 5)

Library management deals with books information such as name, id , genres ,quantity, and location. Etc

(member 2,4,6)

Health care includes report about students medical report , employee medical report and doctors information .

(member 1,3,5)

Lab management can be used to know devices information

, quantity , location and teacher assistants ...etc.

(member 1,2,3,4,5,6)

System admin: he she can modify system database and has full access to all of the system entities

he\she can add new employee/professors\students by inserting their personal information into the database

(member 2,3,4)

System admin :

there is two admins who can access all information in the college management system

the dean and IT head of department.

And there could be another supervisor who could only have access to the employees database and another supervisor who has access to the students database.

(member 2,5,6)

Student system : student system contains personal information about student like his name ,id , phone number , address, Edu mail, national number, joining year, graduation year, nationality, picture, attendance ,exams result ,warnings, course enrollments, PA, time table

A student starts majoring in third year in a department of his own choice as long as he obtains the required GPA for entry.

(member 1,6,3)

Student system:

personal information : full name , nationality , gender , religion , birth-date , hometown , national number

family information: parents name , parents job , city , address , mobile phone , email , fax.

A student can enroll in courses as long as he does not exceed 18 credit hours at a semester and he had passed all the prerequisite courses needed for that course, after a student finishes a course, a grade will be set for that particular course and will be added to his grade report.

A student starts majoring in third year in a department of his own choice as long as he obtains the required GPA for entry.

(member 4)

Contact information :

city , address , telephone , email , phone number .

(member 5,6,2,1)

High school score :

school ,graduation date ,score and seat number

(member 2,4,3)

Employee system :

personal information :

full name , nationality , marital status , salary , insurance , job title , role , working hours , attendance , contact information , holidays , date of birth , training courses , length of service , recruitment details , qualifications held , time-sheets , roles , join date

Each lecture is related to a single instructor and a single course, The lecture is held at a certain time and scheduled in a classroom on a certain floor.

We also store information about instructors, each instructor has a unique id, full name, address, nationality, join date, national number, phone number, marital status, salary, job title, working hours, attendance, Date of Birth, age and e-mail.

(member 1,2,3,4)

course :

course id , name , credit hour , prerequisite courses , salary , department , semester , room id , lab number , instructor , time , number of instructors , elective or must , start date - end date , number of seats.

(member 4)

Department;

number of departments , number of doctors in each department , department courses , head of department , floor number , labs , stat of department.

## 2. Processing:

The college management system is a big system consists of several subsystems namely:

system Administrator, student system, course management system, department administration, employee system, accounting system , human resource, health care , lab management ,and library system .. etc.

This system can be used to store student information like attendance, fees, student result, course enrollments, timetable, fee detail and personal information. etc

Employee information like personal information, salary, attendance, job title and work hours.

Each lecture is related to a single instructor and a single course, The lecture is held at a certain time and scheduled in a classroom on a certain floor.

We also store information about instructors, each instructor has a unique id, full name, address, nationality, // join date, national number, phone number, // marital status, //salary, // job title, // working hours, // attendance, Date of Birth, age , e-mail etc...

Course system has course ID , course name , department name , credits , building , room number and semester. Each course provides a lecture(s) and maybe provides a lab(s).

a lecture has a unique lecture code, A lecture code is a code by which you can get information about the lecture like course name, instructor name, time, classroom id, classroom floor and time.

System Administrators can be used to store users who can access all data in the college system and they can create , update or delete from the system database



Department administration used to store department information like department students , grades and additional information. Each instructor works in one department and responsible for teaching either lectures or labs not both for different courses.

Accounting system deals with college the budgetary needs of college management and include payrolls and taxes.. etc.

Human resource system can be used to deal with employees information , recording training details and managing recruitment

Library management deals with books information such as name , id , genres , quantity , and location. etc.

Health care includes report about students medical report , employee medical report and doctors information .

Lab management can be used to know devices information , quantity , location and teacher assistants ...etc.

System admin:

He /she can modify system database and has full access to all of the system entities.

He/she can add new employee/professors/students by inserting their personal information into the database.

There is two admins who can access all information in the college management system:

- The dean and IT head of department.

And there could be another supervisor who could only have access to the

employees database and another supervisor who has access to the students database.

### Student system :

Student system contains personal information about student like : His name , ID , Phone number , Address , Edu mail , National number , Joining year , Graduation year , Nationality , Picture , Attendance , Exams result , Warnings , Course enrollments , GPA , Time table. A student starts majoring in third year in a department of his own choice as long as he obtains the required GPA for entry.

### Personal information:

Full name , Nationality , Gender , Religion , Birthdate , Hometown , National number

### Family information :

Parents name , Parents job , City , Address , Mobile phone , Email , Fax. A student can enroll in courses as long as he does not exceed 18 credit hours at a semester and he had passed all the prerequisite courses needed for that course, after a student finishes a course, a grade will be set for that particular course and will be added to his grade report. A student starts majoring in third year in a department of his own choice as long as he obtains the required GPA for entry.

### Contact information :

City , Address , Telephone , Email , Phone number.

### High school score :

School , Graduation date , Score and Seat number.

### Employee system :

Personal information :

Full name , Nationality , Martial status , Salary , Insurance , Job title , Role , Working hours , Attendance , Contact information , Holidays , Date of birth , Training courses , Length of service , Recruitment details, Qualifications held , Timesheets , Rotas , Join date

Course :

Course ID , Name , Credit hour , Prerequisite courses, Salary , Department , Semester , Room ID , Lab number , Instructor , Time , Number of Instructors , Elective or must , Start date - end date , Number of seats.

Each course provides a lecture(s) and maybe provides a lab(s).

a lecture has a unique lecture code, A lecture code is a code by which you can get information about the lecture like course name, instructor name, time, classroom id, classroom floor and time.

Department :

Number of departments , Number of doctors in each department , Department courses , Head of department , Floor number , Labs , Stat of department.

## **Rubbish (does not fit customer requirements):**

System Administrators

System admin

management system

Accounting system

Human resource system

Library management

Health care includes

Lab management

High school score information

customer does not need employee system he needs INSTRUCTORS system instead .

### **3. Used Methods:**

Interviewing, searching and Brainstorming used for gathering data.

### **4. Used Tools/Apps:**

Word and PDF editor.

### **5. Person's Name:**

System analysts or Data collector.

## 6. Outputs:

The faculty manages several departments, each department has a unique name, a unique code number and a floor of the faculty building, and it is managed by one of the instructors.

a department offers several courses for all levels, but not all courses are offered by departments, each of which has a unique name, unique code number, course credit hours, a course price, a start-end date, semester and a course description

it may have prerequisite course(s), it can be Compulsory that every student must take it to be able to graduate from the faculty or elective which means that each student can choose either to take or not.

After the student joins our faculty we generate an educational mail, unique student id and we store some basic information like his: full name, nationality, gender, date of birth, age, national number, address, phone number, E-mail, GPA, level.

a student can enroll in courses as long as he does not exceed 18 credit hours at a semester and he had passed all the prerequisite courses needed for that course, after a student finishes a course, a grade will be set for that particular course and will be added to his grade report.

A student starts majoring in third year in a department of his own choice as long as he obtains the required GPA for entry.

Each course provides a lecture(s) and maybe provides a lab(s).

a lecture has a unique lecture code, A lecture code is a code by which you can get information about the lecture like course name, instructor name, time, classroom id, classroom floor and time.

each lecture is related to a single instructor and a single course, The lecture is held at a certain time and **scheduled** in a classroom on a certain floor.

A lab is held at a certain time, and it's related to a single course and many instructors, if there are many labs, are responsible for teaching it and Instructor can teach many labs.

Each lab has a unique id and a number (if there are many).

We also store information about instructors, each instructor has a unique id, full name, address, nationality, join date, national number, phone number, marital status, salary, job title, working hours, attendance, Date of Birth, age and e-mail.

Each instructor works in one department and responsible for teaching either lectures or labs not both for different courses.

## • Analysis Phase:

### 1. Inputs:

The faculty manages several departments, each department has a unique name, a unique code number and a floor of the faculty building, and it is managed by one of the instructors.

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A lab is held at a certain time, and it's related to a single course and many instructors, if there are many labs, are responsible for teaching it and Instructor can teach many labs.

Each lab has a unique id and a number (if there are many).

We also store information about instructors, each instructor has a unique id, full name, address, nationality, join date, national number, phone number, marital status, salary, job title, working hours, attendance, Date of Birth, age and e-mail.

Each instructor works in one department and responsible for teaching either lectures or labs not both for different courses.

## **2. Processing:**

Applying on the User Requirement/Story

the Processing/Converting rules from  
User Requirements/Story to ERD.

The Object Assigning Process

Attributes		
Entity Name	Attributes Name	Attributes Type
STUDENT	full name	composite
	nationality	simple
	gender	single
	DoB	stored
	national number	single
	age	derived
	address	simple
	e-mail	single
	educational mail	single
	major	simple
	student_id	PK
	Level	simple
	GPA	derived
	Registered credit hours	derived
	phone	simple
COURSE	unique course_code	PK
	unique name	PK
	credit hours	stored
	price	simple
	number of labs	derived
	number of enrolled students	derived
	semester	simple
	description	stored
	R (Compulsory) or E (Elective)	stored
	start-end date	composite
LECTURE	lecture_time	simple
	lecture_code	PK
	classroom_id	simple
	classroom_floor	simple
INSTRUCTOR	full name	composite
	address	simple
	nationality	simple
	instructor_id	PK
	join date	stored
	national number	single
	phone number	simple
	marital status	simple
	salary	simple
	job title	simple
	working hours	composite
	attendance	simple
	DoB	stored
	role	multi valued
	age	derived
	e-mail	simple
DEPARTMENT	department_code	PK
	department name	PK
	department_floor	simple
	minimum gpa to enroll	derived
	number of courses	derived
	number of students	derived
	number of instructors	derived
LAB	lab_time	simple
	lab_id	PK
	lab_number	simple

Number of Entities				Name of relationship	DEGREE OF RELATIONSHIP	Cardinality	TYPE OF PARTICIPATION	attribute
Name E1	Name E2	Name E3	Name E4					
student	course			enroll	binary r	M M	TOTAL-TOTAL	grade
student	department			majors in	binary r	M 1	PARTIAL-TOTAL	
student	lab			attend	binary r	M M	PARTIAL-TOTAL	
student	lecture			attend	binary r	M M	TOTAL-TOTAL	
course	lab			provide	binary r	1:M	PARTIAL-TOTAL	
course	lecture			provide	binary r	1 1	TOTAL-TOTAL	
department	course			offers	binary r	1 M	TOTAL-PARTIAL	
instructor	lecture			teaches	binary r	1 M	PARTIAL-TOTAL	
instructor	lab			teaches	binary r	1 M	PARTIAL-TOTAL	
instructor	department			manage	binary r	1 1	PARTIAL-TOTAL	
instructor	department			works in	binary r	M 1	TOTAL-TOTAL	
course	course			prerequisite	unary r	M 1	PARTIAL-PARTIAL	

**3. Used Methods:**

Processing/Converting Method.

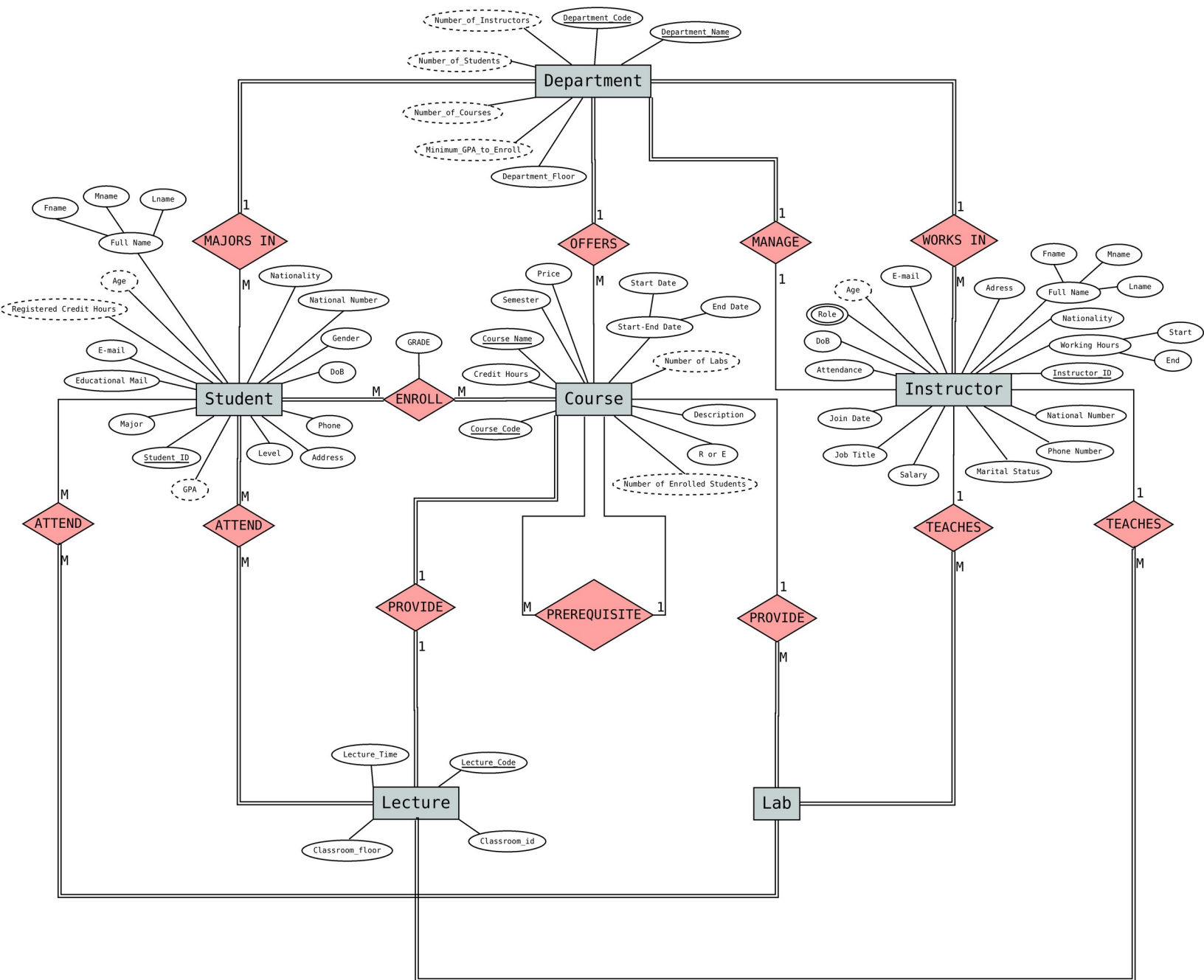
**4. Used Tools/Apps:**

Dia app that support the UR's notations.

**5. Person's Name:**

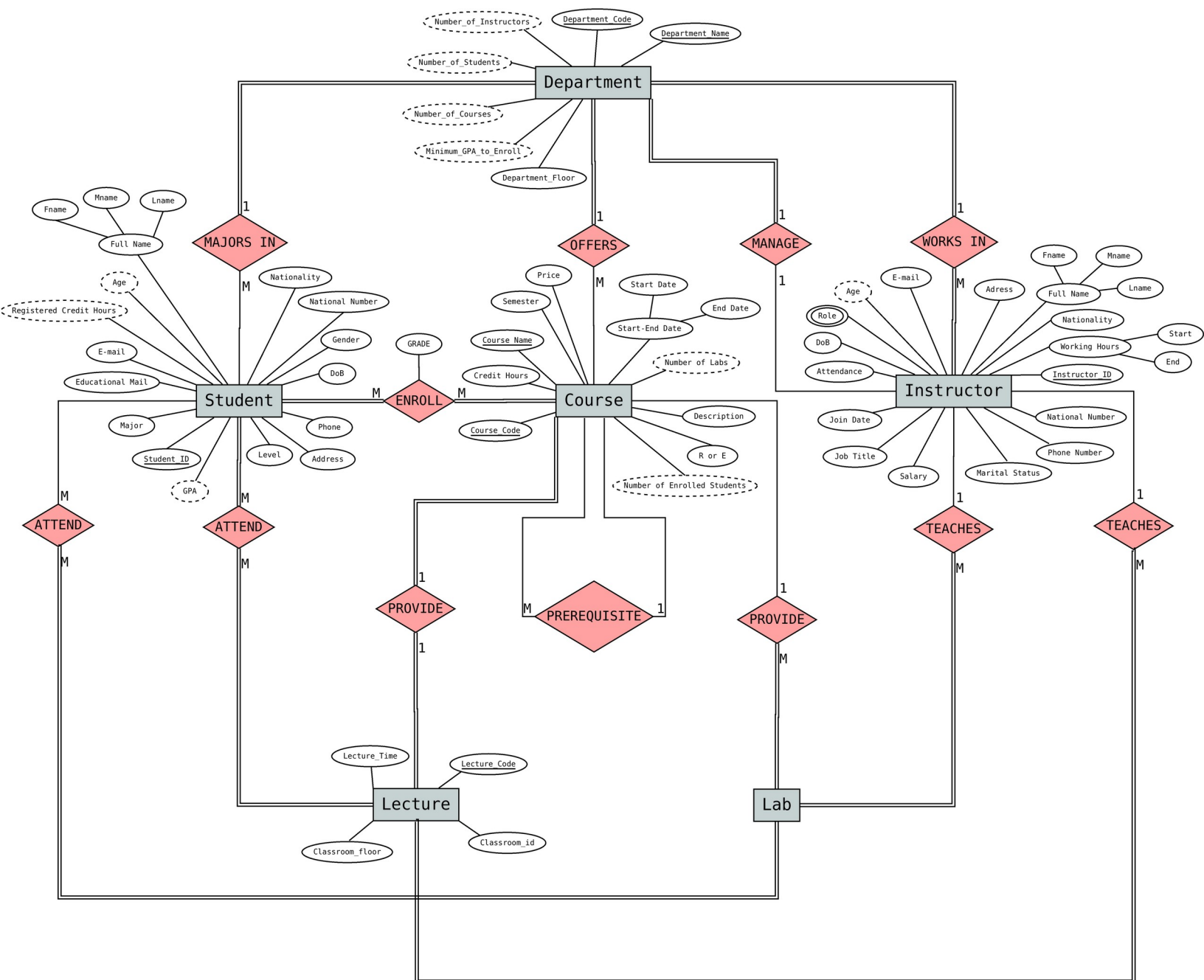
System Analyst.

# 6. Outputs:



# • Design Phase (Part 1: Creating Schema):

## 1. Inputs:



## **2. Processing:**

Applying on the ERD the Mapping rules.

## **3. Used Methods:**

Mapping Method.

## **4. Used Tools/Apps:**

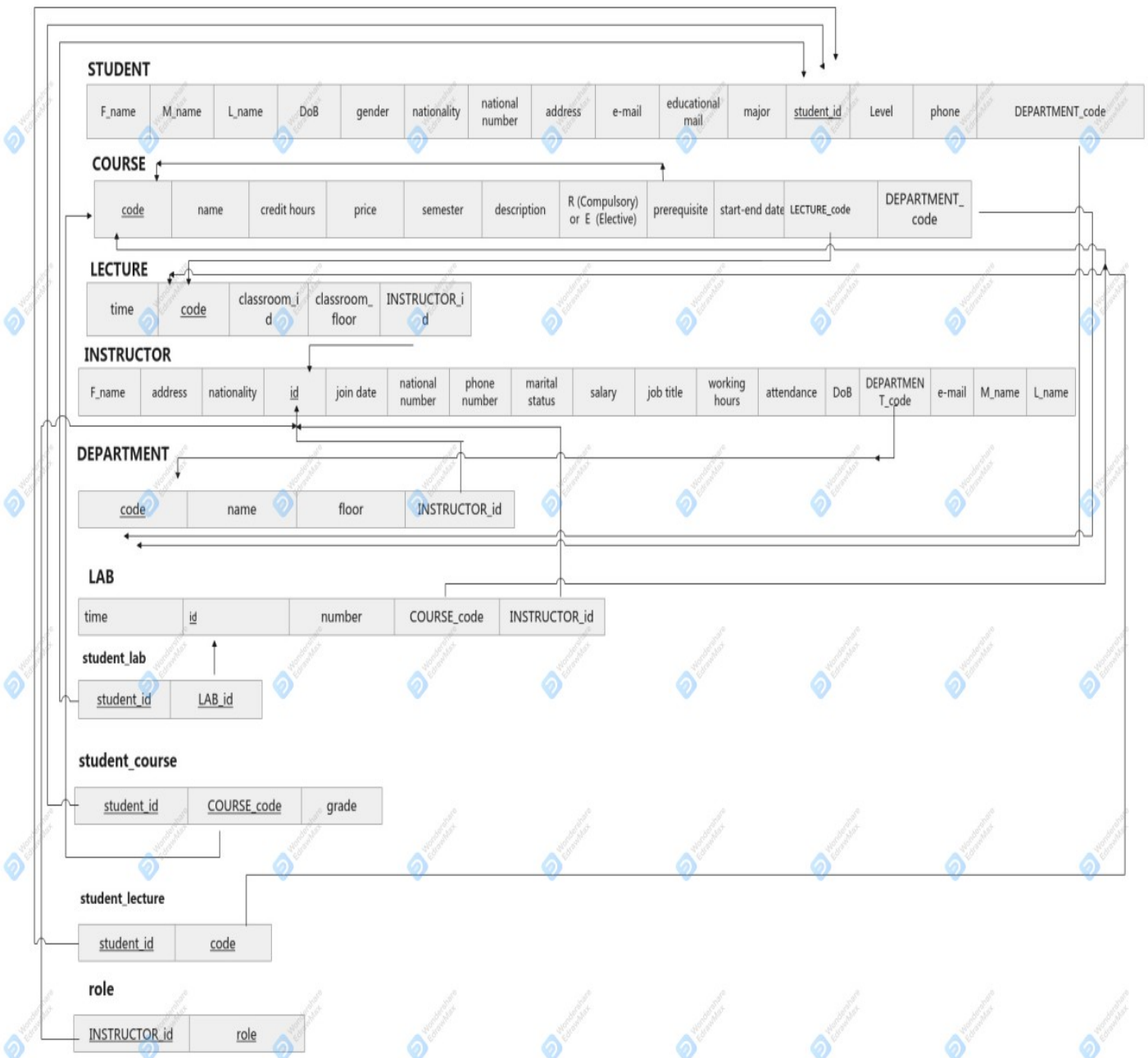
E-DRAW MAX

## **5. Person's Name:**

DB Designer.



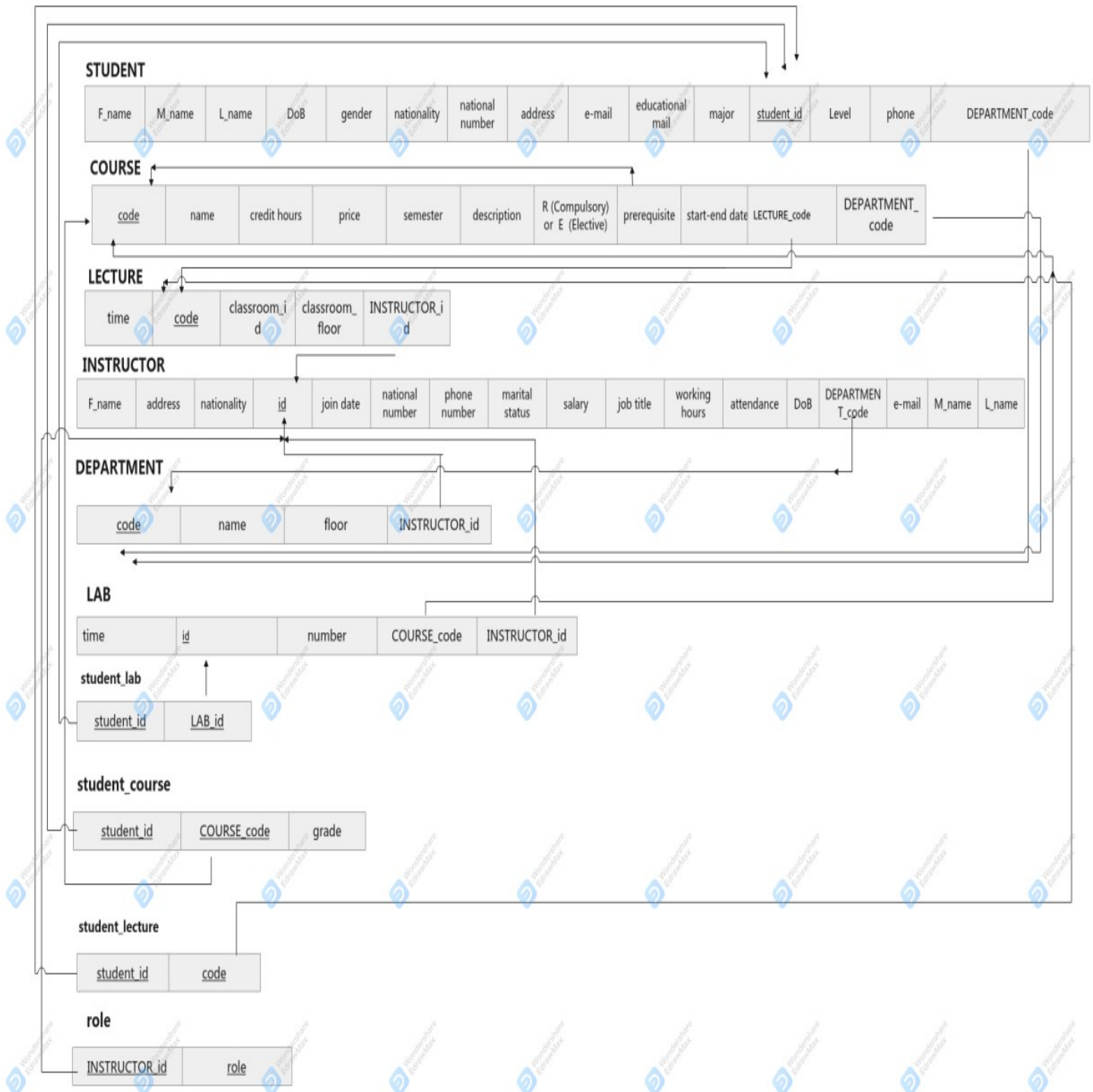
# 6. Outputs: DB Schema.



# • Design Phase (Part 2: Normalization):

## 1. Inputs:

DB Schema,



## **2. Processing:**

Applying on the DB schema the normalization rules (first, second and third) normal forms,

## **3. Used Methods:**

Normalization Method.

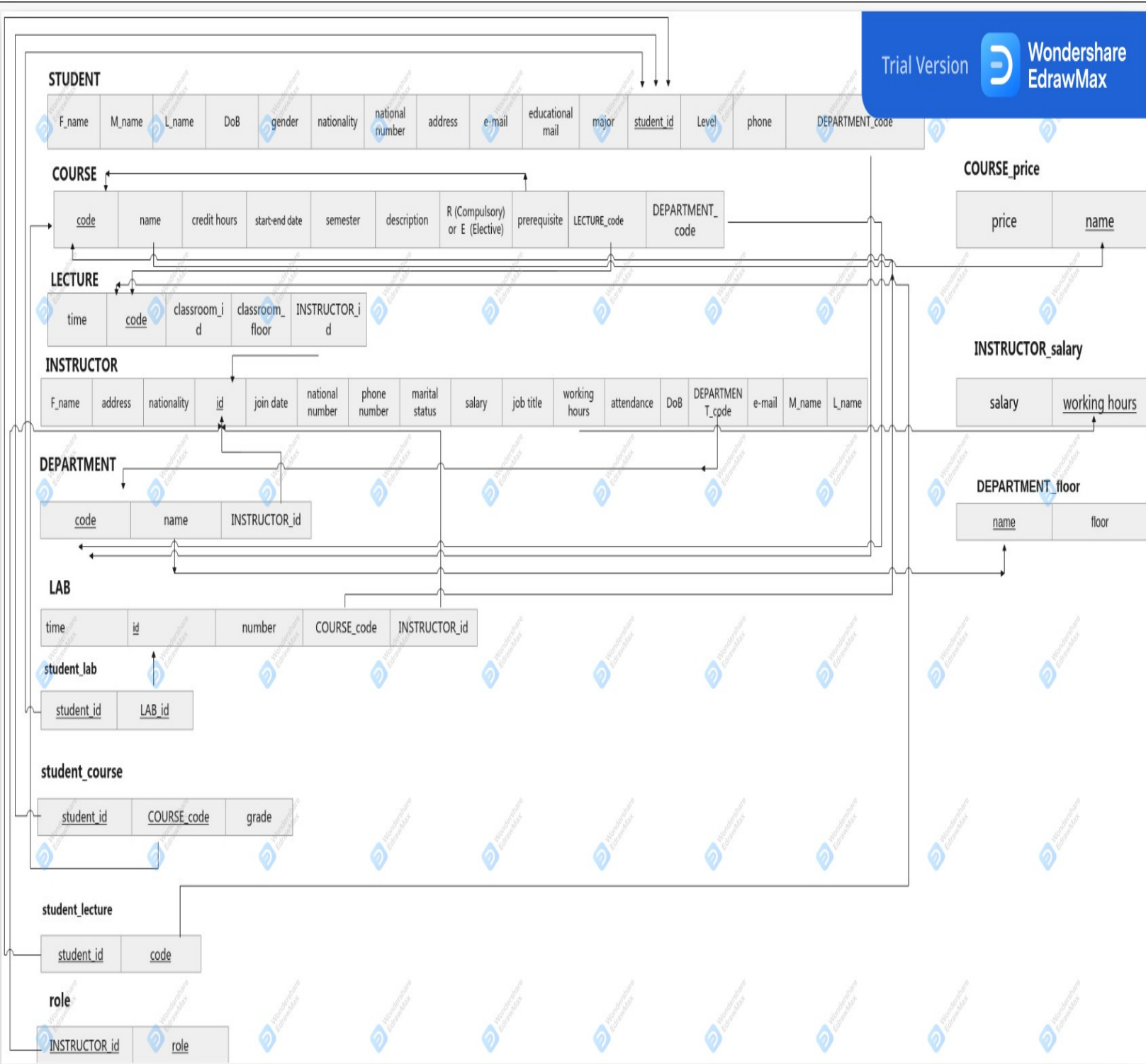
## **4. Used Tools/Apps:**

E-draw max

## **5. Person's Name:**

DB Designer.

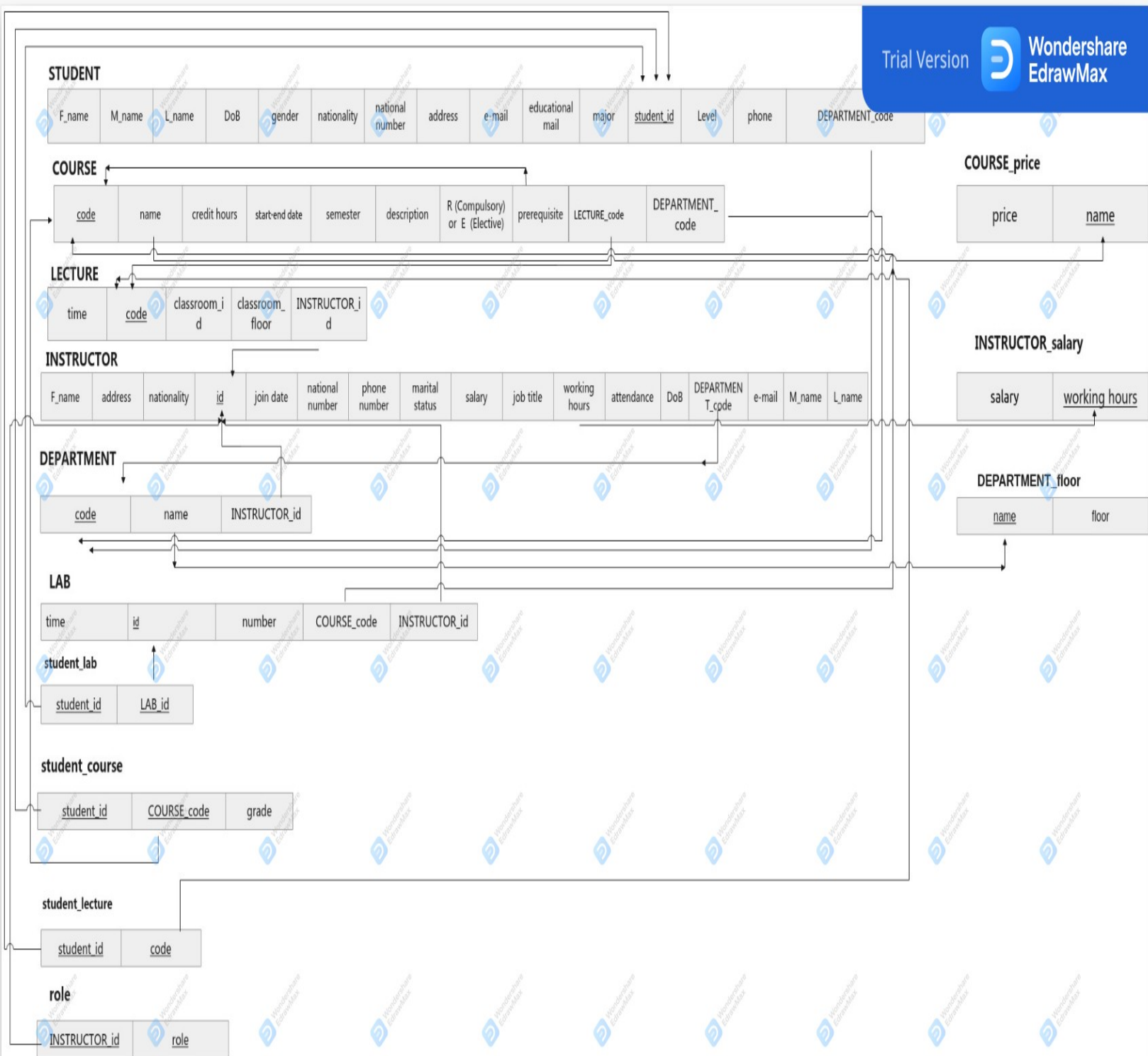
## 6. Outputs: Normalized DB Schema



# • Implementation Phase:

## 1. Inputs:

Normalized DB Schema.



## **2. Processing:**

Using DBMS (Microsoft SQL Server) for creating the normalized DB schema.

## **3. Used Methods:**

Implementation or development method.

## **4. Used Tools/Apps:**

DBMS (Microsoft SQL Server).

## **5. Person's Name:**

DB Developer.

## **6. Outputs:**

DB Script :

## CREATE DATABASE CMS

```
CREATE table student(  
student_id bigint primary key,  
f_name varchar(50) not null,  
m_name varchar(50),  
l_name varchar(50),  
Dob varchar(20) not null,  
gender varchar(10) not null,  
nationality varchar(50) not null,  
national_number bigint unique not null,  
address varchar(50) not null,  
email varchar(50) unique not null,  
educational_mail varchar(50) unique not null,  
major varchar(50) null,  
level bigint not null,  
phone bigint not null unique,  
department_code varchar(2) null  
);
```

```
CREATE TABLE course(  
code varchar(50) primary key,  
name varchar(50) not null,  
credit_hours bigint not null,  
start_end_date varchar(20) not null,  
semester varchar(50) not null,  
description varchar(200),  
compulsory_elective varchar(1),  
prerequisite varchar(50) null,  
lecture_code bigint not null unique,  
department_code varchar(2) null  
  
);
```

```
CREATE TABLE lecture(  
time_ varchar(50) not null,  
code bigint primary key,  
classroom_id bigint not null,  
classroom_floor bigint not null,  
instructor_id bigint not null  
);
```

```
CREATE TABLE instructor(  
f_name varchar(50) not null,  
address varchar(50) not null,
```

```
nationality varchar(50) not null,  
id bigint primary key,  
join_date varchar(20) not null,  
national_number bigint not null unique,  
phone_number bigint not null unique,  
marital_status varchar(10),  
salary bigint not null,  
job_title varchar(50) not null,  
working_hours bigint not null,  
attendance bigint not null,  
date_of_birth varchar(20) not null,  
department_code varchar(2) not null,  
email varchar(50) not null unique,  
m_name varchar(50) not null,  
l_name varchar(50) not null  
);
```

```
CREATE TABLE course_price(  
name varchar(50) primary key,  
price bigint not null check(price>0)  
);
```

```
CREATE TABLE instructor_salary(  
salary bigint not null,  
working_hours bigint primary key  
);
```

```
CREATE TABLE department_floor(  
name varchar(50) primary key,  
floor bigint not null  
);
```

```
CREATE TABLE department(  
code varchar(2) primary key,  
name varchar(50) not null,  
instructor_id bigint not null  
);
```

```
CREATE TABLE lab(  
time varchar(50) not null,  
id bigint primary key,  
number bigint not null,  
course_code varchar(50) not null,  
instructor_id bigint not null  
);
```



```
CREATE TABLE student_lab(  
  student_id bigint ,  
  lab_id bigint  
  
  primary key (student_id,lab_id)  
);
```

```
CREATE TABLE student_course(  
  student_id bigint,  
  course_code varchar(50),  
  grade varchar(1) not null  
  
  primary key (student_id,course_code)  
);
```

```
CREATE TABLE student_lecture(  
  student_id bigint,  
  code bigint  
  
  primary key (student_id,code)  
);
```

```
CREATE TABLE role(  
  instructor_id bigint,  
  role varchar(50)  
  
  primary key (instructor_id,role)  
);
```