COMP 353

Main Project Report

Group Members

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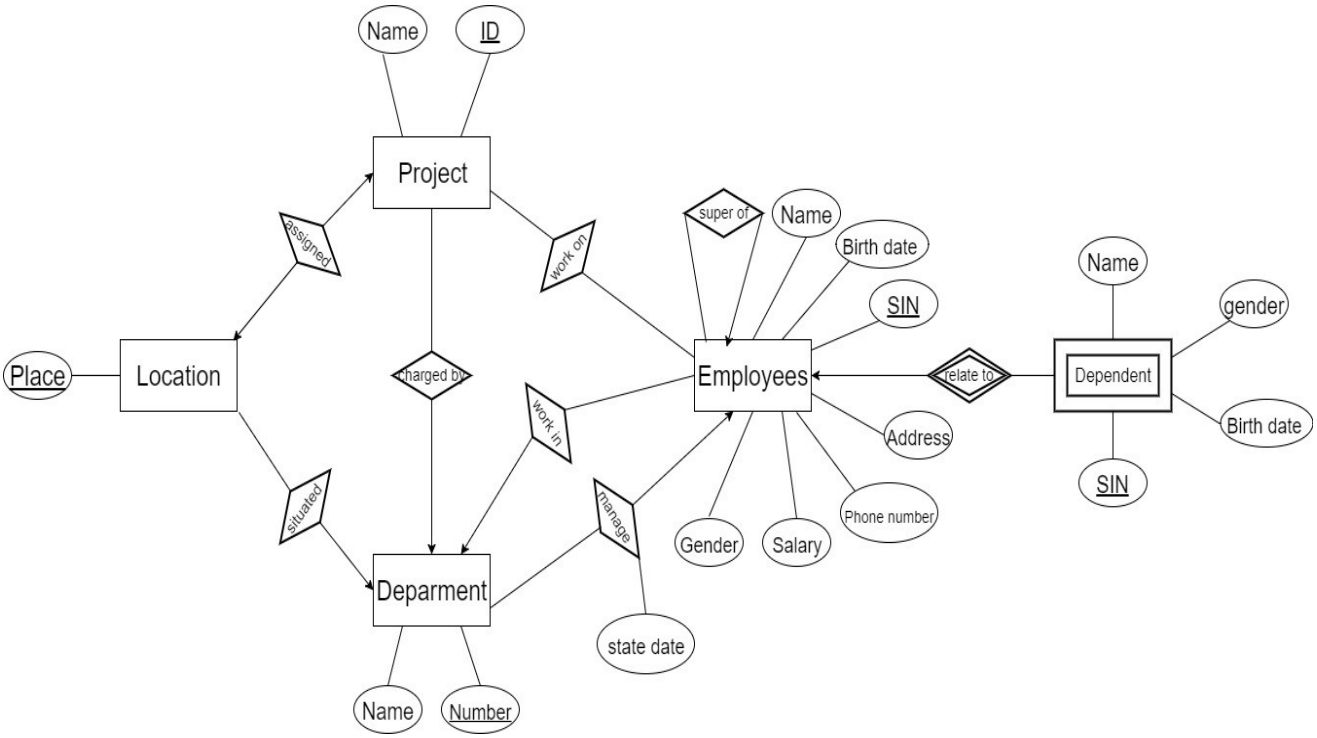
Table of Contents

Introduction

The purpose of this project is to design a web-based database of a company management system using MySQL and PHP to set relations in between different components such as Employees, Department and projects, and keep track of the performances.

In progress of building the system, an E/R relationship model is presented to explain relationship of entities. To enhance the system performance in long run, we decomposed the relations into 3NF. Constraints during creating system are listed to better understand the inner system structure. A brief introduction on our user interface is provided to help users getting on to it. Test data and some example queries are provided.

E/R Model



A department may have several locations, so the relationship between department and location is one to many.
A department is in charge of a number of projects, so the relationship between department and project is one to many.
A single location assigned to each project, so the relationship between location and project is one to one.
Each employee is assigned to one department but he/she may work on different projects in the company, so the relationship between employee and department is many to many and the relationship between employee and department is many to one.

Since both department and project have location, we upgrade it to an entity, and created relation between location and department/project.

E/R Model to Relation

Employees(SIN, Name, birthDate, address, gender, phoneNumber, salary)
SuperviseOf(SIN, Name, birthDate, address, gender, phoneNumber, salary)
Dependent(DSIN, ESIN, dependentName, dBirthDate, dGender)
Department(DNumber, DName)
Project(PID, PName)
Location(place)
assigned(PID, place)
situated(place, DNumber)
chargedBy(PID, DNumber)
workOn(PID, ESIN, hours)
workIn(ESIN, DNumber)
manage(DNumber, ESIN, StartDate)

Convert to 3NF:

For all tuples with single key, they are already in 3NF, so no need to convert.
For table workOn, (PID, ESIN) -> hours, 3NF
For table Dependent,
(DSIN, ESIN) -> dependentName , 3NF
(DSIN, ESIN) -> dependentBirthday, 3NF
(DSIN, ESIN) -> dependentGender, 3NF

So all relations are in 3NF
No trivial dependencies found

SQL Statements

1. List of tables and constraints

```
CREATE TABLE Employees(
  SIN INTEGER(40) NOT NULL PRIMARY KEY,
  Name VARCHAR(40) NOT NULL ,
  birthDate DATE NOT NULL ,
  address VARCHAR(60),
  gender ENUM('M', 'F') DEFAULT 'F',
  phoneNumber BIGINT,
  salary DOUBLE UNSIGNED DEFAULT 0
);
```

We picked SIN as primary key for employee, used enum to make sure gender is either male or female.

```
CREATE TABLE SuperviseOf(
  EmployeeSIN INTEGER(40) NOT NULL PRIMARY KEY ,
  SupervisorSIN INTEGER(40) NOT NULL,
  FOREIGN KEY (EmployeeSIN) REFERENCES Employees(SIN),
  FOREIGN KEY (SupervisorSIN) REFERENCES Employees(SIN)
);
```

Set foreign keys EmployeeSIN and supervisorSIN

```
CREATE TABLE Dependent(
  DependentSIN INTEGER(40) NOT NULL,
ESIN INTEGER(40) NOT NULL,
FOREIGN KEY(ESIN) REFERENCES EMPLOYEES(SIN),
  dependentName VARCHAR(40) NOT NULL,
  dBirthDate DATE,
  dGender ENUM('M', 'F') DEFAULT 'F',
PRIMARY KEY(DependentSIN, ESIN)
);
```

Primary key is the pair (DependentSIN, ESIN), since Dependent is a weak entity;

```
CREATE TABLE Department(
  DepartmentNumber INTEGER(40) NOT NULL PRIMARY KEY,
  DepartmentName VARCHAR(40) NOT NULL UNIQUE
);
```

Used UNIQUE to make department name unique

```
CREATE TABLE Project(
  PID INTEGER(40) NOT NULL PRIMARY KEY,
  PName VARCHAR(40) NOT NULL UNIQUE
);

CREATE TABLE Location(
  place VARCHAR(40) NOT NULL PRIMARY KEY
);

CREATE TABLE assigned(
  PID INTEGER(40) NOT NULL PRIMARY KEY,
  place VARCHAR(40),
  FOREIGN KEY (PID) REFERENCES Project(PID),
```

```
  FOREIGN KEY (place) REFERENCES Location(place)
);

CREATE TABLE situated(
  place VARCHAR(40) NOT NULL PRIMARY KEY ,
  DepartmentNumber INTEGER(40) NOT NULL,
  FOREIGN KEY (place) REFERENCES Location(place),
  FOREIGN KEY (DepartmentNumber) REFERENCES Department(DepartmentNumber)
);

CREATE TABLE changedBy (
  PID     INTEGER(40) NOT NULL PRIMARY KEY ,
  DNumber INTEGER(40) NOT NULL ,
  FOREIGN KEY (PID) REFERENCES Project (PID),
  FOREIGN KEY (DNumber) REFERENCES Department (DepartmentNumber)
);

CREATE TABLE workOn(
  PID INTEGER(40) NOT NULL ,
  SIN INTEGER(40) NOT NULL ,
  hours DOUBLE,
  PRIMARY KEY (PID, SIN),
  FOREIGN KEY (PID) REFERENCES Project(PID),
  FOREIGN KEY (SIN) REFERENCES Employees(SIN)
);

CREATE TABLE workIn(
  SIN INTEGER(40) NOT NULL PRIMARY KEY ,
  DNumber INTEGER(40) NOT NULL ,
  FOREIGN KEY (SIN) REFERENCES Employees(SIN),
  FOREIGN KEY (DNumber) REFERENCES Department(DepartmentNumber)
);

CREATE TABLE manage(
  DNumber INTEGER(40) PRIMARY KEY,
  SIN INTEGER(40),
  StartDate DATE,
  FOREIGN KEY (DNumber) REFERENCES Department(DepartmentNumber),
  FOREIGN KEY (SIN) REFERENCES Employees(SIN)
);
```

One to many relation, so pick department number as primary key

```
CREATE TABLE related(
```

```
  DependentSIN INTEGER(40) NOT NULL ,
  SIN INTEGER(40) NOT NULL ,
  FOREIGN KEY (SIN) REFERENCES Employees(SIN)
);
```

2. Sample Test Data

```
INSERT INTO Employees VALUE (1,'jason','1991-04-22','188 boul de L\'Assomption, QC', 'M',
5149926186, 3199.4237);
INSERT INTO Employees VALUE (2,'Fatimah', '1991-04-12', '20 Maple Avenue San Pedro, QC',
'M', 5149926186, 3129.4237);
INSERT INTO Employees VALUE (3,'Chanel', '1992-06-22', '7 W. Adams Lane San Jose, QC', 'F',
5149926186, 4999.4237);
INSERT INTO Employees VALUE (4,'Dayna', '1995-05-12', '188 boul de L\'Assomption, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (5,'Sue', '1994-09-22', '601 Sherwood Ave, QC', 'F', 5149926186,
1929.4237);
INSERT INTO Employees VALUE (6,'Kennedy', '1993-04-22', '1 East Bayberry Street, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (7,'Isabel', '1996-04-22', '241 Indian Spring St, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (8,'Nico', '1995-12-22', '25 Fairview Dr. Los Angeles, QC', 'M',
5149926186, 2349.4237);
INSERT INTO Employees VALUE (9,'Lottie', '1995-08-22', '737 Hill Field Street, QC', 'F',
5149926186, 2789.4237);
INSERT INTO Employees VALUE (10,'Roxanne', '1997-01-22', '23 boul de L\'Assomption, QC',
'M', 5149926186, 2991.4237);
INSERT INTO Employees VALUE (11,'Marilyn','1990-04-23','188 boul de L\'Assomption, QC', 'F',
5149926186, 3299.4237);
INSERT INTO Employees VALUE (12,'Judy', '1995-04-12', '12 S. Sulphur Springs St, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (13,'Camilla', '1996-06-22', '33 Addison Street, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (14,'Hiba', '1990-05-12', '282 Hawthorne Street, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (15,'Kathy ', '1992-09-22', '8 SE. Washington St, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (16,'Jamie', '1993-04-22', '9877 Washington Dr, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (17,'Michal ', '1996-02-12', '13 Vermont Dr.Sacramento, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (18,'Agnes ', '1995-12-22', '148 boul de Shadow, QC', 'M',
5149926186, 2999.4237);
```

```
INSERT INTO Employees VALUE (19,'Cindy', '1995-08-22', '112 boul de Shadow, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (20,'Robbie', '1997-01-22', '188 boul de Boston, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (21,'Phillip','1991-04-22','188 boul de L\'Assomption, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (22,'Tommy ', '1991-04-12', '18 boul de Assomon, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (23,'Iestyn', '1992-06-22', '7755 Shadow Brook Ave, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (24,'Phillip', '1995-05-12', '188 boul de Asso, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (25,'Krish', '1994-09-22', '181 boul de Assomption, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (26,'Harlow', '1993-04-22', '991 Tarkiln Hill Ave, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (27,'Everly', '1996-04-22', '182 boul de L\'Assomption, QC', 'M',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (28,'Georgie', '1995-12-22', '49 Ridgewood Ave, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (29,'Emmanuel', '1995-08-22', '9089 Constitution Court, QC', 'F',
5149926186, 2999.4237);
INSERT INTO Employees VALUE (30,'Max', '1997-01-22', '389 Gainsway Stree, QC', 'M',
5149926186, 2999.4237);

INSERT INTO Department VALUE (1, 'gaming');
INSERT INTO Department VALUE (2, 'web');
INSERT INTO Department VALUE (3, 'application');

INSERT INTO Location VALUE ('H building');
INSERT INTO Location VALUE ('EV building');
INSERT INTO Location VALUE ('S building');
INSERT INTO Location VALUE ('T building');

INSERT INTO Project VALUE (1, 'phython','preliminary');
INSERT INTO Project VALUE (2, 'app','intermediate');
INSERT INTO Project VALUE (3, 'website','advanced');
INSERT INTO Project VALUE (4, 'game','complete');

INSERT INTO Dependent VALUE (136, 1, 'Lily', '1968-03-23', 'F');
INSERT INTO Dependent VALUE (213, 2, 'Lily', '1976-03-23', 'F');
INSERT INTO Dependent VALUE (323, 3, 'tam', '1979-01-23', 'M');
INSERT INTO Dependent VALUE (412, 4, 'tom', '1956-04-23', 'F');
INSERT INTO Dependent VALUE (523, 5, 'tqm', '1967-05-23', 'F');
```

```
INSERT INTO Dependent VALUE (614, 6, 'sem', '1983-08-23', 'F');
INSERT INTO Dependent VALUE (712, 7, 'wem', '1999-01-23', 'M');
INSERT INTO Dependent VALUE (811, 8, 'lem', '1978-09-23', 'F');
INSERT INTO Dependent VALUE (912, 9, 'tem', '1993-01-23', 'F');
INSERT INTO Dependent VALUE (1011, 10, 'tem', '1993-07-23', 'F');
INSERT INTO Dependent VALUE (1136, 11, 'tem', '1968-03-23', 'F');
INSERT INTO Dependent VALUE (1213, 12, 'tem', '1976-03-23', 'F');
INSERT INTO Dependent VALUE (1323, 13, 'jem', '1979-01-23', 'M');
INSERT INTO Dependent VALUE (1412, 14, 'gem', '1956-04-23', 'F');
INSERT INTO Dependent VALUE (1523, 15, 'tem', '1967-05-23', 'F');
INSERT INTO Dependent VALUE (1614, 16, 'bem', '1983-08-23', 'F');
INSERT INTO Dependent VALUE (1712, 17, 'cem', '1999-01-23', 'M');
INSERT INTO Dependent VALUE (1811, 18, 'zem', '1978-09-23', 'F');
INSERT INTO Dependent VALUE (1912, 19, 'yem', '1993-01-23', 'F');
INSERT INTO Dependent VALUE (2012, 20, 'rem', '1993-01-23', 'F');

INSERT INTO related VALUE (136, 1);
INSERT INTO related VALUE (213, 2);
INSERT INTO related VALUE (323, 3);
INSERT INTO related VALUE (412, 4);
INSERT INTO related VALUE (523, 5);
INSERT INTO related VALUE (614, 6);
INSERT INTO related VALUE (712, 7);
INSERT INTO related VALUE (811, 8);
INSERT INTO related VALUE (912, 9);
INSERT INTO related VALUE (1011,10);
INSERT INTO related VALUE (1136, 11);
INSERT INTO related VALUE (1213, 12);
INSERT INTO related VALUE (1323, 13);
INSERT INTO related VALUE (1412, 14);
INSERT INTO related VALUE (1523, 15);
INSERT INTO related VALUE (1614, 16);
INSERT INTO related VALUE (1712, 17);
INSERT INTO related VALUE (1811, 18);
INSERT INTO related VALUE (1912, 19);
INSERT INTO related VALUE (2011,20);

INSERT INTO SuperviseOf VALUE (2,1);
INSERT INTO SuperviseOf VALUE (3,1);
INSERT INTO SuperviseOf VALUE (4,1);
INSERT INTO SuperviseOf VALUE (5,1);
INSERT INTO SuperviseOf VALUE (6,1);
INSERT INTO SuperviseOf VALUE (8,7);
INSERT INTO SuperviseOf VALUE (9,7);
```

```
INSERT INTO SuperviseOf VALUE (10,7);
INSERT INTO SuperviseOf VALUE (11,7);
INSERT INTO SuperviseOf VALUE (12,7);
INSERT INTO SuperviseOf VALUE (14,13);
INSERT INTO SuperviseOf VALUE (15,13);
INSERT INTO SuperviseOf VALUE (16,13);
INSERT INTO SuperviseOf VALUE (17,13);
INSERT INTO SuperviseOf VALUE (18,13);
INSERT INTO SuperviseOf VALUE (19,13);
INSERT INTO SuperviseOf VALUE (20,13);
INSERT INTO SuperviseOf VALUE (21,13);
INSERT INTO SuperviseOf VALUE (22,13);
INSERT INTO SuperviseOf VALUE (23,13);
INSERT INTO SuperviseOf VALUE (24,13);
INSERT INTO SuperviseOf VALUE (25,13);
INSERT INTO SuperviseOf VALUE (26,13);
INSERT INTO SuperviseOf VALUE (27,13);
INSERT INTO SuperviseOf VALUE (28,13);
INSERT INTO SuperviseOf VALUE (29,13);
INSERT INTO SuperviseOf VALUE (30,13);


INSERT INTO workOn VALUE (1,1,20);
INSERT INTO workOn VALUE (1,2,20);
INSERT INTO workOn VALUE (1,3,20);
INSERT INTO workOn VALUE (1,4,20);
INSERT INTO workOn VALUE (1,5,20);
INSERT INTO workOn VALUE (1,6,20);
INSERT INTO workOn VALUE (2,7,20);
INSERT INTO workOn VALUE (2,8,20);
INSERT INTO workOn VALUE (2,9,20);
INSERT INTO workOn VALUE (2,10,20);
INSERT INTO workOn VALUE (2,11,20);
INSERT INTO workOn VALUE (2,12,20);
INSERT INTO workOn VALUE (3,13,20);
INSERT INTO workOn VALUE (3,14,20);
INSERT INTO workOn VALUE (3,15,20);
INSERT INTO workOn VALUE (3,16,20);
INSERT INTO workOn VALUE (3,17,20);
INSERT INTO workOn VALUE (3,18,20);
INSERT INTO workOn VALUE (3,19,20);
INSERT INTO workOn VALUE (4,20,20);
INSERT INTO workOn VALUE (4,21,20);
INSERT INTO workOn VALUE (4,22,20);
```

```
INSERT INTO workOn VALUE (4,23,20);
INSERT INTO workOn VALUE (4,24,20);
INSERT INTO workOn VALUE (4,25,20);
INSERT INTO workOn VALUE (4,26,20);
INSERT INTO workOn VALUE (4,27,20);
INSERT INTO workOn VALUE (4,28,20);
INSERT INTO workOn VALUE (4,29,20);
INSERT INTO workOn VALUE (4,30,20);


INSERT INTO assigned VALUE (1, 'H building');
INSERT INTO assigned VALUE (2, 'EV building');
INSERT INTO assigned VALUE (3,'S building');
INSERT INTO assigned VALUE (4,'T building');

INSERT INTO situated VALUE ('H building', 1);
INSERT INTO situated VALUE ('EV building', 2);
INSERT INTO situated VALUE ('S building',3);
INSERT INTO situated VALUE ('T building',3);

INSERT INTO chargedBy VALUE (1,1);
INSERT INTO chargedBy VALUE (2,2);
INSERT INTO chargedBy VALUE (3,3);
INSERT INTO chargedBy VALUE (4,3);


INSERT INTO workIn VALUE (1, 1);
INSERT INTO workIn VALUE (2, 1);
INSERT INTO workIn VALUE (3, 1);
INSERT INTO workIn VALUE (4, 1);
INSERT INTO workIn VALUE (5, 1);
INSERT INTO workIn VALUE (6, 1);
INSERT INTO workIn VALUE (7, 2);
INSERT INTO workIn VALUE (8, 2);
INSERT INTO workIn VALUE (9, 2);
INSERT INTO workIn VALUE (10,2);
INSERT INTO workIn VALUE (11,2);
INSERT INTO workIn VALUE (12,2);
INSERT INTO workIn VALUE (13,3);
INSERT INTO workIn VALUE (14,3);
INSERT INTO workIn VALUE (15,3);
INSERT INTO workIn VALUE (16,3);
INSERT INTO workIn VALUE (17,3);
```

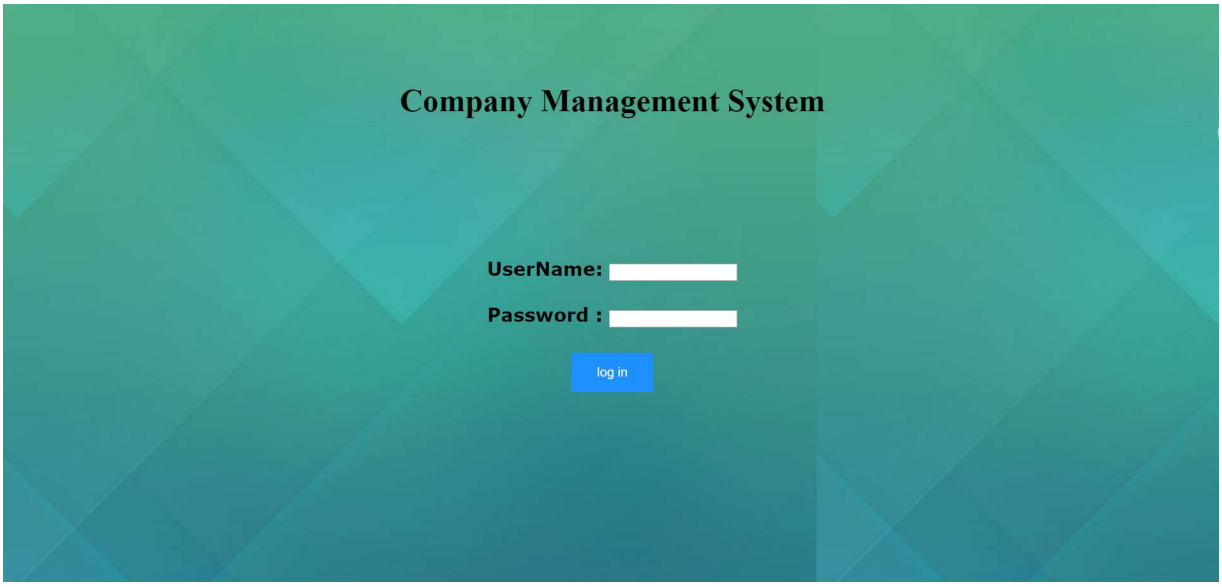
```
INSERT INTO workIn VALUE (18,3);
INSERT INTO workIn VALUE (19,3);
INSERT INTO workIn VALUE (20,3);
INSERT INTO workIn VALUE (21,3);
INSERT INTO workIn VALUE (22,3);
INSERT INTO workIn VALUE (23,3);
INSERT INTO workIn VALUE (24,3);
INSERT INTO workIn VALUE (25,3);
INSERT INTO workIn VALUE (26,3);
INSERT INTO workIn VALUE (27,3);
INSERT INTO workIn VALUE (28,3);
INSERT INTO workIn VALUE (29,3);
INSERT INTO workIn VALUE (30,3);


INSERT INTO manage VALUE (1,1,'2014-02-23');
INSERT INTO manage VALUE (2,7,'2014-02-23');
INSERT INTO manage VALUE (3,13,'2015-03-22');
```

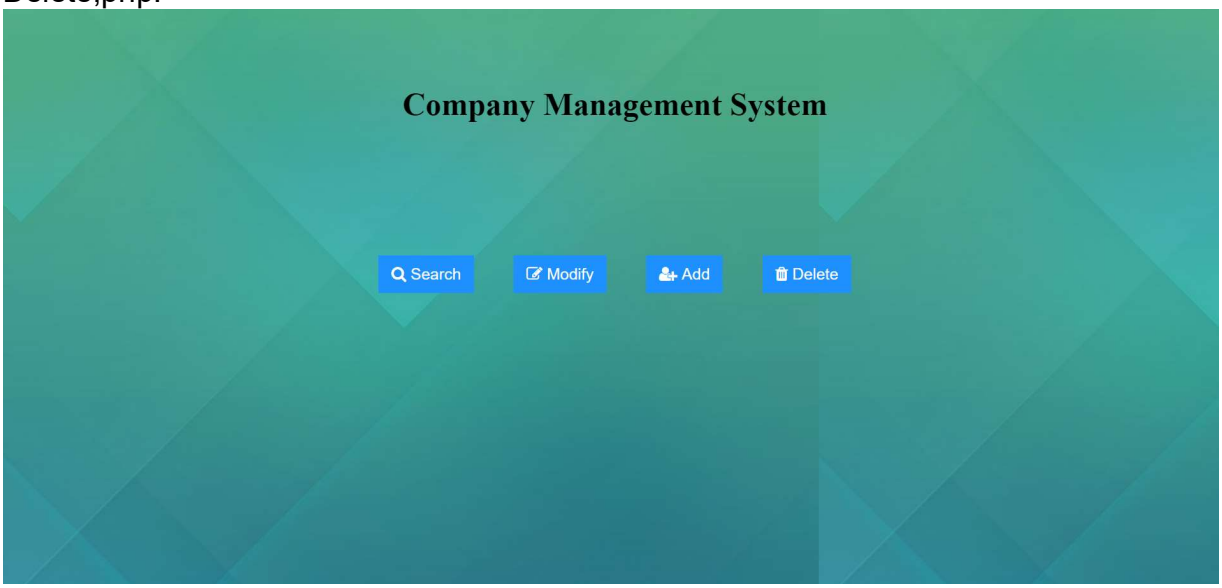
User Interface and PHP

There are 7 PHP files in this project which are query.php, logIn.php, main.php, check.php, update.php, insert.php, and delete.php.

The logIn.php is used for login the website and database, the username and password is the same as login in to the database. If login success, the webpage will jump to main.php.



The main.php is the home page of this project. The function of this page is used for user select the function which they want to use. There are four function buttons on this page which is Search, Modify, Add, and Delete. Each buttons will jump to corresponding page. The Search button correspond to check.php, the Modify button correspond to update.php, the Add button correspond to insert.php, and the Delete correspond to Delete,php.



The check.php is used for search the data of the database. The Home button is used for return to Main.php. User can use From to select which part of data they want to search,

and the Select1 and Select2 are used for selecting the data which user want to be show. (If use want to show all the information, just select From and select the option All in Select1.

The query.php is not offer to normal user. It is offer for Database administrator. It is design for database maintaining. The administrator can key in every query.

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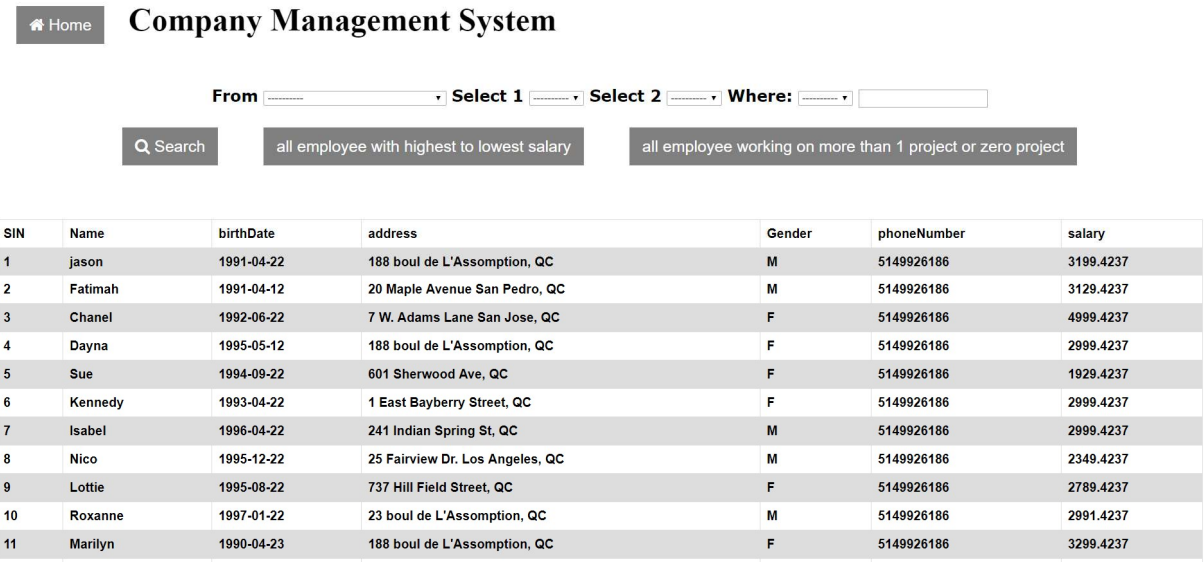
Search button used for submit the form, and the result will be return after click the Search button.



SIN	Name	birthDate	address	Gender	phoneNumber	salary
1	jason	1991-04-22	188 boul de L'Assomption, QC	M	5149926186	3199.4237
2	Fatimah	1991-04-12	20 Maple Avenue San Pedro, QC	M	5149926186	3129.4237
3	Chanel	1992-06-22	7 W. Adams Lane San Jose, QC	F	5149926186	4999.4237
4	Dayna	1995-05-12	188 boul de L'Assomption, QC	F	5149926186	2999.4237
5	Sue	1994-09-22	601 Sherwood Ave, QC	F	5149926186	1929.4237
6	Kennedy	1993-04-22	1 East Bayberry Street, QC	F	5149926186	2999.4237
7	Isabel	1996-04-22	241 Indian Spring St, QC	M	5149926186	2999.4237
8	Nico	1995-12-22	25 Fairview Dr. Los Angeles, QC	M	5149926186	2349.4237
9	Lottie	1995-08-22	737 Hill Field Street, QC	F	5149926186	2789.4237
10	Roxanne	1997-01-22	23 boul de L'Assomption, QC	M	5149926186	2991.4237
11	Marilyn	1990-04-23	188 boul de L'Assomption, QC	F	5149926186	3299.4237

The all employee with highest to lowest salary button is used for return the data of employee with highest to lowest salary.

Home **Company Management System**

From --------- Select 1 --------- Select 2 --------- Where: ---------

Search | all employee with highest to lowest salary | all employee working on more than 1 project or zero project

Name	Salary
Chanel	4999.4237
Marilyn	3299.4237
jason	3199.4237
Fatimah	3129.4237
Cindy	2999.4237
Robbie	2999.4237
Phillip	2999.4237
Tommy	2999.4237
lestyn	2999.4237
Phillip	2999.4237
Krish	2999.4237

The all employee working on more than 1 project or zero project button is used for return the data of employee working on more than 1 project or zero project.

From --------- Select 1 --------- Select 2 --------- Where: ---------

Search | all employee with highest to lowest salary | all employee working on more than 1 project or zero project

Name
Marilyn
Judy
Camilla
Hiba
Kathy
Jamie
Michal
Agnes
Cindy
Robbie
Phillip
Tommy
lestyn

The update.php is used for update or modify the data which exist in the database. The function of the Home button as same as check.php. The Update is used for select which part of data user want to modify. And user can key in the new data in New Data section. They also need give the condition of the old data in Where area.

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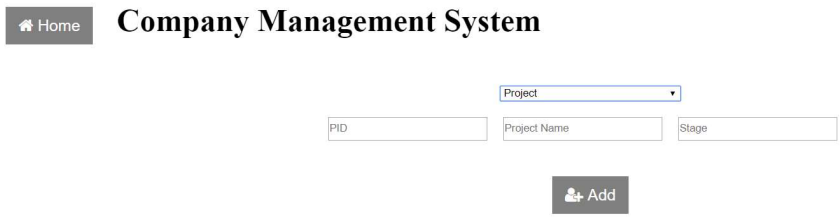
The insert.php is used for add data into the database. The function of the Home button as same as check.php. First of all, the user need select the table which they want to add data in. After that the text area will appear, user must fill out all of them, and click Add button. If the command is successful executed, the “insert success” will appear, otherwise, the “insert unsuccessful” will appear.



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The Delete.php is used for delete data of database. The function of the Home button as same as check.php. First of all, user need select Delete From which will determine which table user will modify. After that, user can key in the information of the data which user want to delete. If the command is successful executed, the “Delete success” will appear, otherwise, the “Delete unsuccessful” will appear.

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Contributions of Each Team Member

He Liu
PHP file, design main function.

Tiantian Ji
E/R Model, convert to relation schema, convert to 3NF, php function check, report

Han Gao:
E/R Model, convert to relation schema, html and css, php test, report.

Tianshu Ji
E/R, Relation, 3NF converting, php check and debug, original version code, program logical design.