CSC455 Assignment#2

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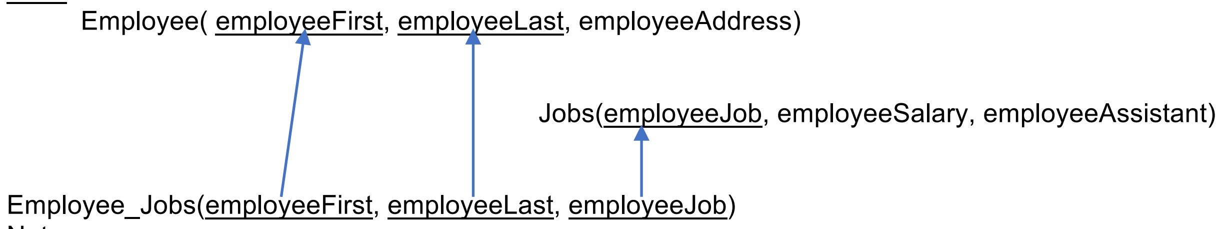
Part-1) Create Table for 3NF by SQL (No Partial Dependencies & No Transition Dependencies)

3NF:



Employee(employeeFirst, employeeLast, employeeAddress)

Jobs(employeeJob, employeeSalary, employeeAssistant)

Employee_Jobs(employeeFirst, employeeLast, employeeJob)

Note:
employeeFirst, employeeLast are Foreign Keys referencing to Table Employee
employeeJob is Foreign Key referencing to Table Jobs

```
/*DROP ALL the Tables */
DROP TABLE Employee_Jobs;
DROP TABLE Employee;
DROP TABLE Jobs;

/*Create Table for Employee*/
CREATE TABLE Employee
(
  employeeFirst varchar2(15) NOT NULL,
  employeeLast varchar2(15) NOT NULL,
  employeeAddress varchar2(50),

  CONSTRAINT Employee_PK
    PRIMARY KEY (employeeFirst,employeeLast)
);

/*Create Table for Jobs*/
CREATE TABLE Jobs
(
  employeeJob varchar2(15) NOT NULL,
  employeeSalary varchar2(5),
  employeeAssistant varchar2(3),

  CONSTRAINT Jobs_PK
    PRIMARY KEY (employeeJob)
);
```

```
/*Create Table for Emloyee & Jobs*/
CREATE TABLE Employee_Jobs
(
 employeeFirst varchar2(15) NOT NULL,
 employeeLast varchar2(15) NOT NULL,
 employeeJob varchar2(15) NOT NULL,

 CONSTRAINT Employee_Jobs_PK
  PRIMARY KEY (employeeFirst, employeeLast, employeeJob),

 CONSTRAINT Employee_Jobs_FK1
  FOREIGN KEY (employeeFirst, employeeLast)
   REFERENCES  Employee (employeeFirst,employeeLast),

 CONSTRAINT Employee_Jobs_FK3
  FOREIGN KEY (employeeJob)
   REFERENCES  Jobs (employeeJob)
);
```

Part-1) Load data provided in the text file data_hw2.txt by using Python Code:

```
#Open the provided txt file
fd=open("data_hw2.txt")
lines=fd.readlines()
stringLst=[]
#Reading and Cleaning the data line by line
for l in lines:
    a=l.strip().split(', ') # Get rid all the spaces
    stringLst.append(a)
fd.close()

#View the data read from the data_hw2.txt
stringLst
```

```
Out[2]:
[['John', 'Smith', '111 N. Wabash Avenue', 'plumber', '40K', 'NULL'],
 ['John', 'Smith', '111 N. Wabash Avenue', 'bouncer', '35K', 'NULL'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'waitress', '50K', 'NULL'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'accountant', '42K', 'Yes'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'bouncer', '35K', 'NULL'],
 ['Mike', 'Jackson', '1 Michigan Avenue', 'accountant', '42K', 'Yes'],
 ['Mike', 'Jackson', '1 Michigan Avenue', 'plumber', '40K', 'NULL'],
 ['Mary', 'Who', '20 S. Michigan Avenue', 'accountant', '42K', 'Yes'],
 ['Mary', 'Who', '20 S. Michigan Avenue', 'risk analyst', '80K', 'Yes']]
```

Part-1) Generate INSERT OR IGNORE Statement by using Python Function:

```
#Function to Generate the SQL Insert OR IGNORE Statement
def generateInsert(tableName,inputList):
    newList=[]
    #Check and turn all the numerical value to integer
    for item in inputList:
        if item.isdigit()== True:
            item=int(item)
            newList.append(item)
        else:
            newList.append(item)
    #Subset the input source file to generate Insert statement for Table '
Employee','Jobs','Employee_Jobs'
    if tableName=='Employee':
        return "INSERT OR IGNORE INTO {} VALUES ('{}','{}','{}');".format
(tableName, newList[0],newList[1],newList[2])
    elif tableName=='Jobs':
        #Convert the 'Null' value to compatible to SQL code by using '''NU
LL'''
        if str(newList[5])=="NULL":
            return "INSERT OR IGNORE INTO %s VALUES ('%s','%s',%s);"%(tabl
eName, newList[3],newList[4],'''NULL''')
        else:
            return "INSERT OR IGNORE INTO {} VALUES ('{}','{}','{}');".for
mat(tableName, newList[3],newList[4],newList[5])
    elif tableName=='Employee_Jobs':
        return "INSERT OR IGNORE INTO {} VALUES ('{}','{}','{}');".format
(tableName, newList[0],newList[1],newList[3])
```

```
#Display the INSERT OR IGNORE statements for Table "Employee"
for l in stringLst:
    l=generateInsert("Employee", l)
    print(l)
INSERT OR IGNORE INTO Employee VALUES ('John','Smith','111 N. Wabash Avenue
');
INSERT OR IGNORE INTO Employee VALUES ('John','Smith','111 N. Wabash Avenue
');
INSERT OR IGNORE INTO Employee VALUES ('Jane','Doe','243 S. Wabash Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Jane','Doe','243 S. Wabash Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Jane','Doe','243 S. Wabash Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Mike','Jackson','1 Michigan Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Mike','Jackson','1 Michigan Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Mary','Who','20 S. Michigan Avenue');
INSERT OR IGNORE INTO Employee VALUES ('Mary','Who','20 S. Michigan Avenue');
```

In [20]:

```
#Display the INSERT OR IGNORE statements for Table "Jobs"
for l in stringLst:
    l=generateInsert("Jobs", l)
    print(l)
INSERT OR IGNORE INTO Jobs VALUES ('plumber','40K',NULL);
INSERT OR IGNORE INTO Jobs VALUES ('bouncer','35K',NULL);
INSERT OR IGNORE INTO Jobs VALUES ('waitress','50K',NULL);
INSERT OR IGNORE INTO Jobs VALUES ('accountant','42K','Yes');
INSERT OR IGNORE INTO Jobs VALUES ('bouncer','35K',NULL);
INSERT OR IGNORE INTO Jobs VALUES ('accountant','42K','Yes');
INSERT OR IGNORE INTO Jobs VALUES ('plumber','40K',NULL);
INSERT OR IGNORE INTO Jobs VALUES ('accountant','42K','Yes');
INSERT OR IGNORE INTO Jobs VALUES ('risk analyst','80K','Yes');
```

In [21]:

```
#Display the INSERT OR IGNORE statements for Table "Employee_Jobs"
for l in stringLst:
    l=generateInsert("Employee_Jobs", l)
    print(l)
INSERT OR IGNORE INTO Employee_Jobs VALUES ('John','Smith','plumber');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('John','Smith','bouncer');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Jane','Doe','waitress');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Jane','Doe','accountant');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Jane','Doe','bouncer');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Mike','Jackson','accountant');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Mike','Jackson','plumber');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Mary','Who','accountant');
INSERT OR IGNORE INTO Employee_Jobs VALUES ('Mary','Who','risk analyst');
```

Part2) Write Python Script to load the data:

```
#Step 1: Load all the data from provided 'data_hw2.txt'
#Open the provided txt file
fd=open("data_hw2.txt")
lines=fd.readlines()
stringLst=[]
#Reading and Cleaning the data line by line
for l in lines:
    a=l.strip().split(', ') # Get rid all the spaces
    stringLst.append(a)
fd.close()

#View the data read from the data_hw2.txt
stringLst
```

```
Out[2]:
[['John', 'Smith', '111 N. Wabash Avenue', 'plumber', '40K', 'NULL'],
 ['John', 'Smith', '111 N. Wabash Avenue', 'bouncer', '35K', 'NULL'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'waitress', '50K', 'NULL'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'accountant', '42K', 'Yes'],
 ['Jane', 'Doe', '243 S. Wabash Avenue', 'bouncer', '35K', 'NULL'],
 ['Mike', 'Jackson', '1 Michigan Avenue', 'accountant', '42K', 'Yes'],
 ['Mike', 'Jackson', '1 Michigan Avenue', 'plumber', '40K', 'NULL'],
 ['Mary', 'Who', '20 S. Michigan Avenue', 'accountant', '42K', 'Yes'],
 ['Mary', 'Who', '20 S. Michigan Avenue', 'risk analyst', '80K', 'Yes']]
```

Part2) Write Python Script to CREATE Table and Populate the data into the Table:

```
#Step2: Create Table 'Employee' Script
Em = '''CREATE TABLE Employee
(
  employeeFirst varchar(15) NOT NULL,
  employeeLast varchar(15) NOT NULL,
  employeeAddress varchar2(50),

  CONSTRAINT Employee_PK
    PRIMARY KEY (employeeFirst,employeeLast)
);'''

#Step3: Drop the Table 'Employee'
c.execute("DROP TABLE Employee")
#Step4: Populate the Table 'Employee'
c.execute(Em)
Out[]:
<sqlite3.Cursor at 0x10eb0d5e0>

#Step5:Collecting all the INSERT Statement to a List which is called "filterL
ist"
filterList=[]
for l in stringLst:
    l=generateInsert("Employee", l)
    filterList.append(l)

#Own Reference: Filtering out all the DUPLICATED INSERT Statement
#insertList=[]
#for i in range(len(filterList)):
    #print(i)
 #   if filterList[i] in insertList:
  #       pass
   # else:
    #    insertList.append(filterList[i])

#Step6: populate the tables with the provided data
for l in filterList:
#Execuate the INSERT statement
    c.execute(l)
                                                                      In [23]:
```

```
#Step7: Double Check and Query the 'Employee' Table
c.execute("select * from Employee;").fetchall()
Out[23]:
[('John', 'Smith', '111 N. Wabash Avenue'),
 ('Jane', 'Doe', '243 S. Wabash Avenue'),
 ('Mike', 'Jackson', '1 Michigan Avenue'),
 ('Mary', 'Who', '20 S. Michigan Avenue')]
```

```
#Step8: Create Table 'Jobs' Script
Jo='''CREATE TABLE Jobs
(
  employeeJob varchar(15) NOT NULL,
  employeeSalary varchar(5),
  employeeAssistant varchar2(3),

  CONSTRAINT Jobs_PK
    PRIMARY KEY (employeeJob)
);'''

#Step9: DROP the 'Jobs' TABLE
c.execute("DROP TABLE Jobs")
#Setp10: Populate the Table 'Jobs'
c.execute(Jo)
Out[]:
<sqlite3.Cursor at 0x10eb0d5e0>
In []:
#Step11: Collecting all the INSERT Statement to a List which is called "filte
rList"
filterList=[]
for l in stringLst:
    l=generateInsert("Jobs", l)
    filterList.append(l)

#Filtering out all the DUPLICATED INSERT Statement
#insertList=[]
#for i in range(len(filterList)):
    #print(i)
 #   if filterList[i] in insertList:
  #       pass
   # else:
    #    insertList.append(filterList[i])

#Step12: populate the tables with the provided data
for l in filterList:
    #Execuate the INSERT statement
    c.execute(l)
```

```
In [29]:
#Step13: Double Check and Query the 'Jobs' Table
c.execute("select * from Jobs;").fetchall()
Out[29]:
[('plumber', '40K', None),
 ('bouncer', '35K', None),
 ('waitress', '50K', None),
 ('accountant', '42K', 'Yes'),
 ('risk analyst', '80K', 'Yes')]
```

```
In [30]:
#Step14: Double check the listings where employeeAssistant is NULL
c.execute("select * from Jobs where employeeAssistant is NULL").fetchall()
Out[30]:
[('plumber', '40K', None), ('bouncer', '35K', None), ('waitress', '50K', Non
e)]
```

```
#Step15: Create Table 'Employee_Jobs' Script
EmJo='''CREATE TABLE Employee_Jobs
(
  employeeFirst varchar(15) NOT NULL,
  employeeLast varchar(15) NOT NULL,
  employeeJob varchar(15) NOT NULL,

  CONSTRAINT Employee_Jobs_PK
    PRIMARY KEY (employeeFirst, employeeLast, employeeJob),

  CONSTRAINT Employee_Jobs_FK1
    FOREIGN KEY (employeeFirst, employeeLast)
      REFERENCES  Employee (employeeFirst,employeeLast),

  CONSTRAINT Employee_Jobs_FK3
    FOREIGN KEY (employeeJob)
      REFERENCES  Jobs (employeeJob)
);'''

#Step16: Drop the 'Employee_jobs' Table
c.execute("DROP TABLE Employee_Jobs")
#Step17: Populate the Table 'Employee_Hobs'
c.execute(EmJo)
```

```
Out[]:
<sqlite3.Cursor at 0x10eb0d5e0>
```

```
#Step17: Collecting all the INSERT Statement to a List which is called "filte
rList"
filterList=[]
for l in stringLst:
    l=generateInsert("Employee_Jobs", l)
    filterList.append(l)

#Filtering out all the DUPLICATED INSERT Statement
#insertList=[]
#for i in range(len(filterList)):
    #print(i)
 #   if filterList[i] in insertList:
  #      pass
   # else:
    #    insertList.append(filterList[i])
```

```
#Step18: populate the tables with the provided data
for l in filterList:
    #Execuate the INSERT statement
    c.execute(l)
```

```
In [37]:
#Step19: Double Check and Query the 'Employee_Jobs' Table
c.execute("SELECT * from Employee_Jobs;").fetchall()
Out[37]:
[('John', 'Smith', 'plumber'),
 ('John', 'Smith', 'bouncer'),
 ('Jane', 'Doe', 'waitress'),
 ('Jane', 'Doe', 'accountant'),
 ('Jane', 'Doe', 'bouncer'),
 ('Mike', 'Jackson', 'accountant'),
 ('Mike', 'Jackson', 'plumber'),
 ('Mary', 'Who', 'accountant'),
 ('Mary', 'Who', 'risk analyst')]
```

Part 3) Write the queries to answer questions:

```
/***********Provided Script***********/
CREATE TABLE Animal
(
AID NUMBER(3, 0),
AName VARCHAR2(30) NOT NULL,
ACategory VARCHAR2(18),
TimeToFeed NUMBER(4,2),
CONSTRAINT Animal_PK
PRIMARY KEY(AID)
);

INSERT INTO Animal VALUES(1, 'Galapagos Penguin', 'exotic', 0.5);
INSERT INTO Animal VALUES(2, 'Emperor Penguin', 'rare', 0.75);
INSERT INTO Animal VALUES(3, 'Sri Lankan sloth bear', 'exotic', 2.5);
INSERT INTO Animal VALUES(4, 'Grizzly bear', 'common', 3.0);
INSERT INTO Animal VALUES(5, 'Giant Panda bear', 'exotic', 1.5);
INSERT INTO Animal VALUES(6, 'Florida black bear', 'rare', 1.75);
INSERT INTO Animal VALUES(7, 'Siberian tiger', 'rare', 3.5);
INSERT INTO Animal VALUES(8, 'Bengal tiger', 'common', 2.75);
INSERT INTO Animal VALUES(9, 'South China tiger', 'exotic', 2.25);
INSERT INTO Animal VALUES(10, 'Alpaca', 'common', 0.25);
INSERT INTO Animal VALUES(11, 'Llama', NULL, 3.5);

select * from Animal;
```

Answers:

```
/*Part3-1*/
SELECT ANAME from Animal
where TIMETOFEED<1.5;

/*Part3-2*/
SELECT * from Animal
where ACATEGORY='rare'
order by TIMETOFEED;

/*Part3-3*/
SELECT ANAME, ACATEGORY from Animal
where ANAME LIKE '%bear%';

/*Part3-4*/
SELECT * from Animal
where ACATEGORY is NULL;
```

```
/*Part3-5*/
SELECT ACATEGORY from Animal
where TIMETOFEED BETWEEN 1 AND 2.5;

/*Part3-6*/
SELECT ANAME from Animal
where ANAME LIKE '%tiger%' AND ACATEGORY != 'common';

/*Part3-7*/
SELECT ANAME FROM Animal
where ANAME NOT LIKE '%tiger%';

/*Part3-8*/
/*Minimum*/
SELECT MIN(TIMETOFEED) from Animal;
/*Maximum*/
SELECT MAX(TIMETOFEED) from Animal;

/*Part3-9*/
/*Round Average Result upto 4 Decimal place*/
SELECT ROUND(AVG(TIMETOFEED),4) from Animal;
```