Assignment 7

Jiarong Ye

October 15, 2018

Load the data

```
In [40]: import pandas as pd
         from datetime import datetime
         import pymysql
```

```
In [41]: department = pd.read_csv('departments.csv', sep=',')
         department.columns = ['department_name']
         shift = pd.read_csv('shifts.csv', sep=',')
         shift.columns = ['from_time', 'length']
         employees = pd.read_csv('employees.csv', sep=',')
         employees.emptype = employees.emptype.fillna('')
         schedule = pd.read_csv('schedule.csv', sep=',')
         schedule.columns = ['date', 'empid', 'dept', 'start_time', 'shift_length']
```

Manipulate the data

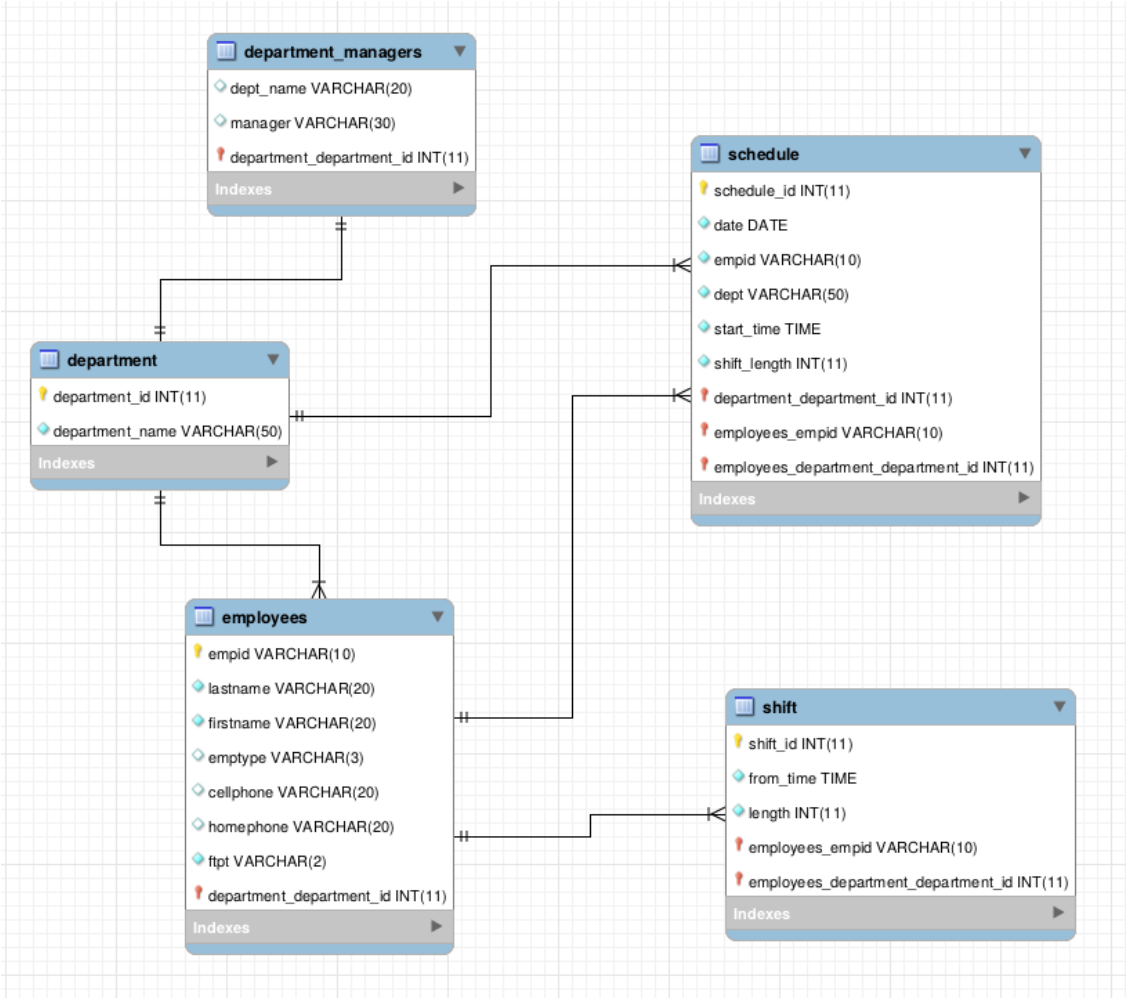
```
In [48]: class DataSqlLoader:
             def __init__(self, database):
                 # connect to mysql local server
                 self.db = pymysql.Connect(
                     host='us-cdbr-iron-east-01.cleardb.net',
                     port=3306,
                     user='b033ff6b193dc0',
                     passwd='02f96442',
                     db=database)
                 self.c = self.db.cursor()

             # convert the shift and schedule time to `time` format compatible in MySQL
             def convert_time_format(self, time):
                 return datetime.strptime('{}'.format(time), '%I%p').strftime('%H:%M:%S')

             # convert schedule date to `date` format compatible in MySQL
             def convert_date_format(self, time):
                 return datetime.strptime('{}'.format(time), '%m/%d/%Y').strftime('%Y-%m-%d')

             def creat_tables(self):
                 self.c.execute('''
```

```
        create table if not exists department
        (
          department_id  int auto_increment
            primary key,
          department_name varchar(50) not null
        );
        ''')
self.c.execute('''
    create table if not exists shift
    (
      shift_id int auto_increment
        primary key,
      from_time   time not null,
      length   int  not null
    );
    ''')
self.c.execute('''
    create table if not exists schedule
    (
      schedule_id  int auto_increment
        primary key,
      date         date        not null,
      empid        varchar(10) not null,
      dept         varchar(50) not null,
      start_time   time        not null,
      shift_length int         not null
    );
    ''')
self.c.execute('''
    create table if not exists employees
    (
      empid     varchar(10) not null primary key,
      lastname  varchar(20) not null,
      firstname varchar(20) not null,
      emptype   varchar(3)  null,
      cellphone varchar(20) null,
      homephone varchar(20) null,
      ftpt      varchar(2)  not null,
      constraint employee_empid_uindex
      unique (empid)
    );
''')

self.c.execute('''
    create table if not exists department_managers
    (
        dept_name varchar(20),
        manager varchar(30)
```

```
                );
            ''')

        def insert_into_tables(self, table, table_name):
            for i in range(len(table)):
                attributes = '{}'.format(tuple(table.columns.tolist())).replace("'","")
                query = "insert into {} {} values {};".format(
                    table_name, attributes, tuple(table.iloc[i,:].values))
                query = query.replace("(none)","")
                query = query.replace(r",)",")")
                # print(query)
                try:
                    self.c.execute(query)
                    self.db.commit()
                except Exception as e:
                    print(e)

        def close(self):
            self.db.close()
```

```
In [110]: dsl = DataSqlLoader('heroku_f2b490785080ebd')
          dsl.creat_tables()

          schedule['start_time'] = list(map(lambda x: dsl.convert_time_format(x),
                                            schedule['start_time']))
          shift['from_time'] = list(map(lambda x: dsl.convert_time_format(x),
                                        shift['from_time']))
          schedule['date'] = list(map(lambda x: dsl.convert_date_format(x),
                                      schedule['date']))

          dsl.insert_into_tables(department, 'department')
          dsl.insert_into_tables(shift, 'shift')
          dsl.insert_into_tables(schedule,'schedule')
          dsl.insert_into_tables(employees, 'employees')
```

ER Diagram



SQL Query

php demo site: click here
(source code attached in the submission)

1. Show tables

```
In [62]: query = 'show tables;'
         tables = pd.read_sql(query, dsl.db)
         print(tables.to_latex())
```

	Tables
0	department
1	department_managers
2	employees
3	schedule
4	shift

2. Describe tables

```
In [55]: for table in tables.values:
             query = 'describe {};'.format(table[0])
             df = pd.read_sql(query, dsl.db)
             print(df)
             print('\n')
```

```
             Field         Type Null  Key Default           Extra
0    department_id      int(11)   NO  PRI    None  auto_increment
1  department_name  varchar(50)   NO         None


       Field         Type Null Key Default Extra
0  dept_name  varchar(20)  YES        None
1    manager  varchar(30)  YES        None


       Field         Type Null  Key Default Extra
0      empid  varchar(10)   NO  PRI    None
1   lastname  varchar(20)   NO         None
2  firstname  varchar(20)   NO         None
3    emptype   varchar(3)  YES         None
4  cellphone  varchar(20)  YES         None
5  homephone  varchar(20)  YES         None
6       ftpt   varchar(2)   NO         None


          Field         Type Null  Key Default           Extra
0   schedule_id      int(11)   NO  PRI    None  auto_increment
1          date         date   NO         None
2         empid  varchar(10)   NO         None
3          dept  varchar(50)   NO         None
4    start_time         time   NO         None
5  shift_length      int(11)   NO         None


       Field     Type Null  Key Default           Extra
0   shift_id  int(11)   NO  PRI    None  auto_increment
1  from_time     time   NO         None
```

```
2     length  int(11)   NO         None
```

3. Find out the need of employees of certain type in certain department during certain period *(eg: EMERGENCY, RN, from 2018-10-03 to 2018-10-11)*

```
In [91]: query = '''
             SELECT s.dept AS Department,
                 s.empid AS EmployeeID,
                 s.date AS Date,
                 date_format(s.start_time, '%I%p') AS ShiftStartTime,
                 e.emptype AS EmployeeType
                         FROM schedule as s, department as d, employees as e
                         WHERE s.dept=d.department_name
                               AND s.empid = e.empid
                               AND s.date >= '2018-10-03'
                               AND s.date <= '2019-10-11'
                               AND s.dept = 'EMERGENCY'
                               AND e.emptype = 'RN'
                         ORDER BY d.department_id, s.date;
             '''
         tables = pd.read_sql(query, dsl.db)
         print(tables.to_latex())
```

	Department	EmployeeID	Date	ShiftStartTime	EmployeeType
0	EMERGENCY	940824	2018-10-03	11PM	RN
1	EMERGENCY	854480	2018-10-04	03PM	RN
2	EMERGENCY	860127	2018-10-05	07AM	RN
3	EMERGENCY	945540	2018-10-07	07AM	RN
4	EMERGENCY	921331	2018-10-07	07PM	RN

4. Find out whether certain employee has been scheduled on a certain date *(eg: Remona Locke on 2018-10-03)*

```
In [92]: query = '''
             SELECT s.schedule_id AS ScheduleID,
                                     s.empid AS EmployeeID,
                                     concat(e.firstname, ' ', e.lastname) AS Fullname,
                                     s.dept AS Department,
                                     s.date AS Date,
                                     date_format(s.start_time, '%I%p') AS ShiftStartTime,
                                     s.shift_length AS ShiftLength
                                FROM employees as e, schedule as s
                                WHERE s.empid = e.empid
                                  AND e.firstname = 'Remona'
                                  AND e.lastname = 'Locke'
```

```
                            AND s.date = '2018-10-03'
                '''
        tables = pd.read_sql(query, dsl.db)
        print(tables.to_latex())
```

	ScheduleID	EmployeeID	Fullname	Department	Date	ShiftStartTime	ShiftLength

5. If not, then this employee is open for schedule

```
In [95]: query = '''
             INSERT INTO schedule (date, empid, dept, start_time, shift_length) VALUES
                                 ('2018-10-03',
                                  (SELECT empid FROM employees WHERE firstname='Remona' AND lastname=
                                  'EMERGENCY',
                                  '12:00:00',
                                   8)
         '''
         dsl.c.execute(query)

Out[95]: 1
```

6. Check the schedule

```
In [96]: query = '''
             SELECT s.schedule_id AS ScheduleID,
                                    s.empid AS EmployeeID,
                                    concat(e.firstname, ' ', e.lastname) AS Fullname,
                                    s.dept AS Department,
                                    s.date AS Date,
                                    date_format(s.start_time, '%I%p') AS ShiftStartTime,
                                    s.shift_length AS ShiftLength
                               FROM employees as e, schedule as s
                               WHERE s.empid = e.empid
                                 AND e.firstname = 'Remona'
                                 AND e.lastname = 'Locke'
                                 AND s.date = '2018-10-03'
                 '''
         tables = pd.read_sql(query, dsl.db)
         print(tables.to_latex())
```

	ScheduleID	EmployeeID	Fullname	Department	Date	ShiftStartTime	ShiftLength
0	4371	854480	Remona Locke	EMERGENCY	2018-10-03	12PM	8

7. Unschedule

```
In [107]: query = '''
              SELECT s.schedule_id
                   FROM employees as e, schedule as s
```

```
                WHERE s.empid = e.empid
                AND e.firstname = 'Remona'
                AND e.lastname = 'Locke'
                AND s.date = '2018-10-03'
               '''
        dsl.c.execute(query)
        schedule_id  = dsl.c.fetchall()[0][0]
        query = '''
            DELETE FROM schedule WHERE schedule_id={}
            '''.format(schedule_id)
        dsl.c.execute(query)
```

```
Out[107]: 1
```

8. Check the employee has been unscheduled

```
In [111]: query = '''
              SELECT s.schedule_id AS ScheduleID,
                                  s.empid AS EmployeeID,
                                  concat(e.firstname, ' ', e.lastname) AS Fullname,
                                  s.dept AS Department,
                                  s.date AS Date,
                                  date_format(s.start_time, '%I%p') AS ShiftStartTime,
                                  s.shift_length AS ShiftLength
                             FROM employees as e, schedule as s
                             WHERE s.empid = e.empid
                               AND e.firstname = 'Remona'
                               AND e.lastname = 'Locke'
                               AND s.date = '2018-10-03'
                    '''
          tables = pd.read_sql(query, dsl.db)
          print(tables.to_latex())
```

	ScheduleID	EmployeeID	Fullname	Department	Date	ShiftStartTime	ShiftLength