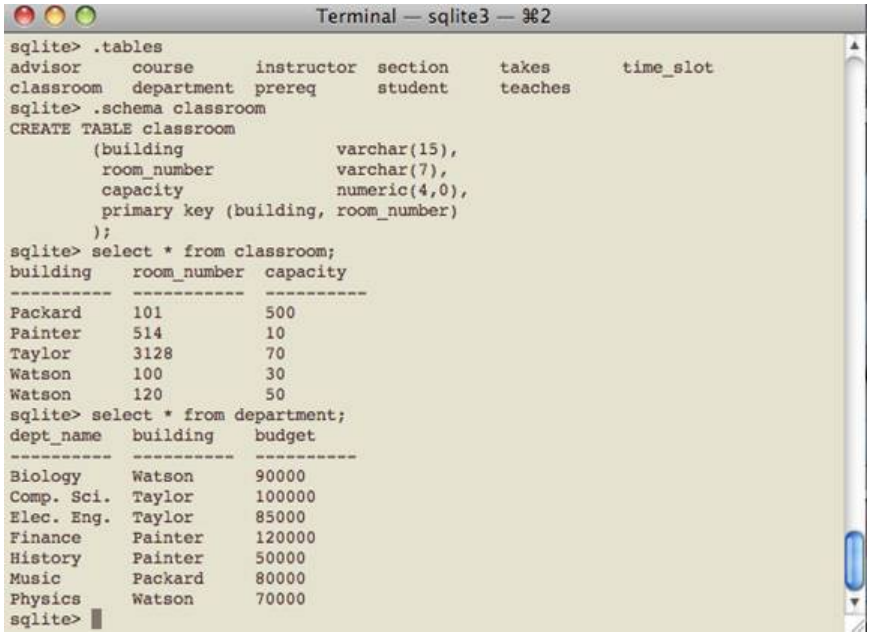
# Homework 2

## SQL

Total points: 40

1. (10 pts.) Database creation and querying exercise.
The schema, DDL, and instance for the University database from the textbook are provided in Appendix A. The electronic form of the DDL and insert statements can be downloaded from the textbook website. Follow "Lab material" from the textbook home page to "Sample tables" and download "DDL with drop tables" and "SQL code for creating small relations". Analyze these files. Next, create the university database in SQLite (if you are comfortable with another DBMS, you may use it as long as it follows standard SQL). You do not have to retype any SQL statements, just use the files. Submit sample screenshots of the database schema and the database instance. Here is one such example.
**Note**: All screenshots should be included in one document. Zip folder submissions will not be graded.




2. (10 pts.) Run the following queries on the university database you just created. Submit actual queries and their results (copy and paste text would be best). Hint – All these queries are single relation queries.

a. List all students.
b. List only course_ids of courses that are offered in Spring 2009.
c. List only student names and how many more credits they have to take to complete their degree. Assume that the degree completion requirement is 124 credits for all students.
d. Find the total number of instructors and their average salary.
e. List only course_ids of all courses that are either offered in Spring or Summer.
f. List all rooms that have a capacity of at least 50 and utmost 100.
g. List all instructors who have a name that begins with K.
h. List only student_ids of students who have received a grade of A, A-, or B+ in any course.

3. (8 pts.) Exercise 3.11 – you may want to ignore 'Spring' in part b.

Run these queries on the university database you have created. Submit actual queries and their results (copy and paste text would be best).
From book:
Write the following queries in SQL, using the university schema.

a. Find the names of all students who have taken at least one Comp. Sci. course; make sure there are no duplicate names in the result.

b. Find the IDs and names of all students who have not taken any course offering before Spring 2009.

c. For each department, find the maximum salary of instructors in that department. You may assume that every department has at least one instructor.

d. Find the lowest, across all departments, of the per-department maximum salary computed by the preceding query.

4. (4 pts.) Exercise 3.15 – parts b and c only.
Consider the bank database of Figure 3.19, where the primary keys are underlined. Construct the following SQL queries for this relational database:

*branch (branch_name, branch_city, assets)*
*customer (customer_name, customer_street, customer_city)*
*loan (loan_number, branch_name, amount)*
*borrower (customer_name, loan_amount)*
*account (account_number, branch_name, balance)*
*depositor (customer_name, account_number)*

a. Find all customers who have an account at all the branches located in "Brooklyn".

b. Find out the total sum of all loan amounts in the bank.

c. Find the names of all branches that have assets greater than those of at least one branch located in "Brooklyn".

5. (4 pts.) Exercise 3.21 – parts a and c only.

*member (memb_no, name, age)*
*book (isbn, title, authors, publisher)*
*borrowed (memb_no, isbn, date)*

Consider the library database of Figure 3.21. Write the following queries in SQL:

a. Print the names of members who have borrowed any book published by "McGraw-Hill".

b. Print the names of members who have borrowed all books published by "McGraw-Hill".

c. For each publisher, print the names of members who have borrowed more than five books of that publisher.

d. Print the average number of books borrowed per member. Take into account that if a member does not borrow any books, then that member does not appear in the borrowed relation at all.

6. (2 pts.) Exercise 4.14
Show how to define a view tot_credits (year, num_credits), giving the total number of credits taken by students in each year.

7. (2 pts.) Exercise 5.12

Consider the following relations for a company database:

- emp(ename, dname, salary)
- mgr(ename, mname) and the Java code in Figure 5.26, which uses the JDBC API. Assume that the userid, password, machine name, etc. are all okay. Describe in concise English what the Java program does. (That is, produce an English sentence like “It finds the manager of the toy department,” not a line-by-line description of what each Java statement does.)