# COSC 3318: Database Management Systems

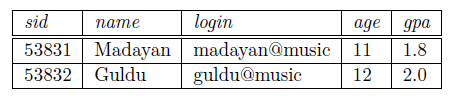
# (Assignment 2)

**Assigned on Feb 14, 2017. Hardcopy due at the start of class on Feb 23, 2017.**

1. (10 points) For the following representation:

**Students(sid: string, name: string, login: string, age: integer, gpa: real)**

Consider the SQL query whose answer is shown in the following Figure:



a). Modify this query so that only the login column is included in the answer.

b). If the clause WHERE S.gpa >= 2 is added to the original query, what is the set of

tuples in the answer?

2. (35 points) Download and install a DBMS system (e.g., Microsoft SQL server express, SQLite studio, Postgresql, Mysql).

a) Add a new database and create the following relations called “cities”:

|  |  |
| --- | --- |
| Column | **Data Type** |
| **Name** | String |
| **Population** | Integer |
| **Country** | String |
| **Elevation** | Integer |

b) Add some sample data into the table so each of the following query returns some results.

c) Construct the SQL query for the following questions and **attach the screenshots** of the running result of your query:

* What is the average elevation of cities in “Canada” with names starting with “T”?
* Find the city with the highest population for each country that has at most 3 cities.

3. Write the following queries based on the given database schema. You should use at least one **subquery** in each of your answers (20 points). (Although it is not required, fell free to set up a database with the following relations to test/verify your constructed queries)

Product (make, model, type)

PC (model, speed, ram, hd, price)

Laptop (model, speed, ram, hd, screen, price)

Printer (model, color, type, price)

a) Find the laptops whose speed is slower than that of any PC.

b) Find the model number of the item (PC, laptop, or printer) with the highest price.

Hint: you can use aggregate operators to express the highest or lowest values of certain column.

4. Your personal database on the database server has a table called “monkeys,” which has the following fields: (10 points)

|  |  |
| --- | --- |
| Column | **Comments** |
| **Name** | Monkey’s name |
| **Size** | monkey's size in cm |
| **Bananas** | number of bananas in monkey's possession (an integer) |
| **Mood** | “H” if the monkey is happy, “S” if it is sad, NULL if the mood is unknown |

1. Add five monkeys to your database. Each monkey needs to have a name and size. Each monkey should have one banana. Some monkeys should be happy and some should be sad.
2. Let's give one additional banana to each sad monkey and record the resulting number of bananas. (The new number of bananas for each sad monkey should be set to the number of bananas the monkey currently has plus 1. Assume that someone else might have modified the database, so the monkeys may now have a different number of bananas from what you originally recorded.)

Hint: using **DML** to answer both parts of the question.

5. a) Suggest suitable keys and foreign keys for the relations of the database from question 3 (10 points).

b) Declare a schema of relation **PC** including declarations of keys using DDL.(5 points).

c) Declare a schema of relation **Printer** and add an attribute-based constraint to the declaration which disallows price higher than 450. (10 points).

Product (make, )