CSCI-UA.60-1 – SAMPLE MIDTERM QUESTIONS
For class discussion and study
This is not an actual test!

1. Sample general Python question - *Comparing python lists and dictionaries*
What are some of the differences between lists and dictionaries in python? Describe three differences between lists and dictionaries in python and illustrate each of the three differences with python code for both a list and a dictionary.

Difference: description	Python code: using a list	Python code: using a dictionary

2. Sample general questions

a) Identify, describe and write sample code to illustrate the use of the `csv` and `urllib` modules when you work with data. (For `urllib`, you may limit your comments to `urllib.request`).

b) List five "dot commands" in SQLite. For each command, provide a definition and an example of how you would use it.

c) List three aggregate functions in SQLite. For each function, provide a definition and an example of how you would use it.

d) What is a list comprehension in Python? Describe in one or two sentences and write code to illustrate your answer.

e) What is First Normal Form? Define 1NF and cite an example by writing a table using fictitious data samples to illustrate your answer.

f) What is Second Normal Form? Define 2NF and use fictitious data samples to illustrate your answer.

g) Define and describe: *database normalization*

3. Sample SQLite question:
Given the following data set and script, write SQLite queries to answer the following questions.
*Note: Please be sure to write each **QUERY** … not the ANSWER.*

This table contains data on all of the artists who have at least one work in the Museum of Modern Art collection. There are over 15,000 records in this table. (SOURCE: https://github.com/MuseumofModernArt/collection)

Here is a data sample:

```
2,Doroteo Arnaiz,Spanish,Male,1936,0
3,Bill Arnold,American,Male,1941,0
10,Irene Aronson,American,Female,1918,0
11,Jean (Hans) Arp,French,Male,1886,1966
13,J. Arrelano Fischer,Mexican,Male,1911,1995
15,Folke Arstrom,Swedish,Male,1907,1997
16,Cristobal Arteche,Spanish,Male,1900,1964
21,Ruth Asawa,American,Female,1926,2013
22,Isidora Aschheim,Israeli,Female,0,0
23,Charles Robert Ashbee,British,Male,1863,1942
24,Donald Ashcraft,American,Male,1927,0
25,E. M. Ashe,American,Male,1867,1941
27,Erik Gunnar Asplund,Swedish,Male,1885,1940
30,Sergio Asti,Italian,Male,1926,0
34,Alvar Aalto,Finnish,Male,1898,1976
35,Aino Aalto,Finnish,Female,1894,1949
38,Magdalena Abakanowicz,Polish,Female,1930,2017
39,James Abbe,American,Male,1883,1973
42,Nobuya Abe,Japanese,Male,1913,1971
43,Abe Shiro (pen Name: Suichiku),Japanese,Male,1900,0
```

… and here is an .SQL script for this table:

```
DROP TABLE IF EXISTS artists;
CREATE TABLE 'artists' (
      'ConstituentID'   TEXT,
      'DisplayName'     TEXT,
      'Nationality'     TEXT,
      'Gender'          TEXT,
      'BeginDate'       INTEGER,
      'EndDate'         INTEGER,
      PRIMARY KEY('ConstituentID')
);
```

Here is an explanation of the fields:

1. ConstituentID – a unique number for each artist
2. DisplayName – the artist's name as it would appear in a catalogue or label (typically in the format *Last Name , First Name*).
3. Nationality – the artist's country of origin
4. Gender – artist self-identified gender
5. BeginDate – the year that the artist was born; a zero indicates that the year is not known.
6. EndDate – the year that the artist died; a zero indicates that the artist is still alive.

Write the following queries based on the artists in the Museum of Modern Art collection table on the previous page:

(a) How many artists have works in the collection?

(b) How many women artists from Poland are featured in the collection?

(c) List the names of the five countries with the most artists.

(d) What is the breakdown of men vs. women American artists?

(e) What is the average age of all of the living Mexican artists who have work in this collection?

(f) You are planning an exhibition on early modern American and Canadian art. List the names, birth year and death year of all of the American and Canadian artists who were born in the 19th century (before 1900).

(g) You are planning an exhibition on emerging contemporary Iranian art. List the names all of the living artists from Iran who are 40 years old or younger today in order by ConstituentID.

(h) Some artists use a pseudonym (also called a "pen name"). List all of the Japanese and Korean artists who use a pen name. *(Note: there is a sample pen name record in the data sample above.)* Display the artists' names and country of origin in this format:

```
Abe Shiro (pen Name: Suichiku) – (Japanese)
…
```

(i) Provide a list of all of the artists whose data reflect a missing birth year so that you can request further research. Display each artist's name and whether the artist is a man or a woman in order by their ID (Constituent ID).

(j) Write a query of your choice and describe what the query will tell you about this dataset.

Sample Solutions to the SQLite problem:

```
QUERIES:
(a)
SELECT COUNT(*) FROM artists;

(b)
SELECT COUNT(*)
FROM artists
WHERE gender="Female"
     AND nationality="Polish";

C.
SELECT nationality, COUNT(nationality) AS numArtists
FROM artists
GROUP BY nationality
ORDER BY numArtists DESC
LIMIT 5;

(d)
SELECT gender,COUNT(gender) AS numPeople
FROM artists
WHERE nationality="American"
GROUP BY gender
ORDER BY gender;

(e)
SELECT avg(2017-BeginDate)
FROM artists
WHERE Nationality = "Mexican"
     AND BeginDate > 0
     AND EndDate = 0;

(f)
SELECT Nationality, DisplayName||" ("||BeginDate||" - "||EndDate||")" AS
artists
FROM artists
WHERE (Nationality = "American"
    OR   Nationality = "Canadian")
      AND BeginDate < 1900
      AND BeginDate > 0
ORDER BY ConstituentID;

(g)
SELECT ConstituentID,DisplayName,Nationality
FROM artists
WHERE Nationality = "Iranian"
     AND BeginDate >= 1977
ORDER BY ConstituentID;


(h)
SELECT Nationality, DisplayName – use concatenation
FROM artists
```

```
WHERE DisplayName LIKE "%Pen%"
      AND (Nationality = "Japanese"
           OR Nationality = "Korean")
ORDER BY DisplayName;
```

```
(i)
SELECT ConstituentID,DisplayName, Gender
FROM artists
WHERE BeginDate = 0
ORDER BY ConstituentID;
```