# CS315A: Principles of Database Systems

Assignment

Due Date: 26 March, 2021

Study the following database schema:

```
A (A1 integer, A2 string, primary-key(A1))
B (B1 integer, B2 integer (foreign-key = A1), B3 string, primary-key(B1))
```

Use the data given as part of this assignment to construct four database implementations using this schema:

1. SQlite3
2. MariaDB (without index)
3. MariaDB (with index)
4. MongoDB

Use the 9 databases according to the following scheme.

Take the *last* 3 digits of your roll number. Let it be $a, b, c$ where $c$ is the least signficant digit or the last digit.

Create the following set of 9 integers:

$(a \times a)/5$; $(a \times b)/5$; $\ldots$ $(c \times c)/5$;

Use these numbers to pick up databases according to `B-100-3-?.csv`, `B-100-5-?.csv`, `B-100-10-?.csv`, `B-1000-5-?.csv`, `B-1000-10-?.csv`, `B-1000-50-?.csv`, `B-10000-5-?.csv`, `B-10000-50-?.csv`, `B-10000-500-?.csv` where ? are the corresponding numbers, and the appropriate `A-x.csv` files.

Pick up in order the files as shown in the example below.

For example, if roll number is `*123`, the student should use the following data files:

(The 9 numbers are $(1 \times 1)/5 = 1$, $(1 \times 2)/5 = 2$, ..., $(3 \times 3)/5 = 4$.)

```
(A-100.csv,B-100-3-1.csv),
(A-100.csv,B-100-5-2.csv),
(A-100.csv,B-100-10-3.csv),
(A-1000.csv,B-1000-5-2.csv),
(A-1000.csv,B-1000-10-4.csv),
(A-1000.csv,B-1000-50-1.csv),
(A-10000.csv,B-10000-5-3.csv),
(A-10000.csv,B-10000-50-1.csv),
(A-10000.csv,B-10000-500-4.csv).
```

Test the following queries:

(a) Find all $A$ with $A1 \leq 50$.

(b) Find all $B$ in sorted order of $B3$.

(c) Find average number of values per $A1$ by using only $B$ table.

(d) Find all $A2$ that corresponds to $B$ by using $B2$ (output the fields of $B$ and $A2$).

Write the equivalent queries in SQL and MongoDB query languages.

Mention the times taken for each of the queries and each of the database implementations (4 * 9).

Draw graphs per query and per size of the database.

What do you conclude?