CS315 Assignment : Report

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180629

1.) (i)The Mongodb queries are as follows:

```
a) db.A.find({ A1: {$lte : 50}})
b)db.B.aggregate([{$sort : {B3:1}}])
c)db.B.aggregate([{$group:{_id:"$B2", count: {$sum: 1}}}])
d)db.B.aggregate(
        [
             { $lookup:
                     { from: "A", localField: "B2", foreignField: "A1", as: "_A" }
            } ,
            { $project:
                     { B1:1, B2:1,B3:1,"_A.A2":1 }
            }
        ] ,
        {"allowDiskUse":true}
)
```

(ii)The SQL queries are as follows:

```
a)
        SELECT *
        FROM A
        WHERE A1 <= 50;
b)
        SELECT *
        FROM B
        ORDER BY B3;
c)
        SELECT count(B1), B2
        FROM B
        GROUP BY B2;
d)
        SELECT B1, B2, B3, A2
        FROM A INNER JOIN B ON A1 = B2;
```

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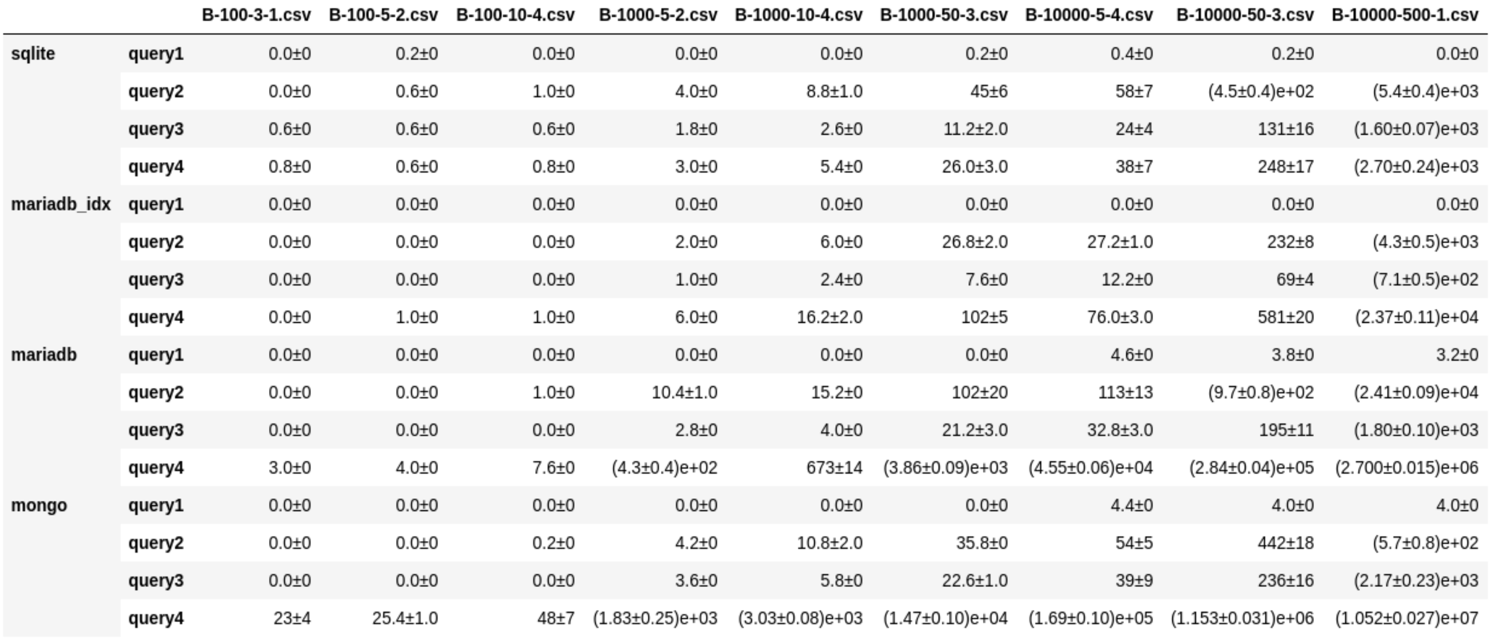
2.) The table for average time is as follows:

Note: each entry of table denotes a ± b.
where, a is the average time taken (in milliseconds)
b is the standard deviation (in milliseconds)
I’ve computed each query 7 times for each set of databases and computed average and standard deviation with discarding mininum and maximum time.

TABLE:



		B-100-3-1.csv	B-100-5-2.csv	B-100-10-4.csv	B-1000-5-2.csv	B-1000-10-4.csv	B-1000-50-3.csv	B-10000-5-4.csv	B-10000-50-3.csv	B-10000-500-1.csv
sqlite	**query1**	0.0±0	0.2±0	0.0±0	0.0±0	0.0±0	0.2±0	0.4±0	0.2±0	0.0±0
	query2	0.0±0	0.6±0	1.0±0	4.0±0	8.8±1.0	45±6	58±7	(4.5±0.4)e+02	(5.4±0.4)e+03
	query3	0.6±0	0.6±0	0.6±0	1.8±0	2.6±0	11.2±2.0	24±4	131±16	(1.60±0.07)e+03
	query4	0.8±0	0.6±0	0.8±0	3.0±0	5.4±0	26.0±3.0	38±7	248±17	(2.70±0.24)e+03
mariadb_idx	**query1**	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0
	query2	0.0±0	0.0±0	0.0±0	2.0±0	6.0±0	26.8±2.0	27.2±1.0	232±8	(4.3±0.5)e+03
	query3	0.0±0	0.0±0	0.0±0	1.0±0	2.4±0	7.6±0	12.2±0	69±4	(7.1±0.5)e+02
	query4	0.0±0	1.0±0	1.0±0	6.0±0	16.2±2.0	102±5	76.0±3.0	581±20	(2.37±0.11)e+04
mariadb	**query1**	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	4.6±0	3.8±0	3.2±0
	query2	0.0±0	0.0±0	1.0±0	10.4±1.0	15.2±0	102±20	113±13	(9.7±0.8)e+02	(2.41±0.09)e+04
	query3	0.0±0	0.0±0	0.0±0	2.8±0	4.0±0	21.2±3.0	32.8±3.0	195±11	(1.80±0.10)e+03
	query4	3.0±0	4.0±0	7.6±0	(4.3±0.4)e+02	673±14	(3.86±0.09)e+03	(4.55±0.06)e+04	(2.84±0.04)e+05	(2.700±0.015)e+06
mongo	**query1**	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	0.0±0	4.4±0	4.0±0	4.0±0
	query2	0.0±0	0.0±0	0.2±0	4.2±0	10.8±2.0	35.8±0	54±5	442±18	(5.7±0.8)e+02
	query3	0.0±0	0.0±0	0.0±0	3.6±0	5.8±0	22.6±1.0	39±9	236±16	(2.17±0.23)e+03
	query4	23±4	25.4±1.0	48±7	(1.83±0.25)e+03	(3.03±0.08)e+03	(1.47±0.10)e+04	(1.69±0.10)e+05	(1.153±0.031)e+06	(1.052±0.027)e+07

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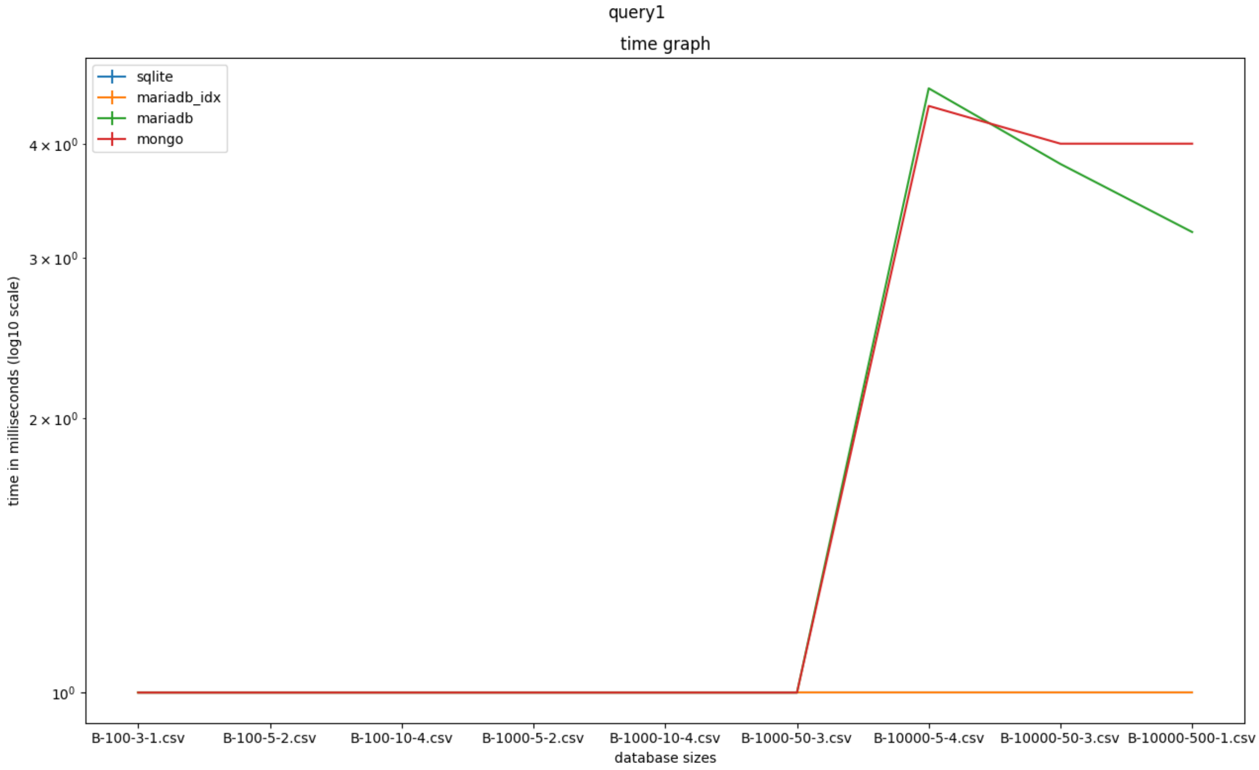
3.)
All graphs are on the logarithmic scale, and standard deviations are shown using vertical lines at appropriate places.

i)Graph for query1 is as follows:



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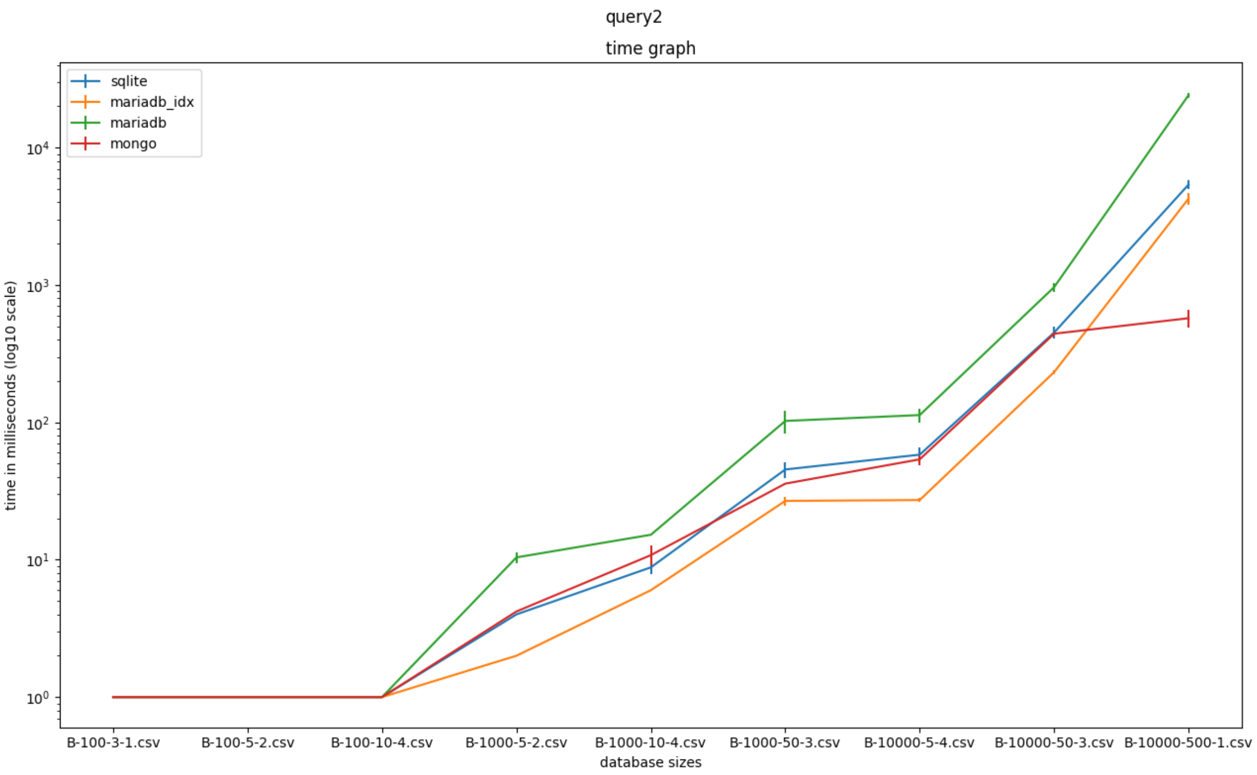
(ii) Graph for query2 is as follows:



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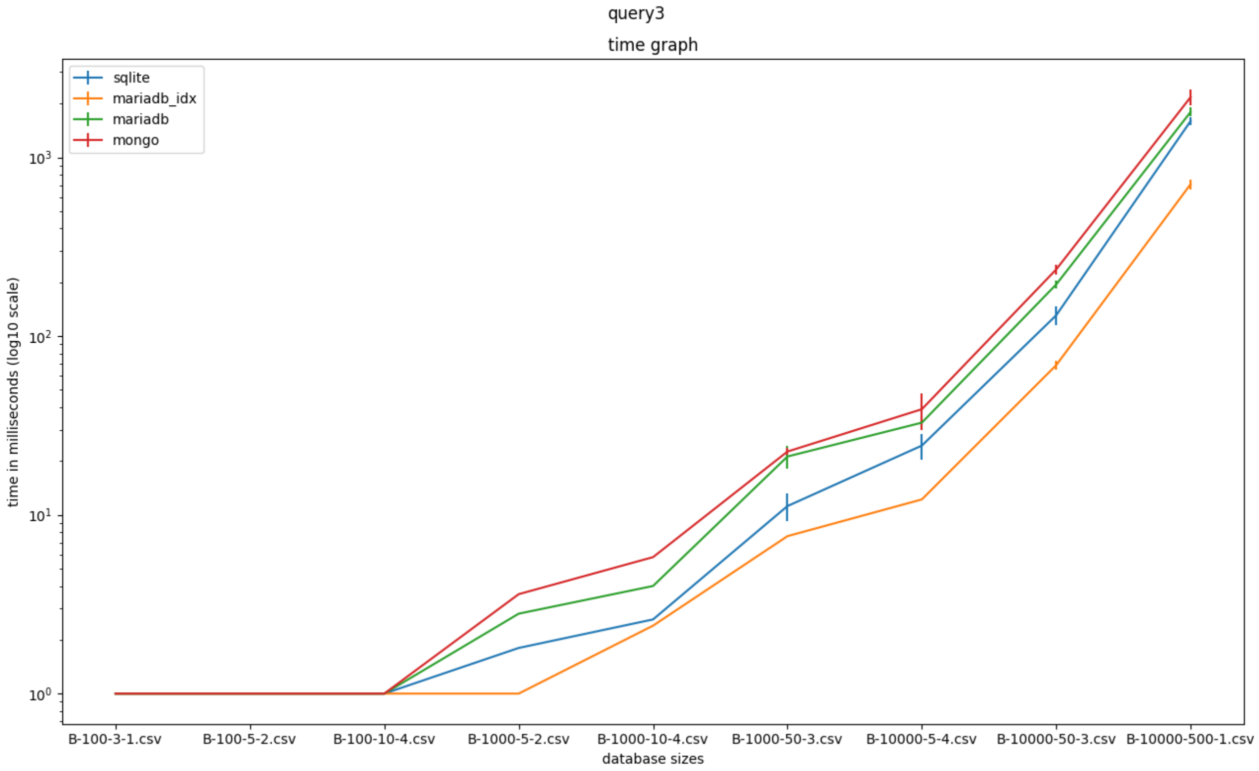
(iii) Graph for query3 is as follows:



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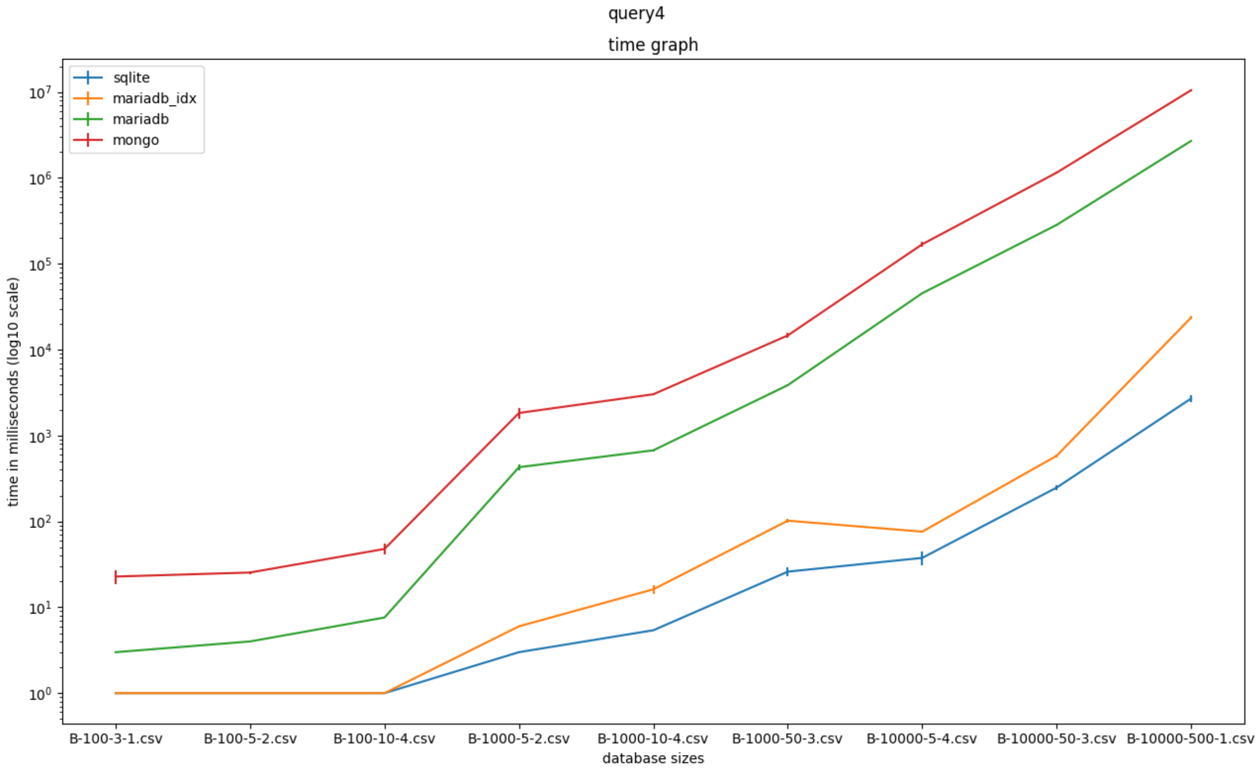
(iv) Graph for query4 is as follows:



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4). Operating System: Ubuntu 20.04.2 LTS
OS type: 64 bit
Graphics: llvmpipe (LLVM 11.0.0, 256 bits)
Processor: Intel® Core™ i5-8265U CPU @ 1.60GHz × 8
Disk Capacity: 274.9 GB
Memory(RAM) : 7.8 GiB

Conclusion:

Overview:

Scalabilty:

Databases Engines:

System issuses:

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5.) My roll number is 180629

Thus, a = 6, b = 2 and c = 9
The set of 9 integers are : [1,2,4,2,4,3,4,3,1]

The Databases sets I’ve used are:

1. A-100.csv, B-100-3-1.csv
2. A-100.csv, B-100-5-2.csv
3. A-100.csv, B-100-10-4.csv
4. A-1000.csv, B-1000-5-2.csv
5. A-1000.csv, B-1000-10-4.csv
6. A-1000.csv, B-1000-50-3.csv
7. A-10000.csv, B-10000-5-4.csv
8. A-10000.csv, B-10000-50-3.csv
9. A-10000.csv, B-10000-500-1.csv

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How to run the scripts?

To run all the scripts make sure you’ve all sets of data files in the directory named **dbs/**(without forward slash).

To run the scripts following things/packages are required(must be installed):

1.**matplotlib** (pip3 python package)
To install if required: `pip3 install matplotlib`
2.**numpy**(pip3 python package)
To install if required: `pip3 install numpy`
3.**pandas**(pip3 python package)
To install if required: `pip3 install pandas`
4.**dataframe_image**(pip3 python package)
To install if required: `pip3 install dataframe_image`
5.**uncertainties**(pip3 python package)
To install if required: `pip3 uncertainties`

To run the all queries for all databases for all engines:

I) Visit to script directory
II) Add the following command

```
$sudo bash run.sh
```

- enter your root password to execute
- wait to finish the program, it usually takes very long time around (22-24 hr) depending the enviornment and machine

To run only for **sqlite:**

You can enter following command:

```
$sudo bash run.sh sqlite
```

This will run on the 9 data files sets corresponding to my roll number. To run on specific files you may run following command:

```
$sudo bash sqlite/sqlite.sh file_name_for_table_A  file_name_for_table_B
```

To run only for **mariadb with indexing:**

You can enter following command:

```
$sudo bash run.sh mariadb_idx
```

This will run on the 9 data files sets corresponding to my roll number. To run on specific files you may run following command:

```
$sudo bash mariadb_idx/mariadb_idx.sh file_name_for_table_A  file_name_for_table_B
```

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To run only for **maridb without indexing:**

You can enter following command:

```
$sudo bash run.sh mariadb
```

This will run on the 9 data files sets corresponding to my roll number. To run on specific files you may run following command:

```
$sudo bash mariadb/mariadb.sh file_name_for_table_A  file_name_for_table_B
```

To run only for **mongodb:**

You can enter following command:

```
$sudo bash run.sh mongodb
```

This will run on the 9 data files sets corresponding to my roll number. To run on specific files you may run following command:

```
$sudo bash mongo/mongo.sh file_name_for_table_A  file_name_for_table_B
```

The time consumptions for each query will appear in form of text file in **${engine}/${engine}_time.txt**

Eg . For **sqlite** it'll appear in **sqlite/** directory in file **sqlite_time.txt**

For Graph and table creation (all graphs and tables will appear in **graph/** directory):
Enter the following command in same directory

Note: Make sure you've all packages installed as mentioned before

```
$python3 draw.py
```

It'll draw graphs and table corresponding to all engines

For Specific engines you may also use:

```
$python3 draw.py [enigne names]
```

for eg: `$python3 draw.py sqlite mariadb_idx`

It'll only draw graphs and tables for sqlite and mariadb with indexing