

Lab Report 6

Databases - CSC 3320 121

Hudson Arney

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What have you learned from the lab?

- Setting up and configuring different storage engines in MySQL
- The impact of different storage engines on SQL query performance

What caused issues?

- It was difficult to keep track of all the steps and documentation.
 - I had to restart the lab more than once
 - I feel like I did too much.
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Execution Times:

	InnoDB	MyISAM	MEMORY
Q1 - join	0.01215425	0.0004735	0.648445
Q2 - restrict	0.000267	0.00040325	0.000403
Q3 - range query	0.010975	0.0034245	0.25417925
Q4 - insert	0.017352	0.0131295	0.01350575
Q5 - update	0.03215225	0.02911075	0.02338625

INNODB

Q1

```
mysql> show profiles;
+-----+-----+-----+
| Query_ID | Duration | Query |
+-----+-----+-----+
| 1 | 31.40185300 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 2 | 0.01099450 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 3 | 31.32576525 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 4 | 1.61280500 | alter table gene_info add constraint primary key (geneid)
| 5 | 69.42838375 | alter table gene2pubmed add constraint primary key (pmid, geneid)
| 6 | 16.46635675 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 7 | 0.00397575 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 8 | 168.37764500 | alter table gene2pubmed drop primary key
| 9 | 80.25162775 | alter table gene2pubmed add constraint primary key (geneid, pmid)
| 10 | 0.00035375 | set profiling=1
| 11 | 0.01215425 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
+-----+-----+-----+
11 rows in set, 1 warning (0.00 sec)
```

```
mysql> explain select *
-> from gene_info gi, gene2pubmed gp
-> where gi.geneid=gp.geneid
-> and gi.geneid=4126706;
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gi	NULL	const	PRIMARY	PRIMARY	4	const	1	100.00	NULL
1	SIMPLE	gp	NULL	ref	PRIMARY	PRIMARY	4	const	6	100.00	NULL

2 rows in set, 1 warning (0.00 sec)

Q2

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.00055950	select * from gene_info gi where gi.locustag='p49879_1p15'
2	0.00040000	explain select * from gene_info gi where gi.locustag='p49879_1p15'
3	0.00118650	create index gene_info_locustag on gene_info(locustag)
4	0.00026700	select * from gene_info gi where gi.locustag='p49879_1p15'

4 rows in set, 1 warning (0.00 sec)

```
mysql> explain select *  
-> from gene_info gi  
-> where gi.locustag='p49879_1p15';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gi	NULL	ref	gene_info_locustag	gene_info_locustag	195	const	1	100.00	NULL

1 row in set, 1 warning (0.00 sec)

Q3

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.01097500	select * from gene_info where geneid between '5961931' and '5999886'

1 row in set, 1 warning (0.00 sec)

```
mysql> explain select *  
-> from gene_info  
-> where geneid between '5961931' and '5999886';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gene_info	NULL	range	PRIMARY	PRIMARY	4	NULL	526	100.00	Using where

1 row in set, 1 warning (0.00 sec)

Q4

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.01097500	select * from gene_info where geneid between '5961931' and '5999886'
2	0.00064975	explain select * from gene_info where geneid between '5961931' and '5999886'
3	0.01735200	insert into gene2pubmed values (9606, 5555, 6666)

3 rows in set, 1 warning (0.00 sec)

```
mysql> explain insert into gene2pubmed values (9606, 5555, 6666);
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	INSERT	gene2pubmed	NULL	ALL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

1 row in set, 1 warning (0.00 sec)

Q5

```
mysql> show profiles;
+-----+-----+-----+
| Query_ID | Duration      | Query                                     |
+-----+-----+-----+
|         1 | 0.01097500    | select *                                |
from gene_info                           |
where geneid between '5961931' and '5999886' |
|         2 | 0.00064975    | explain select *                        |
from gene_info                           |
where geneid between '5961931' and '5999886' |
|         3 | 0.01735200    | insert into gene2pubmed values (9606, 5555, 6666) |
|         4 | 0.00028225    | explain insert into gene2pubmed values (9606, 5555, 6666) |
|         5 | 0.03215225    | update gene_info set locustag='No Locus Tag' where locustag='-'; |
+-----+-----+-----+
5 rows in set, 1 warning (0.00 sec)
```

mysql> explain update gene_info set locustag='No Locus Tag' where locustag='-';

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	E
xtra											
1	UPDATE	gene_info	NULL	range	gene_info_locustag	gene_info_locustag	195	const	1	100.00	U

sing where; Using temporary |

```
+-----+-----+-----+
1 row in set, 1 warning (0.00 sec)
```

MyISAM

Q1

```
mysql> show profiles;
+-----+-----+-----+
| Query_ID | Duration | Query |
+-----+-----+-----+
| 5 | 0.03215225 | update gene_info set locustag='No Locus Tag' where locustag='-'  
| 6 | 0.00037550 | explain update gene_info set locustag='No Locus Tag' where locustag='-'  
| 7 | 1.69397400 | Load Data local Infile  
'C:/Users/conardk/Downloads/gene_info50000.csv' into table  
genomics.gene_info fields terminated by ',' lines terminated by '\n' ignore 1  
lines |  
| 8 | 274.97327325 | Load Data local Infile  
'C:/Users/conardk/Downloads/gene2pubmed' into table  
genomics.gene2pubmed fields terminated by '\t' lines terminated by '\n' IGNORE 1  
LINES |  
| 9 | 117.50690725 | select *  
from gene_info gi, gene2pubmed gp  
where gi.geneid=gp.geneid  
and gi.geneid=4126706  
| 10 | 0.00048675 | explain select *  
from gene_info gi, gene2pubmed gp  
where gi.geneid=gp.geneid  
and gi.geneid=4126706  
| 11 | 116.11201900 | select *  
from gene_info gi, gene2pubmed gp  
where gi.geneid=gp.geneid  
and gi.geneid=4126706  
| 12 | 1.85284550 | alter table gene_info add constraint primary key (geneid)  
| 13 | 359.63430550 | alter table gene2pubmed add constraint primary key (pmid, geneid)  
| 14 | 113.14935075 | select *  
from gene_info gi, gene2pubmed gp
```

```

13 | 359.63430550 | alter table gene2pubmed add constraint primary key (pmid, geneid)
|
14 | 113.14935075 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706
15 | 0.00048050 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706
|
16 | 249.40972675 | alter table gene2pubmed drop primary key
|
17 | 318.71352350 | alter table gene2pubmed add constraint primary key (geneid, pmid)
|
18 | 0.00023325 | set profiling=1
|
19 | 0.00047350 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706

```

```
15 rows in set, 1 warning (0.00 sec)
```

```
mysql> explain select *
-> from gene_info gi, gene2pubmed gp
-> where gi.geneid=gp.geneid
-> and gi.geneid=4126706;
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gi	NULL	const	PRIMARY	PRIMARY	4	const	1	100.00	NULL
1	SIMPLE	gp	NULL	ref	PRIMARY	PRIMARY	4	const	5	100.00	NULL

```
2 rows in set, 1 warning (0.00 sec)
```

Q2

```
mysql> show profiles;
+-----+
| Query_ID | Duration      | Query |
+-----+
| 1 | 0.72282025 | select *
from gene_info gi
where gi.locustag='p49879_1p15' |
| 2 | 0.00039225 | explain select *
from gene_info gi
where gi.locustag='p49879_1p15' |
| 3 | 2.24761050 | create index gene_info_locustag on gene_info( locustag ) |
| 4 | 0.00040325 | select *
from gene_info gi
where gi.locustag='p49879_1p15' |
+-----+
4 rows in set, 1 warning (0.00 sec)

mysql> explain select *
-> from gene_info gi
-> where gi.locustag='p49879_1p15';
+-----+
+ | id | select_type | table | partitions | type | possible_keys | key | key_len | ref | rows | filtered | Extra |
+-----+
+ | 1 | SIMPLE | gi | NULL | ref | gene_info_locustag | gene_info_locustag | 195 | const | 1 | 100.00 | NULL |
+-----+
1 row in set, 1 warning (0.00 sec)
```

Q3

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.00007200	select * from gene_info where geneid between '5961931' and '5999886'
2	0.00018075	explain select * from gene_info where geneid between '5961931' and '5999886'
3	0.00030000	SELECT DATABASE()
4	0.00342450	select * from gene_info where geneid between '5961931' and '5999886'

4 rows in set, 1 warning (0.00 sec)

```
mysql> explain select *  
-> from gene_info  
-> where geneid between '5961931' and '5999886';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gene_info	NULL	range	PRIMARY	PRIMARY	4	NULL	695	100.00	Using index condition

1 row in set, 1 warning (0.00 sec)

Q4

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.01312950	insert into gene2pubmed values (9606, 5555, 6666)

1 row in set, 1 warning (0.00 sec)

```
mysql> explain insert into gene2pubmed values (9606, 5555, 6666);
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	INSERT	gene2pubmed	NULL	ALL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

1 row in set, 1 warning (0.00 sec)

Q5

```
mysql> show profiles;
+-----+-----+-----+
| Query_ID | Duration | Query |
+-----+-----+-----+
| 1 | 0.02911075 | update gene_info set locustag='No Locus Tag' where locustag='- ' |
+-----+-----+-----+
1 row in set, 1 warning (0.00 sec)

mysql> explain update gene_info set locustag='No Locus Tag' where locustag='- ' ;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| id | select_type | table | partitions | type | possible_keys | key | key_len | ref | rows | filtered | Extra |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | UPDATE | gene_info | NULL | range | gene_info_locustag | gene_info_locustag | 195 | const | 1 | 100.00 | Using where; Using temporary |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 row in set, 1 warning (0.00 sec)
```

MEMORY

Q1

```
mysql> show profiles;
+-----+-----+-----+
| Query_ID | Duration | Query |
+-----+-----+-----+
| 1 | 1.40296975 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 2 | 0.00053525 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 3 | 1.12223050 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 4 | 2.52786200 | alter table gene_info add constraint primary key (geneid) |
| 5 | 15.56353000 | alter table gene2pubmed add constraint primary key (pmid, geneid) |
| 6 | 0.65457050 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 7 | 0.00041625 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
| 8 | 2.64356750 | alter table gene2pubmed drop primary key |
| 9 | 14.25205850 | alter table gene2pubmed add constraint primary key (geneid, pmid) |
| 10 | 0.00018100 | set profiling=1 |
| 11 | 0.64784450 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706 |
+-----+-----+-----+
11 rows in set, 1 warning (0.00 sec)
```

```
mysql> explain select *
-> from gene_info gi, gene2pubmed gp
-> where gi.geneid=gp.geneid
-> and gi.geneid=4126706;
```

	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	1	SIMPLE	gi	NULL	const	PRIMARY	PRIMARY	4	const	1	100.00	NULL
1	1	SIMPLE	gp	NULL	ALL	PRIMARY	NULL	NULL	NULL	12917351	10.00	Using where

```
2 rows in set, 1 warning (0.00 sec)
```

Q2

```

10 | 0.00018100 | set profiling=1
11 | 0.64784450 | select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706
12 | 0.00060225 | explain select *
from gene_info gi, gene2pubmed gp
where gi.geneid=gp.geneid
and gi.geneid=4126706
13 | 0.42370300 | select *
from gene_info gi
where gi.locustag='p49879_1p15'
14 | 0.00031175 | explain select *
from gene_info gi
where gi.locustag='p49879_1p15'
15 | 1.95850675 | create index gene_info_locustag on gene_info( locustag )
16 | 0.00040300 | select *
from gene_info gi
where gi.locustag='p49879_1p15'
-----
15 rows in set, 1 warning (0.00 sec)

mysql> explain select *
-> from gene_info gi
-> where gi.locustag='p49879_1p15';
-----
| id | select_type | table | partitions | type | possible_keys | key | key_len | ref | rows | filtered | Extra
-----
| 1 | SIMPLE | gi | NULL | ref | gene_info_locustag | gene_info_locustag | 195 | const | 2 | 100.00 | NULL
-----
1 row in set, 1 warning (0.00 sec)

```


Q3

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.25417925	select * from gene_info where geneid between '5961931' and '5999886'

1 row in set, 1 warning (0.00 sec)

```
mysql> explain select *  
-> from gene_info  
-> where geneid between '5961931' and '5999886';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	SIMPLE	gene_info	NULL	ALL	PRIMARY	NULL	NULL	NULL	50000	11.11	Using where

1 row in set, 1 warning (0.00 sec)

Q4

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.01350575	insert into gene2pubmed values (9606, 5555, 6666)

1 row in set, 1 warning (0.00 sec)

```
mysql> explain insert into gene2pubmed values (9606, 5555, 6666);
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	INSERT	gene2pubmed	NULL	ALL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

1 row in set, 1 warning (0.00 sec)

Q5

```
mysql> show profiles;
```

Query_ID	Duration	Query
1	0.02338625	update gene_info set locustag='No Locus Tag' where locustag='-'

1 row in set, 1 warning (0.00 sec)

```
mysql> explain update gene_info set locustag='No Locus Tag' where locustag='-';
```

id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
1	UPDATE	gene_info	NULL	range	gene_info_locustag	gene_info_locustag	195	const	2	100.00	Using where; Using temporary

1 row in set, 1 warning (0.00 sec)

Notes:

File Path for Gene Info:

C:/Users/arneyh/OneDrive - Milwaukee School of Engineering/Current Classes/CSC 3320 -
Databases/Labs/Lab 6/files/gene_info50000.csv

File path for Gene2PubMed:

'C:/Users/arneyh/OneDrive - Milwaukee School of Engineering/Current Classes/CSC 3320
- Databases/Labs/Lab 6/files/gene2pubmed'

Reset profiles:

SET @@profiling = 0;

SET @@profiling_history_size = 0;

SET @@profiling_history_size = 10;

SET @@profiling = 1;

SET GLOBAL local_infile=1;