Lab 3 Part 4 Report

Part 4-1

Before

```
+----+-------------+--------+------------+------+---------------+------+---------+------+---------+----------+-------------+
| id | select_type | table  | partitions | type | possible_keys | key  | key_len | ref  | rows    | filtered | Extra       |
+----+-------------+--------+------------+------+---------------+------+---------+------+---------+----------+-------------+
|  1 | SIMPLE      | Review | NULL       | ALL  | NULL          | NULL | NULL    | NULL | 1120345 |   100.00 | Using where |
+----+-------------+--------+------------+------+---------------+------+---------+------+---------+----------+-------------+
```

Run	Times (s)	Average	Standard Deviation
1	0.76	0.77	0.006519202
2	0.773		
3	0.776		
4	0.774		
5	0.767		

After

```
+----+-------------+--------+------------+-------+---------------+----------------+---------+------+---------+----------+------------------------+
| id | select_type | table  | partitions | type  | possible_keys | key            | key_len | ref  | rows    | filtered | Extra                  |
+----+-------------+--------+------------+-------+---------------+----------------+---------+------+---------+----------+------------------------+
|  1 | SIMPLE      | Review | NULL       | index | NULL          | review_date_idx | 6      | NULL | 1120345 |   100.00 | Using where; Using index |
+----+-------------+--------+------------+-------+---------------+----------------+---------+------+---------+----------+------------------------+
```

Run	Times (s)	Average	Standard Deviation
1	0.242	0.2466	0.005683309
2	0.251		
3	0.25		
4	0.251		
5	0.239		

Part 4-2

Before

```
+----+-------------+-------+------------+------+---------------+------+---------+------+---------+----------+-------------------------------------------------+
| id | select_type | table | partitions | type | possible_keys | key  | key_len | ref  | rows    | filtered | Extra                                           |
+----+-------------+-------+------------+------+---------------+------+---------+------+---------+----------+-------------------------------------------------+
|  1 | SIMPLE      | ud    | NULL       | ALL  | NULL          | NULL | NULL    | NULL |  765240 |    10.00 | Using where                                     |
|  1 | SIMPLE      | r     | NULL       | ALL  | NULL          | NULL | NULL    | NULL | 1120345 |    10.00 | Using where; Using join buffer (hash join)      |
|  1 | SIMPLE      | b     | NULL       | ALL  | NULL          | NULL | NULL    | NULL |  183269 |   100.00 | Using where; Using join buffer (hash join)      |
+----+-------------+-------+------------+------+---------------+------+---------+------+---------+----------+-------------------------------------------------+
```

Run	Times (s)	Average	Standard Deviation
1	1.416	1.4274	0.006730527
2	1.43		
3	1.427		
4	1.431		
5	1.433		

After

```
+----+-------------+-------+------------+------+-----------------------------+-----------------------------+---------+-------+--------+----------+-------------------------------------------------+
| id | select_type | table | partitions | type | possible_keys               | key                         | key_len | ref   | rows   | filtered | Extra                                           |
+----+-------------+-------+------------+------+-----------------------------+-----------------------------+---------+-------+--------+----------+-------------------------------------------------+
|  1 | SIMPLE      | r     | NULL       | ref  | review_user_id_business_id_idx | review_user_id_business_id_idx | 90      | const |     13 |   100.00 | NULL                                            |
|  1 | SIMPLE      | ud    | NULL       | ALL  | NULL                        | NULL                        | NULL    | NULL  | 765240 |    10.00 | Using where; Using join buffer (hash join)      |
|  1 | SIMPLE      | b     | NULL       | ALL  | NULL                        | NULL                        | NULL    | NULL  | 183269 |   100.00 | Using where; Using join buffer (hash join)      |
+----+-------------+-------+------------+------+-----------------------------+-----------------------------+---------+-------+--------+----------+-------------------------------------------------+
```

Run	Times (s)	Average	Standard Deviation
1	0.59	0.5982	0.00626099
2	0.6		
3	0.606		
4	0.601		
5	0.594		