

Exercise 1

First example:

Without indexes:

1	<code>explain analyze select sum(id) from customer</code>
<div><div>Data Output</div><div>Explain</div><div>Messages</div><div>Notifications</div></div>	
	<div><div>QUERY PLAN</div><div>text</div><div></div></div>
1	Aggregate (cost=2854.29..2854.30 rows=1 width=8) (actual time=41.224..41.224 rows=1 loops=1)
2	[...] -> Index Only Scan using customer_pkey on customer (cost=0.29..2604.29 rows=100000 width=4) (actual time=1.102..14.587 rows=100000 loops=1)
3	[...] Heap Fetches: 0
4	Planning Time: 0.966 ms
5	Execution Time: 41.261 ms

With b_tree id index:

With hash index:

Second example:

1	<code>explain analyze select id from customer where id = 2 or id = 82</code>
<div><div>Data Output</div><div>Explain</div><div>Messages</div><div>Notifications</div></div>	
	<div><div>QUERY PLAN</div><div>text</div><div></div></div>
1	Bitmap Heap Scan on customer (cost=8.60..16.47 rows=2 width=4) (actual time=0.143..0.151 rows=2 loops=1)
2	[...] Recheck Cond: ((id = 2) OR (id = 82))
3	[...] Heap Blocks: exact=2
4	[...] -> BitmapOr (cost=8.60..8.60 rows=2 width=0) (actual time=0.128..0.129 rows=0 loops=1)
5	[...] -> Bitmap Index Scan on customer_pkey (cost=0.00..4.30 rows=1 width=0) (actual time=0.016..0.016 rows=1 loops=1)
6	[...] Index Cond: (id = 2)
7	[...] -> Bitmap Index Scan on customer_pkey (cost=0.00..4.30 rows=1 width=0) (actual time=0.110..0.110 rows=1 loops=1)
8	[...] Index Cond: (id = 82)
9	Planning Time: 0.153 ms
10	Execution Time: 0.230 ms


With b_tree id index:

With hash index:

Third example:

```
1 explain analyze select id from customer where address in ('Kazan')
```

Data Output Explain Messages Notifications

QUERY PLAN		
	text	
1	Seq Scan on customer (cost=0.00..4192.00 rows=1 width=4) (actual time=25.504..25.504 rows=0 loops=1)	
2	[...] Filter: (address = 'Kazan'::bpchar)	
3	[...] Rows Removed by Filter: 100000	
4	Planning Time: 1.244 ms	
5	Execution Time: 25.520 ms	

With b_tree id index:

With hash index: