# query E

```
EXPLAIN
SELECT DISTINCT C.name
FROM   County C, State S, Feature F
WHERE  S.abbrev = 'MO'  AND S.stateID = C.stateID  AND C.name = F.name AND
       F.stateID = C.stateID AND F.countyID <> C.countyID AND
       NOT EXISTS (SELECT * FROM Feature F2
                   WHERE F2.stateID = C.stateID AND F2.countyID = C.countyID AND F2.name = C.name)
ORDER BY C.name;
```

tiger1 (time ms)

```
                                                QUERY PLAN
-----------------------------------------------------------------------------------------------------------------------
 Unique  (cost=14470302.38..14470336.47 rows=9 width=11)
   ->  Merge Join  (cost=14470302.38..14470336.45 rows=9 width=11)
         Merge Cond: (("outer"."?column5?" = "inner"."?column4?") AND ("outer".stateid = "inner".stateid))
         Join Filter: ("outer".countyid <> "inner".countyid)
         ->  Sort  (cost=4255.15..4262.87 rows=3088 width=19)
               Sort Key: (f.name)::text, f.stateid
               ->  Hash Join  (cost=1.70..4076.16 rows=3088 width=19)
                     Hash Cond: ("outer".stateid = "inner".stateid)
                     ->  Seq Scan on feature f  (cost=0.00..3179.05 rows=172905 width=17)
                     ->  Hash  (cost=1.70..1.70 rows=1 width=2)
                           ->  Seq Scan on state s  (cost=0.00..1.70 rows=1 width=2)
                                 Filter: (abbrev = 'MO'::bpchar)
         ->  Sort  (cost=14466047.24..14466051.28 rows=1616 width=15)
               Sort Key: (c.name)::text, c.stateid
               ->  Seq Scan on county c  (cost=0.00..14465961.12 rows=1616 width=15)
                     Filter: (NOT (subplan))
                     SubPlan
                       ->  Seq Scan on feature f2  (cost=0.00..4475.84 rows=1 width=37)
                             Filter: ((stateid = $0) AND (countyid = $1) AND ((name)::text = ($2)::text))
```

tiger2 (time 6371.970 ms)

```
                                                QUERY PLAN
-----------------------------------------------------------------------------------------------------------------------
 Unique  (cost=79360.63..79360.69 rows=13 width=11)
   ->  Sort  (cost=79360.63..79360.66 rows=13 width=11)
         Sort Key: c.name
         ->  Merge Join  (cost=22631.46..79360.39 rows=13 width=11)
               Merge Cond: ("outer".stateid = "inner".stateid)
               Join Filter: ((("outer".name)::text = ("inner".name)::text) AND ("inner".countyid <> "outer".countyid))
               ->  Nested Loop  (cost=0.00..102954.51 rows=29 width=17)
                     ->  Index Scan using state_primary on state s  (cost=0.00..3.76 rows=1 width=2)
                           Filter: (abbrev = 'MO'::bpchar)
                     ->  Index Scan using county_primary on county c  (cost=0.00..102950.39 rows=29 width=15)
                           Index Cond: ("outer".stateid = c.stateid)
                           Filter: (NOT (subplan))
                           SubPlan
                             ->  Index Scan using feature_primary on feature f2  (cost=0.00..1774.29 rows=1 width=37)
                                   Index Cond: ((stateid = $0) AND (countyid = $1))
                                   Filter: ((name)::text = ($2)::text)
               ->  Sort  (cost=22631.46..23063.72 rows=172905 width=17)
                     Sort Key: f.stateid
                     ->  Seq Scan on feature f  (cost=0.00..3179.05 rows=172905 width=17)
```

tiger3 (time 45.108 ms)

```
                                                QUERY PLAN
-----------------------------------------------------------------------------------------------------------------------
 Unique  (cost=6815.22..6815.27 rows=11 width=11)
   ->  Sort  (cost=6815.22..6815.25 rows=11 width=11)
         Sort Key: c.name
         ->  Nested Loop  (cost=0.00..6815.03 rows=11 width=11)
               Join Filter: (("inner".stateid = "outer".stateid) AND ("inner".countyid <> "outer".countyid))
               ->  Nested Loop  (cost=0.00..4554.08 rows=29 width=17)
                     ->  Index Scan using state_primary on state s  (cost=0.00..3.76 rows=1 width=2)
                           Filter: (abbrev = 'MO'::bpchar)
                     ->  Index Scan using county_primary on county c  (cost=0.00..4549.96 rows=29 width=15)
                           Index Cond: ("outer".stateid = c.stateid)
                           Filter: (NOT (subplan))
                           SubPlan
                             ->  Index Scan using featurename_index on feature f2  (cost=0.00..77.73 rows=1 width=37)
                                   Index Cond: ((name)::text = ($2)::text)
                                   Filter: ((stateid = $0) AND (countyid = $1))
               ->  Index Scan using featurename_index on feature f  (cost=0.00..77.63 rows=19 width=17)
                     Index Cond: (("outer".name)::text = (f.name)::text)
```