CSCI4707

Lab4

Rain Xuanyu Zhang(zhan2223, 4642453)

Hao Wang(wang5167, 5086487)

Part1

1.Original

select age from student where age= 20

time = 00:00:00.026355

select year from student where year = 4

time = 00:00:00.027019

select gpa from student where gpa>3

time = 00:00:00.032992

2.B-tree

select age from student where age=20

time = 00:00:00.014952

select year from student where year = 4

time = 00:00:00.018239

select gpa from student where gpa>3

time = 00:00:00.021597

3.Hash-index

select \* from student where age=20

time = 00:00:00.017857

select year from student where year = 4

time = 00:00:00.022371

select gpa from student where gpa>3

time = 00:00:00.031892

4.Hash-index and B-tree for range

(1) B-tree

select age from student where age > 1

time = 00:00:00.035786

select age from student where age > 10

time = 00:00:00.038814

select age from student where age > 50

time = 00:00:00.018606

(2) Hash-index

select age from student where age > 1

time = 00:00:00.051346

select age from student where age > 10

time = 00:00:00.041011

select age from student where age > 50

time = 00:00:00.029515

5.Hash-index and B-tree for equal and range

(1)B-tree

select age from student where age = 20

time = 00:00:00.014136

select age from student where age>10 and age<20

time = 00:00:00.017036

(2)Hash-index

select age from student where age = 20

time = 00:00:00.016286

select age from student where age>10 and age<20

time = 00:00:00.031833

6.

(1)Original

select \* from student where age>15 and sex=’male’

time = 00:00:00.051809

(2)B-tree only for age

select \* from student where age>15 and sex=’male’

time = 00:00:00.037687

(3)B-tree for age and Hash-index for sex

select \* from student where age>15 and sex=’male’

time = 00:00:00.013173

(4)Hash-index for age and sex

select \* from student where age>15 and sex=’male’

time = 00:00:00.016825

Part 2

1.

(1) withour DISTINCT

select \* from student where age<30

time = 00:00:00.032001

(2) using DISTINCT

select distinct \* from student where age<30

time = 00:00:00.372044

2.

(1) using Where

select age, avg(gpa) as Avegpa from student where age>22 group by age

time = 00:00:00.063205

(2) using Having

select age, avg(gpa) as Avegpa from student group by age having age>22

time = 00:00:00.090370

3.

(1)using join and where

select distinct m.dname from major m join student s on s.sid = m.sid and s.age<30

time = 00:00:01.927912

HashAggregate  (cost=46304.12..46304.22 rows=10 width=3) (actual time=1659.718..1659.721 rows=10 loops=1)

   ->  Hash Join  (cost=5004.09..45344.54 rows=383831 width=3) (actual time=81.796..1595.136 rows=384640 loops=1)

         Hash Cond: (m.sid = s.sid)

         ->  Seq Scan on major m  (cost=0.00..17586.51 rows=1219151 width=7) (actual time=0.045..76.671 rows=1219151 loops=1)

         ->  Hash  (cost=3971.00..3971.00 rows=62967 width=4) (actual time=71.984..71.984 rows=63077 loops=1)

               Buckets: 4096  Batches: 4  Memory Usage: 559kB

               ->  Seq Scan on student s  (cost=0.00..3971.00 rows=62967 width=4) (actual time=0.017..45.036 rows=63077 loops=1)

                     Filter: (age < 30)

                     Rows Removed by Filter: 136923

 Total runtime: 1659.796 ms

(2)using in and nested query

select distinct m.dname from major m where m.sid in (select s.sid from student s where s.age<30)

time = 00:00:01.725931

HashAggregate  (cost=42733.11..42733.21 rows=10 width=3) (actual time=3248.803..3248.805 rows=10 loops=1)

   ->  Hash Semi Join  (cost=5004.09..41745.90 rows=394886 width=3) (actual time=81.234..3197.020 rows=384640 loops=1)

         Hash Cond: (m.sid = s.sid)

         ->  Seq Scan on major m  (cost=0.00..17586.51 rows=1219151 width=7) (actual time=0.020..65.346 rows=1219151 loops=1)

         ->  Hash  (cost=3971.00..3971.00 rows=62967 width=4) (actual time=59.937..59.937 rows=63077 loops=1)

               Buckets: 4096  Batches: 4  Memory Usage: 559kB

               ->  Seq Scan on student s  (cost=0.00..3971.00 rows=62967 width=4) (actual time=0.008..18.882 rows=63077 loops=1)

                     Filter: (age < 30)

                     Rows Removed by Filter: 136923

 Total runtime: 3248.851 ms