New submission for: Lecture Exercise 21

Due: 11/22/2020 @ 11:59 PM EST

Use the following information when answering all the questions below. Assume all indices are 3 levels (root, internal level and leaf).

Relation `R(A,B,C,D,E): TUPLES(R)=200,000 - PAGES(R)=5,000`

Relation `S(F,G): TUPLES(S)=800,000 - PAGES(S)=6,000`

Index `I1 on R(A,D) with 500 leaf nodes`

Index `I2 on R(C,D) with 1,250 leaf nodes`

Index `I3 on R(D,A,B,C) with 4,000 leaf nodes`

Condition	Number of matching tuples
`R.C='corriedale'`	40
`'corridale'<= R.C and R.C <='karakul'`	2,000
`R.D=200`	1,000
`R.D=200 and R.C='corriedale'`	8
`R.D=200 and 'corridale'<= R.C and R.C <='karakul'`	400

Note that cost of index scan for a query includes the cost scanning the index and the cost of reading matching tuples if necessary. In your computations, always use the worst case assumptions.

1. You are given the following query: `SELECT A,B FROM R WHERE R.C='corriedale' and R.D=200`

Check all options below that apply are correct for answering this query:

- [ ] Cost of index scan using I3 is 5,002
- [ ] Cost of index scan using I1 is 502
- [x] Cost of sequential scan is 5,000
- [ ] Cost of index scan using I1 is 1,402
- [ ] Cost of index scan using I3 is 4,002
- [ ] Cost of index scan using I1 is 8
- [ ] Cost of index scan using I1 is 13
- [x] Cost of index scan using I2 is 12
- [x] Cost of index scan using I1 is 1,502
- [ ] Cost of index scan using I2 is 10
- [ ] None of these options are correct.
- [ ] Cost of sequential scan is 200,000
- [ ] Cost of index scan using I3 is 4
- [ ] Cost of index scan using I2 is 1003
- [ ] Cost of index scan using I2 is 44
- [ ] Cost of index scan using I1 is 10
- [ ] Cost of index scan using I2 is 1,252
- [ ] Cost of index scan using I2 is 3
- [ ] Cost of index scan using I3 is 4,010

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2. You are given the following query. `SELECT A,B FROM R WHERE R.D=200`

Check all options below that apply are correct:

- [ ] Cost of index scan using I3 is 5,002
- [ ] Cost of index scan using I1 is 502
- [x] Cost of sequential scan is 5,000
- [ ] Cost of index scan using I1 is 1,005
- [ ] Cost of index scan using I3 is 4,002
- [ ] Cost of index scan using I1 is 8
- [ ] Cost of index scan using I1 is 13
- [ ] Cost of index scan using I2 is 12
- [x] Cost of index scan using I1 is 1,502
- [ ] Cost of index scan using I2 is 10
- [ ] None of these options are correct.
- [ ] Cost of sequential scan is 200,000
- [ ] Cost of index scan using I3 is 4
- [ ] Cost of index scan using I2 is 1003
- [ ] Cost of index scan using I2 is 44
- [ ] Cost of index scan using I1 is 10
- [ ] Cost of index scan using I2 is 1,252
- [ ] Cost of index scan using I2 is 3
- [ ] Cost of index scan using I3 is 4,010

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3. You are given the following query: `SELECT A,B FROM R WHERE 'corridale'<= R.C and R.C <='karakul' and R.D=200`

Check all options below that apply are correct:

- [ ] Cost of sequential scan is 200,000
- [x] Cost of index scan using I2 is 414
- [ ] Cost of index scan using I3 is 4,002
- [ ] Cost of index scan using I1 is 502
- [ ] Cost of index scan using I1 is 10
- [ ] None of these options are correct.
- [ ] Cost of index scan using I3 is 4
- [ ] Cost of index scan using I1 is 8
- [ ] Cost of index scan using I2 is 14
- [ ] Cost of index scan using I3 is 4,402
- [ ] Cost of index scan using I2 is 4
- [ ] Cost of index scan using I2 is 1,252
- [ ] Cost of index scan using I1 is 1,005
- [ ] Cost of index scan using I1 is 13
- [x] Cost of index scan using I1 is 1,502
- [ ] Cost of index scan using I3 is 6,002
- [ ] Cost of index scan using I2 is 2,014
- [ ] Cost of index scan using I2 is 404
- [x] Cost of sequential scan is 5,000
- [ ] Cost of index scan using I2 is 2,004

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4. Suppose you are joining R and S using block nested loop join (BNLJ). Check all options below that are correct. Note: R join S means R is the outer and S is the inner relation (similarly S join S means S is the outer and R is the inner relation).

- [ ] BNLJ Cost with M=1,001 for S join R is: 11,000
- [x] BNLJ Cost with M=2,001 for R join S is: 23,000
- [ ] BNLJ Cost with M=1,001 for R join S is: 11,000
- [x] BNLJ Cost with M=1,001 for S join R is: 36,000
- [ ] BNLJ Cost with M=2,001 for R join S is: 11,000
- [ ] BNLJ Cost with M=10,001 for R join S is: 10,000
- [ ] BNLJ Cost with M=10,001 for R join S is: 23,000
- [ ] BNLJ Cost with M=10,001 for R join S is: 35,000
- [ ] BNLJ Cost with M=1,001 for R join S is: 36,000
- [ ] BNLJ Cost with M=2,001 for R join S is: 24,000
- [ ] BNLJ Cost with M=10,001 for R join S is: 36,000
- [ ] BNLJ Cost with M=1,001 for S join R is: 35,000
- [x] BNLJ Cost with M=1,001 for R join S is: 35,000
- [ ] BNLJ Cost with M=2,001 for R join S is: 17,000
- [ ] BNLJ Cost with M=2,001 for R join S is: 18,000
- [ ] BNLJ Cost with M=10,001 for R join S is: 24,000
- [x] BNLJ Cost with M=10,001 for R join S is: 11,000

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