CS166 Practice Final Exam

Q1 SQL Query:

Assume you are given the following relations:

Suppliers(sid: integer, sname: string, address: string)

Parts(pid: integer, pname: string, color: string)

Catalog(sid: integer, pid: integer, cost: real)

The Catalog relation lists the prices charged for parts by Suppliers. Assume a given Supplier would supply a given Part only once (i.e. Catalog should have only 1 row for a given Supplier SID and Parts pid)

Q1.1

Find the sid of suppliers who supply more than 2 parts.

- SELECT sid, COUNT*() FROM Suppliers S, Catalog C WHERE S.sid = C.sid HAVING COUNT()* > 2;
- SELECT sid, COUNT(*) AS numparts FROM Catalog GROUP BY sid WHERE numparts > 2;
- SELECT sid, COUNT(*) AS numparts FROM Catalog GROUP BY sid HAVING numparts > 2;
- None of the above

Q1.2

Find the pids of parts supplied by at least two different suppliers.

- SELECT C2.pid FROM Catalog C2 WHERE sid IN (SELECT C2.sid FROM Catalog C1 WHERE C1.sid <> C2.sid);
- SELECT pid FROM Catalog GROUP BY pid HAVING COUNT(*) > 2;
- SELECT C1.pid FROM Catalog C1 (SELECT COUNT*() FROM Catalog C2 WHERE COUNT()* > 2 AND C1.pid = C2.pid);
- None of the above

Q1.3

For each part, find the sid of the supplier who charges the most for that part.

Q1.4

For every supplier, print the name of the supplier and the total number of parts that they supply

- SELECT C.sid, S.sname, Count(*) AS num FROM Catalog C, Suppliers S WHERE S.sid = C.sid GROUP BY C.sid, S.sname;
- SELECT S.name From Suppliers S (C.sid, Count(*) AS num FROM Catalog C WHERE S.sid = C.sid GROUP BY C.sid);
- SELECT S.name, COUNT(*) From Suppliers S (C.sid FROM Catalog C WHERE S.sid = C.sid);
- None of the above

Q1.5

Write a query that returns the average price for each part.

Q1.6

Write a query that returns the pid of a Part that has the most number of Suppliers.

Q2

General B+ Questions

Q2.1

In a B+ tree, both the internal nodes and the leaves have keys.

- True
- False

Q2.2

B+ tree is a terrible index for range queries because you have to traverse the tree for each value in the specified range.

- True
- False

Q2.3

Statement 1: When a node is split during insertion, the middle key is promoted to the parent as well as retained in right half-node.

Statement 2: When a key is deleted from the leaf, it is also deleted from the non-leaf nodes of the tree.

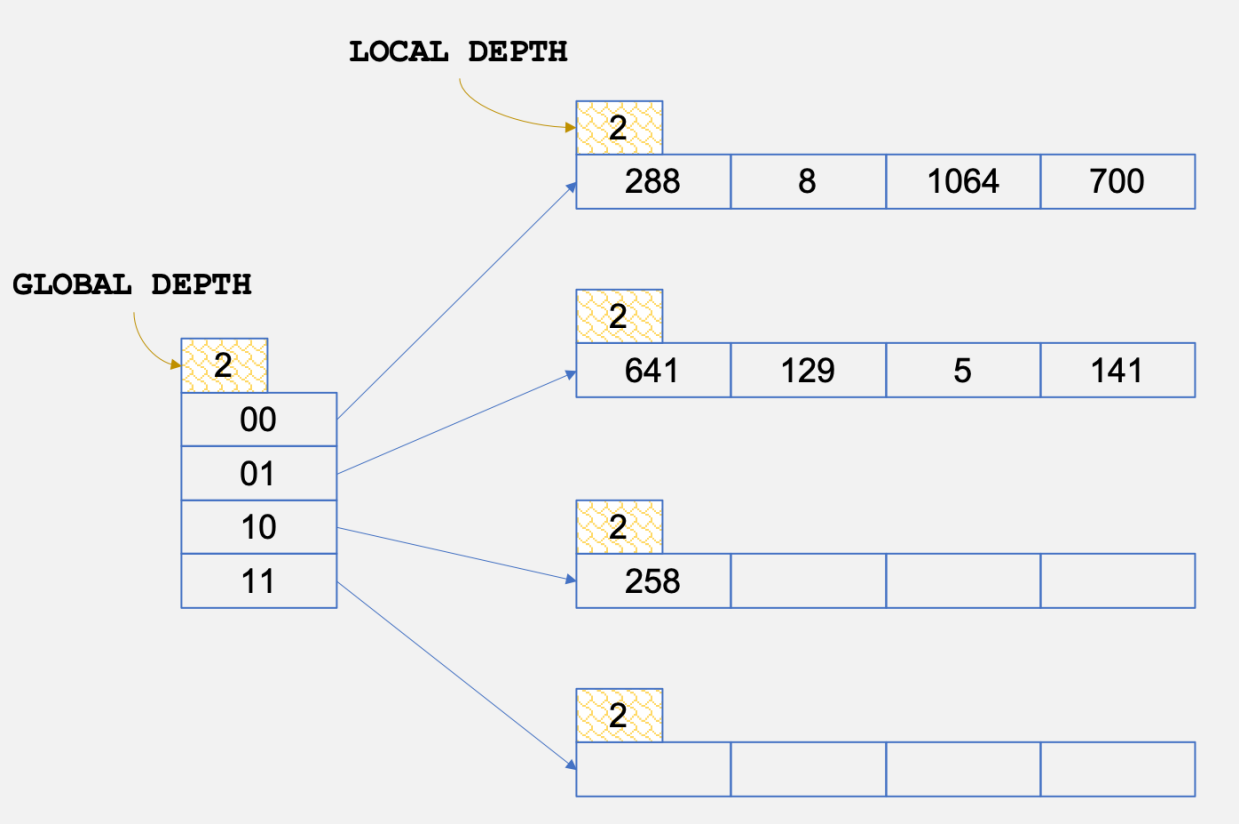
- Statement 1 is true but statement 2 is false
- Statement 2 is true but statement 1 is false
- Both the statements are true
- Both the statements are false

Q2.4

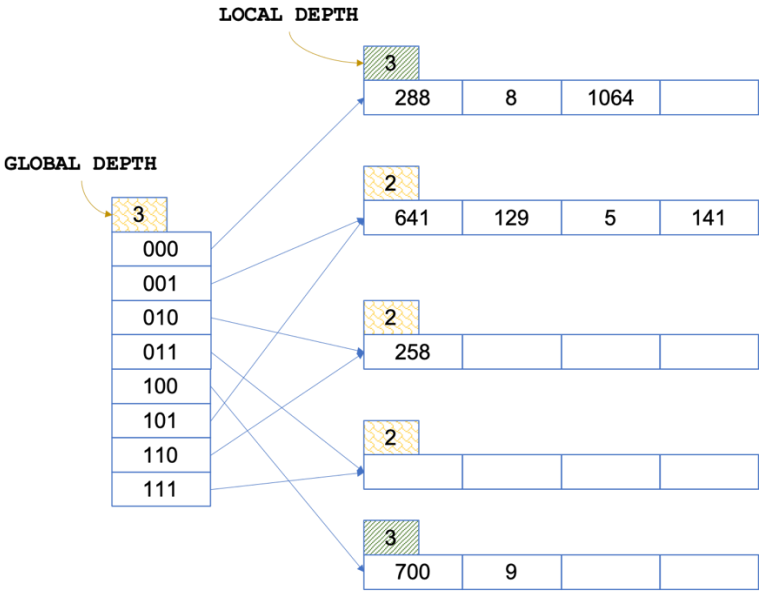
What is the difference between a B-Tree and a B+ Tree?

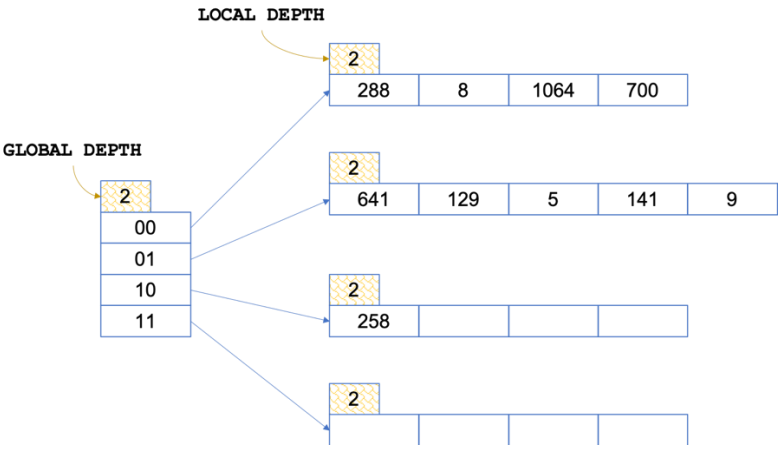
Q3

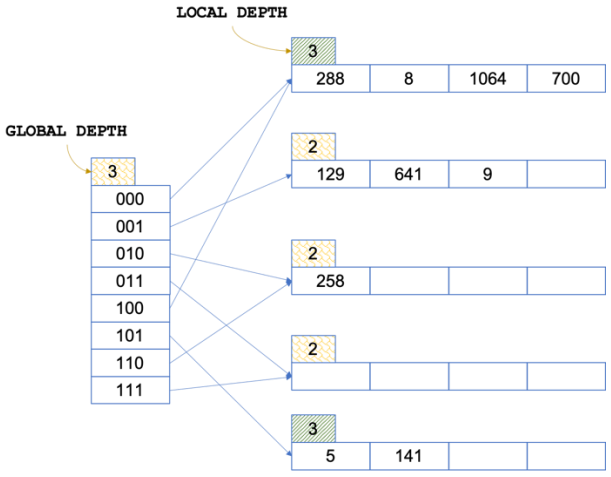
Extensible Hashing Question: Suppose that the global depth is 2 and the bucket size is 4. Suppose that we have records with these keys and hash function h(key) = key mod 64.



Which of the following is the correct state of the index after element 9 is inserted.

- 

- 

- 

- None of the above

Q4

Given the relation R=(A,B,C,D). Assume the functional dependencies are B-> C, D-> A.

If the relation is decomposed into BC and AD, is this a good decomposition?

Briefly explain why or why not.