

Quiz Sheet No. 5 for Architecture and Implementation of Database Systems
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Exercises for Chapter 6: Distributed DBS

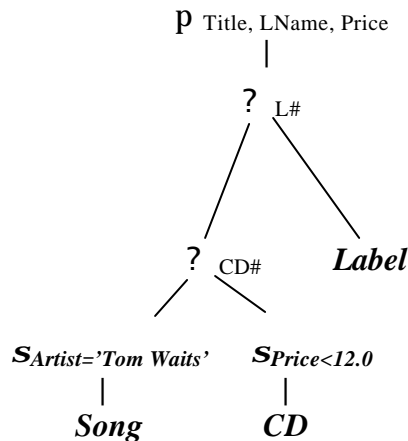
1. Consider the database schema:

```
create table CD
(CD#      integer,
 Title    string,
 Price    real,
 L#       integer )  key is CD#
```

```
create table Label
(L#       integer,
 LName    string,
 LCountry string )  key is L#
```

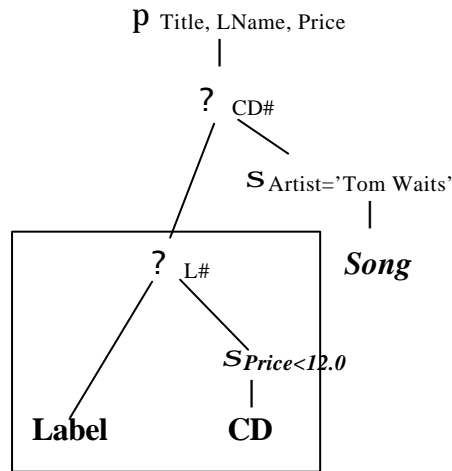
```
create table Song
(CD#      integer,
 Track#   integer,
 STitle   string,
 Artist   string )  key is (CD#, Track#)
```

a) Given below is an operator tree for query “Retrieve the Title, LName and Price of CDs that cost less than \$12 and contain songs by the Artist Tom Waits”:

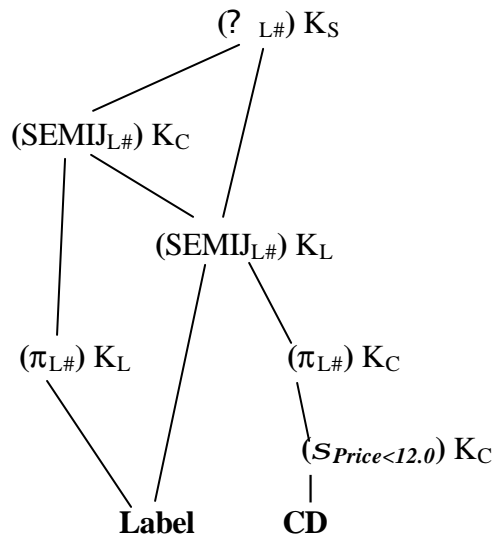


Assume a distributed DBS with nodes K_L (holding relation Label), K_C (holding relation CD) and K_S (holding relation Song). Sketch an operator graph using semi-joins for executing this query on the distributed DBS.

b) The following operator tree is another representation of the query in exercise 1a):



A possible operator graph for the join Label? CD, designed for the distributed DBS hosting K_L , K_C and K_S is:



Compute the transport volume (the number of attributes, regardless of their types) that must be sent from node to node and determine the total transport volume of this query plan. Assume that:

$$|\text{Label}| = 25$$

$$|\text{CD}| = 12,500$$

$$\text{Selectivity} ("Price < 12.0") = 0.4$$

$$\text{Selectivity for all semi-joins} = 0.02$$