Database Systems
Project Deliverable 4

Part A :

- Given two large relations R(X_1,X_2,X_3,….,Y,….) and S(…,Y,Z_1,Z_2,Z_3….), implement Sort-Merge join on R,S such that R.Y = S.Y

Part B :

- Calculate V(R,a) => Number of unique values for attribute ‘a’ in Relation ‘R’.
- V(R,a) should be updated if insertion(s) are made to the relation.
    - You are not supposed to scan complete table again to get updated value of V(R,a) after insertion.
    - Store required meta-data, which can help you in estimating updated V(R,a) value without scanning completing table.
- Implement a method “int V(String tableName, String attributeName)” in DBSystem class which will return the value of V(R,a).
- No error handling is required. You can assume valid inputs.

Part C :

- Suppose we join more than two relations like
    - Join R , S , T =>
        - TEMP <= Join R ,S
        - ANS <= Join Temp , T
            OR
        - TEMP <= Join S ,T
        - ANS <= Join R , Temp
- To get which of the available order(s) of join is better, we need to do cost estimation.
- Implement a cost estimation algorithm which can predict the optimum order of joining multiple tables (without actually joining/scanning them, off course :P)

Sample input and output :

PART - A

Input

```
SELECT Orders.OrderID, Customers.CustomerName, Orders.OrderDate
FROM Orders
INNER JOIN Customers
ON Orders.CustomerID=Customers.CustomerID;
```

Output: the result of the join.

Part B

We will be calling the method V(R,a) defined in DBSystem to evaluate.

Part C

Note: If any of input query contains join of more than two tables in FOR clause, output only the order of JOIN (Part -C). Otherwise, output result (Part -A) of the query.

Input

```
SELECT Items.ItemID, Orders.OrderID, Customers.CustomerName,
Orders.OrderDate

FROM Orders

JOIN Customers

ON Orders.CustomerID=Customers.CustomerID

JOIN Items

ON Items.ItemID=Order.ItemID;
```

Output

- A bracketed expression representing the order of join with its cost.

  ((Items,Orders), Customers)

  xxxx - where xxxx is the cost of joining

Due Date : 10th April 2014