

Database Systems

Project Deliverable 4

PartA:

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

PartB:

- Calculate $V(R,a) \Rightarrow$ 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.

PartC:

- Suppose we join more than two relations like
 - Join R , S , T \Rightarrow
 - $TEMP \leq Join\ R\ ,S$
 - $ANS \leq Join\ Temp\ ,\ T$
 - OR
 - $TEMP \leq Join\ S\ ,T$
 - $ANS \leq Join\ R\ ,\ Temp$
- 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.

PartB

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

PartC

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=Orders.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 : 15th November