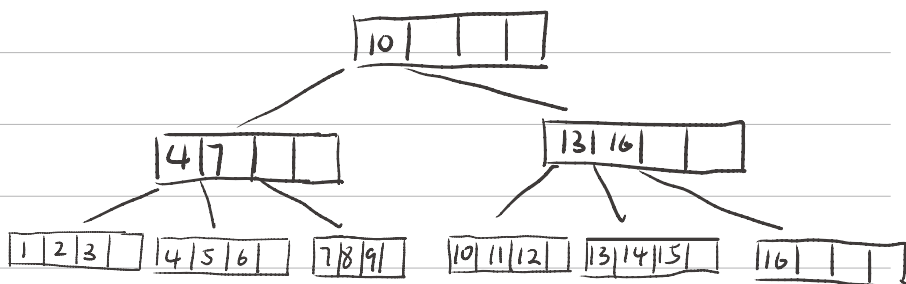


1. BULK LOADING



Its height is 2.

2. RELATIONAL ALGEBRA

$$1. \pi_{Pname} (\sigma_{Pprice < 200 \wedge P.id \% 2 = 1} (Products))$$

$$2. \pi_{Quantity} (\sigma_{Cname = 'Martha'} (Customers \bowtie Orders))$$

$$3. \pi_{Pprice} (\sigma_{Region = 'FL'} (Customers \bowtie Orders \bowtie Products))$$

$$4. \pi_{Region} (\sigma_{Quantity > 1} (Customers \bowtie Orders))$$

$$5. \pi_{\text{cname}}(\text{Customers}) - \pi_{\text{cname}}(\sigma_{\text{pname} = 'pcs'}(\text{Customers} \bowtie \text{Orders} \bowtie \text{Products}))$$

3. JOINS

a. T

b. F

4. QUERY OPTIMIZATION

$$1. \min(id) = 1, \max(id) = 500, |id| = 500$$

$$\text{sel}(id \leq 100) = \frac{99}{500} + \frac{1}{500} = \frac{1}{5}$$

$$2. |rating| = 1000$$

$$\text{sel}(rating = 2500) = \frac{1}{1000}$$

$$\text{sel}(credit < 5) = \frac{1}{10}$$

$$\text{sel}(rating = 2500 \text{ AND } credit < 5) = \frac{1}{10000}$$

3. A

$$\text{sel}(\text{sid} > 1000) = \frac{1}{10}$$

$$\text{sel}(\text{lid} > 1000) = \frac{1500}{2500} = \frac{3}{5}$$

A. 500

B. $25000 \times \frac{1}{10} = 2500$

C. $1000 \times \frac{3}{5} = 600$

4. ACD

According to the Join Type. A, C will not result in an interesting order.

The sorted order of D is not used by the 'ORDER BY', so it will not result in an interesting order

5. ABDF

A, D, F are not left deep join.

B: we can't cross join Students and Courses