COSC 4820

Relational Algebra Continued

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Recap

- Discussed relational operations.
- Some idea of what they do.
- Some idea of how they relate to the database tables.

Exercises

- Start on page 52.
- These start simple but go to VERY complex.
- Have to think in terms of the algebra and **simple** operations.
- We won't worry about it now, but speed of operations is important.

¡slide¿2.4.1.a

- *What PC models have a speed of at least 3.00?*
- This is straight forward.
- Only access one table.
- Only need one column.
- Combination of PROJECT and SELECT.
- Refer to handout.

- $\pi_{\text{model}}(\sigma_{\text{speed}\geq 3.00}(\mathsf{pc}))$;

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- PROJECT(model){SELECT(speed GE 3.00){pc}};
- This can be translated to MySQL fairly easily.

2.4.1.b

- *Which manufacturers make laptops with a hard disk of at least 10GB?*
- More difficult, requires how many tables?
- Requires what operations?
- What is the needed order of the operations?

- $\pi_{\text{maker}}(\sigma_{\text{hd}\geq 100}(\text{product} \bowtie \text{laptop}))$;

- $\pi_{\text{maker}}(\sigma_{\text{hd}\geq 100}(\text{product} \bowtie \text{laptop}))$;
- PROJECT(maker){SELECT(hd GE 100){JOIN {laptop,product}}};
- Why use a JOIN (that is a natural join)?
- What would be some alternatives?

2.4.1.c

- *Find the model number and price of all products (of any type) made by manufacturer* ***B****.*
- More difficult still, requires how many tables?
- Requires what operations?
- What is the needed order of the operations?

- $\pi_{model,price}\{\text{pc} \bowtie (\text{laptop} \bowtie (\text{printer} \bowtie \text{product}))\}$;

- PROJECT(model,price){SELECT(maker EQ 'B') {JOIN {PROJECT (model,maker) {product}, PROJECT(model, price){laptop}} UNION JOIN{ PROJECT(model, maker){product}, PROJECT(model, price){pc}} UNION JOIN{ PROJECT(model, maker) {product}, PROJECT(model, price){printer}}}};

- Why multiple JOIN operations?
- Why are they done in manner shown?
- What are some alternatives to this complex statement?

2.4.1.d.

- *Find the model numbers of all color laser printers.*
- Different.
- Requires what operations?
- What is the needed order of the operations?

- $\pi_{model}(\sigma_{\text{color } = \text{'true'} \text{ AND } \text{type } = \text{'laser'}}(\text{printer}))$

- $\pi_{model}(\sigma_{\text{color } = \text{'true'} \text{ AND type } = \text{'laser'}}(\text{printer}))$
- PROJECT(model){SELECT(color EQ 'true' AND type EQ 'laser') {printer}};