Relational Algebra

Nov 13, 2009

Chapter 4

p 100-116
Queries

- How do we implement a query?
- How do we optimize a query?
- How to we talk about a query?

- What is the definition of Computer Science?
Algebra vs Calculus

• Relational Algebra
  – queries are composed of operators
  – step by step procedure for solving the query
  – relationally complete

• Relational Calculus (p 116-126)
  – describe result of query without specifying how to compute

• Expressiveness: Algebra vs Calculus (section 4.4)
Queries: Defined

• Input and output are \textit{relations}

• Queries work on \textit{instances} of relations

• May refer to columns/fields by name or position
  \hspace{10pt} may need to rename columns/fields to avoid conflict
Queries

• Composed of operators

• Operators:
  – accept one to two relation instances
  – produce a relation instance

• Can compose queries

• Relational algebra expression
  – relation (produced by some operator(s))
Basic Operators

- Selection

- Projection

- Union/Intersection

- Cross-product

- Difference
Joins

• Conditional Joins

• Equijoin

• Natural Join
Others

- Division

- Renaming
Examples