1 RELATIONAL ALGEBRA

- Relations are closed under relational algebra

1.1 Unary operators

1.1.1 Selection

- $\sigma_c(E)$

1.1.2 Projection

- $\pi_{A_1,A_2,\ldots,A_n}(E)$

1.1.3 Rename

- $\rho_{R(A_1,A_2,\ldots,A_n)}(E)$

1.2 Set operators

1.2.1 Cross product

- $E_1 \times E_2$
- $|E_1 \times E_2| = |E_1| \times |E_2|$

1.2.2 Difference

- $E_1 - E_2$

1.2.3 Union

- $E_1 \cup E_2$
- $|E_1 \cup E_2| = |E_1| + |E_1 - E_2|$

1.2.4 Intersection

- $E_1 \cap E_2 = E_1 - (E_1 - E_2)$

1.3 Join operators

1.3.1 θ-join

- $E_1 \bowtie_\theta E_2 = \sigma_\theta(E_1 \times E_2)$

1.3.2 Natural join

- $E_1 \bowtie E_2 = \pi_{\ell_1}(E_1 \bowtie_c \rho_{\ell_2}(E_2)$

1.4 Alternate notations

1.4.1 Assignment statements

- c := E
- Provides a way to modularize an expression

1.4.2 Expression trees

- Similar to an AST