IDS Lecture 15: Database Constraints

Integrity constraints

- instances that satisfy the constraints are called **legal**

Functional Dependencies (FD)

Syntax: $X \to Y$, read X *determines* Y

Definition: A relation R satisfies $X \to Y$ if for every two tuples $t_1, t_2 \in R$

$$\pi_X(t_1) = \pi_X(t_2) \implies \pi_Y(t_1) = \pi_Y(t_2)$$

Keys (special case FD)

Definition: A set of attributes X which satisfy

$$\pi_X(t_1) = \pi_X(t_2) \implies t_1 = t_2 \quad \forall t_1, t_2 \in R$$

Intuition: each value in the attribute (column) uniquely identifies the tuple (row)

Inclusion Dependencies (IND)

Syntax: $R[X] \subseteq S[Y]$ where R, S are relations and X, Y are **sequences** of attributes

Definition: R and S satisfy $R[X] \subseteq S[Y]$ if

$$\pi_X(t_1) = \pi_Y(t_2) \quad \forall t_1 \in R \quad \exists t_2 \in S$$

- Note: the projection must respect attribute order

Intuition: the projection of one table must be a subset of a projection of another table