Amstrong's Axioms

Module IV

Amstrong's Axioms

- 1.Reflexivity if $Y \subseteq X$ then $X \rightarrow Y$
- 2.Augmentation if $X \rightarrow Y$ then $XZ \rightarrow Y$ and /or $XZ \rightarrow YZ$
- 3.Transitivity if $X \rightarrow Y$ and $Y \rightarrow Z$ then $X \rightarrow Z$
- 4.Psuedo transitivity if $X \rightarrow Y$ and $YW \rightarrow Z$ then $XW \rightarrow Z$
- 5.Union $X \rightarrow Y$ and $X \rightarrow Z$ then $X \rightarrow YZ$
- 6.Decomposition If $X \rightarrow YZ$, then $X \rightarrow Y$ and $X \rightarrow Z$

Why armstrong axioms refer to the Sound and Complete?

- By sound, we mean that given a set of functional dependencies F specified on a relation schema R, any dependency that we can infer from F by using the primry rules of armstrong axioms holds in every relation state r of R that satisfies the dependencies in F.

Continue….

- By complete, we mean that using primary rules of amrstrong axioms repeatedly to infer dependencies until no more dependencies can be inferred results in the complete set of all possible dependencies that can be inferred from F.

Example

- F={A→B,B→C,C→D}} on R(A,B,C,D)

- A→C (from A→B and A→C}
- A→D(from A→Cand C→D}
- B→D{from B→C and B→D}

- F+={A→B,B→C, C→D,A→C, A→D,B→D} U {all Reflexive relation}

F={A→B,B→C,C→D}} on R(A,B,C,D)

A	B	C	D
10	20	30	40
11	21	33	41
10	20	30	40
12	21	33	41
13	22	30	40

F={A→B,B→C,C→D}} on R(A,B,C,D)