Armstrong's Axioms

By: Jay D Fuletra

Armstrong's Axioms for functional Dependencies

- Armstrong provided a set of inference rules, generally known as Armstrong's Axioms, to infer(derive) new FDs from other FDs.
- These rules are used to find out redundant functional dependencies as well as clouser of a set of FD.
- These rules are given below.
- Let us assume that a relation R contains attribute-sets W,X,Y and Z.

Rules

1. **Reflexivity (or Inclusion)**
   - If, $Y \subseteq X$, then $X \rightarrow Y$.
2. **Augmentation**
   - If, $X \rightarrow Y$, then $XZ \rightarrow Y$, and $XZ \rightarrow YZ$.
3. **Transitivity**
   - If, $X \rightarrow Y$ and $Y \rightarrow Z$, then $X \rightarrow Z$.

Rules

4. **Self - determination**
   - $X \rightarrow X$.
5. **Pseudo - transitivity**
   - If, $X \rightarrow Y$ and $YW \rightarrow Z$, then $XW \rightarrow Z$.
6. **Union (or Additive)**
   - If, $X \rightarrow Z$ and $X \rightarrow Y$, then $X \rightarrow YZ$.

Rules

7. **Decomposition (or Projective)**
   - if , $X \rightarrow YZ$, then $X \rightarrow Y$ and $X \rightarrow Z$.
8. **Composition**
   - If, $X \rightarrow Y$ and $Z \rightarrow W$, then $XZ \rightarrow YW$.
9. **Self - accumulation**
   - If, $X \rightarrow YZ$ and $Z \rightarrow W$, then $X \rightarrow YZW$.