DB Updates & NonMonotonic Reasoning

CS240B Notes

Notes based on Section 10.2 of *Advanced Database Systems*—Morgan Kaufmann, 1997

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Stratification and Stable Models

Theorem: *Let P be a stratified program. Then P has a stable model that is equal to the result of the iterated fixpoint procedure.*

Locally Stratified Programs

Local stratification. A program P is locally stratifiable iff B_P can be partitioned into a (possibly infinite) set of strata $S_0, S_1, \ldots$, such that the following property holds: For each rule r in $ground(P)$ and each atom g in the body of r, if $h(r)$ and g are, respectively, in strata S_i and S_j, then

(i) $i \geq j$ if $g \in pg(r)$, and

(ii) $i > j$ if $g \in ng(r)$.

A locally stratified program defining integers

$$\texttt{even(0)}.$$
$$\texttt{even(s(J))} \leftarrow \quad \neg\texttt{even(J)}.$$

Local Stratification: cont.

Theorem: *Every locally stratified program has a stable model that is equal to the result of the iterated fixpoint computation (on* $ground(P)$*).*

1. Local stratification, behaves unlike regular stratification from the viewpoints of computation and implementation.
2. The existence of local strati£cation often depends on the database content. Thus, it cannot be checked at compile-time. Also, checking is $\mathcal{NP}$-hard.
3. In the Barber example, the existence of a local stratification depends on whether $\texttt{villager}(\texttt{barber})$ is in the database.