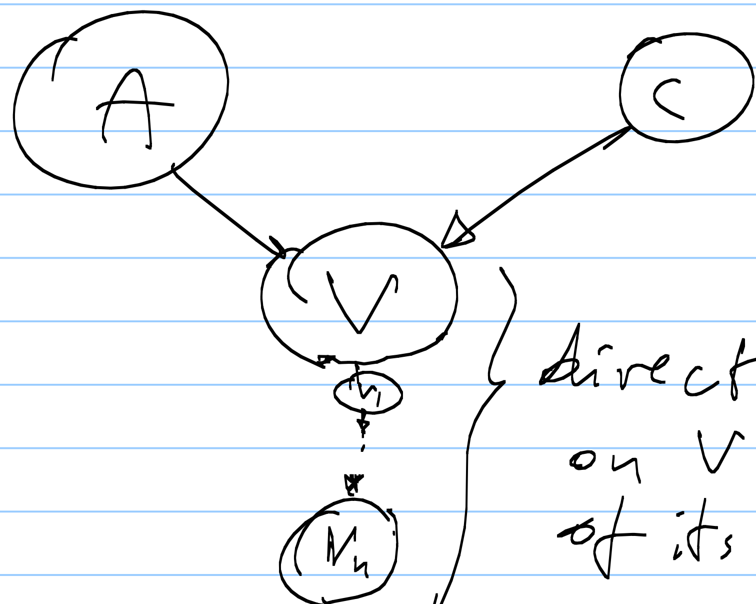
Note Title 1/28/2009

Turn in HW1 on Friday,
email before class or bring in a hard copy



direct evidence on V or one of its descendants

Evidence is a set of findings.
Each finding is a statement that a variable is in

a particular state.

$e_1 = \{ \text{Start} = n \}$ is evidence consisting of a single finding

First compute $p(\text{Religion}, \#\text{Children}, \underline{e})$ by setting to ϕ the entries in $p(\text{Religion}, \#\text{Children})$ for which $\#\text{Children} \neq 3$, then normalize by the sum of all entries in $p(\text{Religion}, \#\text{Children}, \underline{e})$.

This works b/c the normalization constant is $p(\#\text{Children} = 3)$.

Chain rule for Bayesian networks

This rule (a theorem) is an identity relating the joint prob. of all vars in a BN with the CPT (conditional probability tables).

1. Order the vars in reverse topological order

Topological order of a DAG (directed acyclic graph) $G = (V, E)$ is an ordering $\langle v_1, \dots, v_n \rangle$ s.t.

$\{v_1, \dots v_n\} = V$, $\underbrace{i < j, 1 \le i, j \le n}_{\text{if } j \text{ is a descendant of } i}$ & if l is a predecessor of m then $l < m$.

Please review this defn. (topological order).

There is a linear-time algorithm (due to Knuth) to compute a topological order in a ~~DAG~~.

2. Apply the fundamental rule with the last var. conditioned by all others

3. Apply d-separation

4. Repeat 2+3