Choose a paper for presentation in parts from the special section on Bayesian Modelling in *International Journal of Approximate Reasoning*, Vol. 50, No. 3 (March 2009), edited by Linda van der Gaag and Russell Almond.

1) Planning for success: The interdisciplinary approach to building Bayesian models
2) Verifying monotonicity of Bayesian networks with human experts
3) Modeling human reasoning about meta-information
4) Bayesian networks: A teacher's view
5) Preventably knowledge transfer errors. Probabilistic decision support systems through the users’ eyes. Your choice?

Ben Fine & Nick Shifflet: paper #4 April 15

1. Reflexivity. For any lottery $A$, $A \succeq A$.

2. Completeness. For any pair $(A, B)$ of lotteries, $A \succeq B$ or $B \succeq A$.

3. Transitivity. If $A \succeq B$ and $B \succeq C$, then $A \succeq C$.

4. Preference increasing with probability. If $A \succeq B$ then $\alpha A + (1 - \alpha)B \succeq \beta A + (1 - \beta)B$ if and only if $\alpha \geq \beta$.

5. Continuity. If $A \succeq B \succeq C$ then there exists $\alpha \in [0, 1]$ such that $B \sim \alpha A + (1 - \alpha)C$.

6. Independence. If $C = \alpha A + (1 - \alpha)B$ and $A \sim D$, then $C \sim (\alpha D + (1 - \alpha)B)$.

Theorem: For an individual who acts according to a preference ordering satisfying rules 1-6 above, there exists a utility function over the outcomes s.t. the expected utility is maximized.
Influence Diagrams (Sec. 9.14 [J07])

A better representation (an influence diagram):

![Influence Diagram](image)

Advantages:
- You can read the sequence of decisions.
- You can read what is known at each point of decision.
Nodes and links:
- Chance variable → causal links
- Decision variable → information links
- Utility function → utility link, $U = \sum_i U_i$.

Note:
- We assume no-forgetting.
- A directed path comprising all decisions → the scenario is well-defined.

$\{A\} < D_1 < \{C\} < D_2 < \{F\} < D_3 < \{J\} < D_4 < \{B, D, E, G, H, I, K\}$