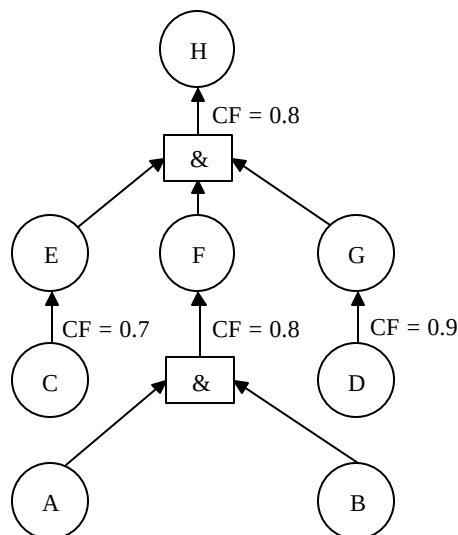


Assignment 2: Conflict Resolution and Uncertainty

- 1 For the following rules, using LEX as the conflict resolution strategy

Rule		Saliency
R1	$A \& B \& C \rightarrow D$	0
R2	$A \& C \& E \rightarrow I$	0
R3	$B \& D \rightarrow G$	0
R4	$\neg B \vee \neg F \rightarrow D$	0
R5	$F \& G \rightarrow E$	10
R6	$A \rightarrow C$	20
R7	$B \rightarrow \neg F$	10
R8	$A \& C \rightarrow H$	0
R9	$B \& H \rightarrow E$	0
R10	$\neg A \rightarrow H$	0

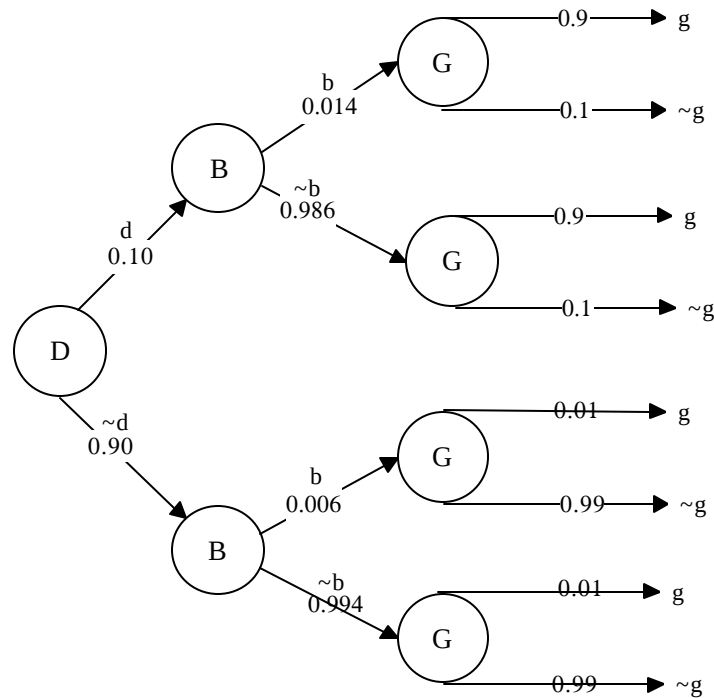
- (a) determine the final contents of working memory using forward chaining, assuming the initial contents of working memory to be $\{A, B\}$
- (b) determine whether the goal $\{E\}$ is supported using backward chaining, assuming the initial contents of working memory to be $\{\neg A, B, \neg C, F\}$.
- 2 For the following inference net



and given

$CF(A) = 0.8$ $CF(B) = 0.9$ $CF(C) = 0.5$ $CF(D) = 0.4$ $CF(E) = 0$ $CF(F) = 0$ $CF(G) = 0$
and $CF(H) = 0.5$, compute the final certainty factor for H.

- 3 A subjective Bayesian probabilist has provided you with the following probability tree model for a system consisting of one disease variable D and two symptom variables B and G . All variables are binary. $D=d$ denotes that the patient has, and $D=\neg d$ that the patient does not have, diabetes. Similarly, $B=b$ and $B=\neg b$ denote the presence and absence respectively of blue toes, and $G=g$ and $G=\neg g$ the presence and absence respectively of glucose in the urine.



- (a) Assume that you are implementing a MYCIN-like expert system for this problem, and that you have access to an expert whose model of the problem is as per the above tree. Describe your expert system by listing all the rules and associated certainty factors. Describe the conclusions of your system (posterior probability that the patient has diabetes) for each of the following cases, and compare it with the exact probability calculation.
- You observe $B=b$
 - You observe $B=b$ and $G=\neg g$
 - You observe $B=b$ with CF = 0.3 and $G=\neg g$ with CF 0.9
- (b) Assume that you are implementing a PROSPECTOR-like expert system for this problem, and that you have access to an expert whose model of the problem is as per the above tree. Describe your expert system by listing all the rules and associated likelihood ratios. Describe the conclusions of your system (posterior probability that the patient has diabetes) for each of the following cases, and compare it with the exact probability calculation.
- You observe $B=b$
 - You observe $B=b$ and $G=\neg g$
 - You observe E such that $P(B=b|E) = 0.3$ and $P(G=\neg g|E) = 0.9$