

**CSE 494/CSE598/CBS598 Spring 2006:  
take home part of the final exam  
(Due: Beginning of the class April 20)**

(1) For the polytree in Figure 19.4 (page 333) of the notes give the complete calculation for  $P(Q|P_{12}, P_{10}, P_5)$  (20 points)

(2) Consider an extension of the 2-man firing squad example where following are the probability associated with the exogenous variables.

(a) There is a probability  $P(U = 1) = p$  that the court has ordered the execution.

(b) There is a probability  $P(W = 1) = r$  that the Rifleman B's rifle is bad. (i.e, when he shoots from it, the bullet does not come out.)

(c) There is a probability  $P(V = 1) = q$  that Rifleman A pulls the trigger out of nervousness.

(i) Modify the equation for  $B$  so that  $B$  depends on  $C$  and  $W$ . (4 points)

Now determine the following:

(ii) P(prisoner dies) i.e.,  $P(D)$ .

(iii) P(prisoner dies |  $U = 1$ )

(iv) P(prisoner dies |  $A = 1$ )

(v) P(prisoner dies | do ( $A = 1$ ))

(vi) Find the probability of the following counterfactual. "If the prisoner is dead, then even if  $A$  were not to have shot, the prisoner would still be dead". (3+3+3+3+6=18 points)

(You are required to show the details of your work. Just giving the final answer is not enough.)