CSE 571 – Artificial Intelligence

Take Home TEST — II b

Due Date: Dec 9th, 3:15 PM.

(1) Consider the following extension of the modified 2-man firing squad example of section 3.3 of the paper titled 'Reasoning with cause and effect' by Judea Pearl.

(a) Besides u, and w, we have v, where $v = 1$ means that Rifleman B's rifle is bad. (i.e, when he shoots from it, it does not fire.) Now assuming $P(v = 1) = r$, determine
(i) P(prisoner dies) i.e., $P(D)$.
(ii) P(prisoner dies | u = 1)
(iii) P(prisoner dies | A =1)
(iv) P(prisoner dies | do (A =1))
(v) Find the probability of the following counter factual. "If the prisoner is dead, then even if A were not to have shot, the prisoner would still be dead". (15 pts)

(b) In addition to u, v and w, we have x, where $x = 1$ means that Rifleman-B has a probability s of pulling the trigger out of nervousness. i.e., $P(x = 1) = s$, Now determine
(i) P(prisoner dies) i.e., $P(D)$.
(ii) P(prisoner dies | u = 1)
(iii) P(prisoner dies | A =1)
(iv) P(prisoner dies | do (A =1))
(v) Find the probability of the following counter factual. "If the prisoner is dead, then even if A were not to have shot, the prisoner would still be dead". (20 pts)

Note that you may need to modify the equation for A and B so that A depends on both C and U, and B depends on C, V and X.

Also, you are required to show the details of your work. Just giving the final answer is not enough.