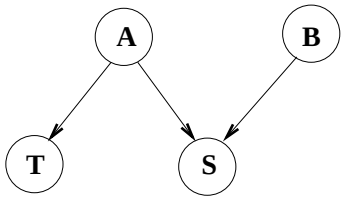
CS 6300 **Bayes Nets Practice** **March 15, 2022**

Suppose that a patient can have a symptom S that can be caused by two different diseases A and B. Disease A is much rarer, but there is a test T that tests for the presence of A. The Bayes' Net and corresponding conditional probability tables are shown below.



A	$P(A)$
$+a$	0.1
$-a$	0.9

B	$P(B)$
$+b$	0.5
$-b$	0.5

A	T	$P(T\|A)$
$+a$	$+t$	1
$+a$	$-t$	0
$-a$	$+t$	0.2
$-a$	$-t$	0.8

A	B	S	$P(S\|A,B)$
$+a$	$+b$	$+s$	1
$+a$	$+b$	$-s$	0
$+a$	$-b$	$+s$	0.8
$+a$	$-b$	$-s$	0.2
$-a$	$+b$	$+s$	1
$-a$	$+b$	$-s$	0
$-a$	$-b$	$+s$	0
$-a$	$-b$	$-s$	1

1. From the Baye's Net structure, what is $P(A, T, B, S)$?
2. What is $P(-a, -t, +b, +s)$?
3. What is the probability that a patient has disease $+a$ given that they have disease $+b$?
4. What is the probability that a patient has disease $+a$ given that they have symptoms $+s$, disease $+b$, and test $+t$ returns positive?
5. What is the probability that a patient has disease $+a$ given that they have symptom $+s$ and test $+t$ returns positive?