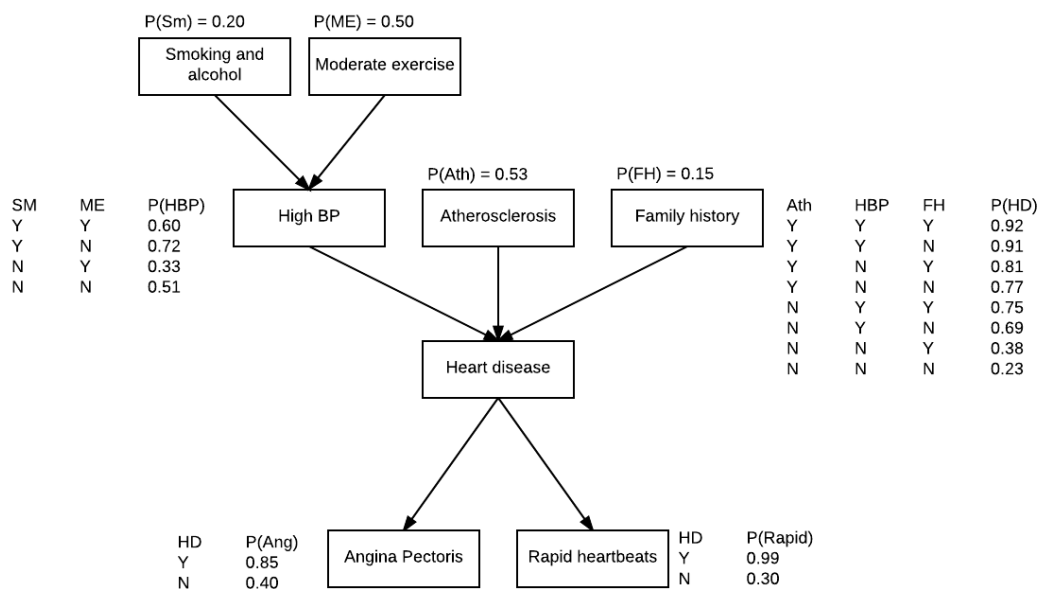CSCI 3202 - Intro to Artificial Intelligence
Instructor: Hoenigman
Assignment 6
Due Friday, November 4 at the beginning of class

Submit written answers and show all of your work for each problem.
Problems:
The following Bayes net is loosely based off the Bayes net shown in the heart disease paper posted on Moodle that examined heart disease risk factors in 167 elderly individuals in South Carolina. Use this Bayes net to answer the following questions.

P(Sm) = 0.20   P(ME) = 0.50

Smoking and alcohol   Moderate exercise

P(Ath) = 0.53   P(FH) = 0.15

SM	ME	P(HBP)
Y	Y	0.60
Y	N	0.72
N	Y	0.33
N	N	0.51

High BP   Atherosclerosis   Family history

Ath	HBP	FH	P(HD)
Y	Y	Y	0.92
Y	Y	N	0.91
Y	N	Y	0.81
Y	N	N	0.77
N	Y	Y	0.75
N	Y	N	0.69
N	N	Y	0.38
N	N	N	0.23

Heart disease

HD	P(Ang)
Y	0.85
N	0.40

Angina Pectoris   Rapid heartbeats

HD	P(Rapid)
Y	0.99
N	0.30

1. Calculate P(HBP)
2. Calculate P(HD)
3. What is the probability that an individual has heart disease if they have a rapid heartbeat?
4. What is the probability that an individual has high blood pressure if they have heart disease and a family history?

   Extra credit
5. **What is the probability that an individual is a smoker if they have heart disease?**
6. **How does the probability in Question 5 change if they also have high blood pressure?**
7. **If an individual complains of angina, is it worth it to send them a coupon for a new exercise bike, i.e. what is the probability that they get moderate exercise?**