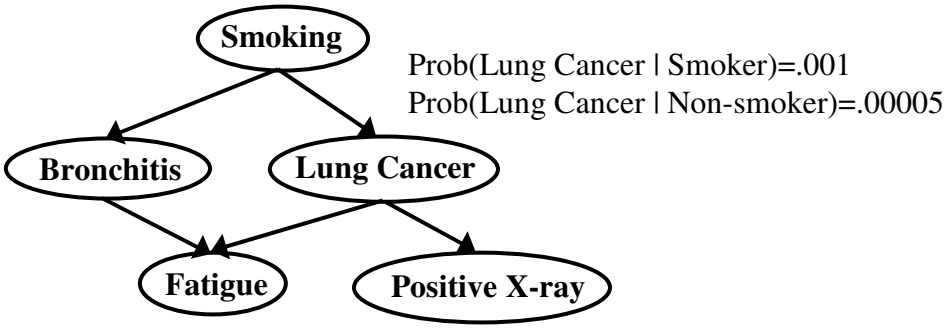
Math 348
Graphical Models

A smoker complains of fatigue. Do you think they have bronchitis or lung cancer? Now, what if their chest X-ray turns up positive?



In this class, we will learn to use pictures like this to answer questions like those. The arrows represent causation. For example, being a smoker will increase your chance of getting lung cancer.

Graphical models (aka Bayesian Networks) have been successfully used in Medicine, Computer Science, and Bioinformatics. How can a computer help me diagnose a patient? When I type "This doesn't work", how does Microsoft Word's helpful paperclip know what I'm talking about? Which of these bits of DNA code for genes, and which don't?

This class will be part pure mathematics (learning the applicable discrete probability theory), part theoretical computer science (how to answer these questions efficiently, though no programming will be required), part applications, and maybe even part philosophy (how do we know causation when we see it?). The prerequisite is Math 220 – Discrete Mathematics.

Spring 2008 **MWF 2:30-3:20pm** **Mr. Woods**