CSCI 3202
Lecture 17
October 3, 2025

Wumo by Wulff and Morgenthaller. https://wumo.com/wumo

Announcements
- HW #5 available now
  - Due on Friday, October 10
  - Look through the HW before the Midterm
  - Some material in HW will be on the Midterm
- Quiz #6 on Friday
  - Probabilities
  - Set up a Bayes network
  - Solve a Bayes network
- Midterm on Wed, October 8, 2024 in class

Midterm
- Exam is approximately 100 points and is 15% of your grade
- Consists of:
  - Definitions (5-10 questions)
    - Written out in Canvas
  - Multiple choice questions (5-10 questions)
    - Similar to Quizzes

- Short answer (5 questions)
  - Want 1-3 sentences
- Work it out (5 questions)
  - Written on paper
  - For the following diagram, use BFS to create a path from the source to the destination. Show all of the steps in creating your path similar to how we did it in class, including your Frontier, Reviewed States and Nodes Expanded.
- You will need a calculator or other way to calculate numeric answers
- Bring Paper and Writing Instrument to Midterm
- There is a midterm study guide on Canvas and a Sample Midterm Exam
  - Midterm Study Guide
  - Sample Midterm Questions.pdf
- I will provide answers to the Sample Midterm Questions and review the Study Guide on Monday

Bayesian Networks
- How can we add a probability to our distribution then sum it out?

$$WTS: \quad P(A,B) = \sum_c P(A,B|c) \cdot P(c)$$

$$P(A,B|c) = \frac{P(A,B,c)}{P(c)} \quad \text{JOINT DIST}$$

$$\Rightarrow P(A,B,c) = P(A,B|c) \cdot P(c)$$

$$P(A,B) = \sum_c P(A,B,c)$$

$$so \quad P(A,B) = \sum_c P(A,B,c)$$

$$= \sum_c P(A,B|c) \cdot P(c) \quad \text{COND DIST}$$

- **There is a difference between summing a conditional probability and summing a joint probability?**
- Solving a Bayes Network
  - Bayes Nets Part II Annotated.pdf
  - Solving Bayes Networks.pdf
  - We begin with a joint distribution containing all of the variables in model
  - Define the conditional probability we want as our result in terms of this joint distribution

- We "sum over" variables we don't want in the final
- Plug in the values from your CPTs and calculate a final result
- Your final result should be a numerical probability
- Predictive, Causal and Diagnostic Models
  - Bayes Nets Part III.pdf

Upcoming
- Midterm on Wed, October 8, 2024 in class
  - Review on Mon, October 6