Lesson Plan – Day 1

# Introduction/Syllabus (5-8 minutes)

## Things to mention

* Office hours – please come to them! ☺ We both encourage questions
* Textbook – no actual book, but there will be required readings posted on blackboard regularly, including one for Wednesday.
* Final Exam Date – Wednesday, May 6 at 10:45 – 1:15
* Pop quizzes – no makeups for *any* reason (1 or 2 will be dropped)
* Homework – will be due every Wednesday (including this one)
* Participation – be courteous to others while in this class.
* Classroom Policies – please take a few seconds and read that paragraph.
* Suggestions – emphasize 1 and 4 – asking questions only improves our opinion of you and challenge yourself (it’s okay to not know everything)

# Worksheet (35-40 minutes)

## Purpose

To expose students to the mathematical topics of the course

## Goals

Students will be able to use their prior knowledge (and logic) to solve all four problems on the worksheet. They will access their knowledge of counting, sequences, logic, and graph theory to produce the correct answers.

## Outline – suggested questions and answers

### 1

Answer:

Could get this by creating a tree diagram, writing out combinations, drawing links between people, multiplying and then dividing by 2 because of the doubles.

Issues:

1. Students may count a handshake twice – ask to see work and ask about AC vs CA (or similar thing depending on their work)
2. Students may not know where to start – give them a concrete example. Have them shake hands with the people at their table.

### 2

Answers:

1. Looking for the 26th odd number. Well, is the 26th even number so the 26th odd number is
2. Want to know how many hot dogs were eaten total. ANSWER: 676
   1. Way 1: Ask the students to look for a pattern when they start adding up all numbers. For instance:
   2. Way 2: I paired up opposite ends of the summation: 1 and 51, 3 and 49, etc. to get that there are 13 pairs each worth 52.

### 3

ANSWER: If Troll 1 is a knave, then Troll 2 is a knight and by default Troll 3 a knight. If this is the case, then Troll 1 was not lying because there *are* exactly 2 knights. Therefore, Troll 1 cannot be a knave. Therefore, Troll 1 must be a knight, which means that Troll 2 is a knave and by default Troll 3 is a knight.

Probing questions:

If Troll 1 is a knave then his statement is false (a.k.a. his is lying). Therefore, would there be exactly two knights if Troll 1 were a knave?

### 4

ANSWER: No. We have one edge too many! This is something that we will prove later on in the course ☺

Probing questions:

If they say no right away, ask them if they have tried *every* configuration of 5 dots.

If they say yes, ask to see their work and check for two dots that are not connected.

Cannot have a straight line between all 5 towns.

# Wrap-up (10-15 minutes)

Have students present solutions to number one.

**Sequencing:** Have a student who ‘brute forced it’ present first followed by someone who used a tree diagram. If someone solved it a different way maybe have them present as well.

Then ask the class which solution was the most efficient and could be used to generalize the solution path. Ask them to work in groups to start on their homework.