"In which we explore environments where other agents are plotting against us." – tagline for the chapter on this topic in
Artificial Intelligence: A Modern Approach by Russell and Norvig

. . . . . .

Consider the following game, called *Nim*: two players begin play with 15 stones on the table, and the players alternate taking the 1,2, or 3 stones each (their choice; players can choose different numbers on different turns). You win if you take the last stone.

Play this game a few times with someone else. Each of you should be the first player at least once. After a few games, try to answer this question:
Question 1. Who is going to win at *Nim*, assuming you are both trying to win? Why? Does your answer change if we start with a different number of stones than 15? Why?

In the game of *Chomp!*, you are given an n by m grid of cookies. Two players alternate turns. On your turn, you choose a single cookie at coordinates (i, j), and then you eat every cookie at coordinates (x, y) such that $x \geq i$ and $y \geq j$. The top left cookie (at coordinates $(1, 1)$) is poisoned (or otherwise undesirable). Your goal is to not be the one forced to collect that cookie.

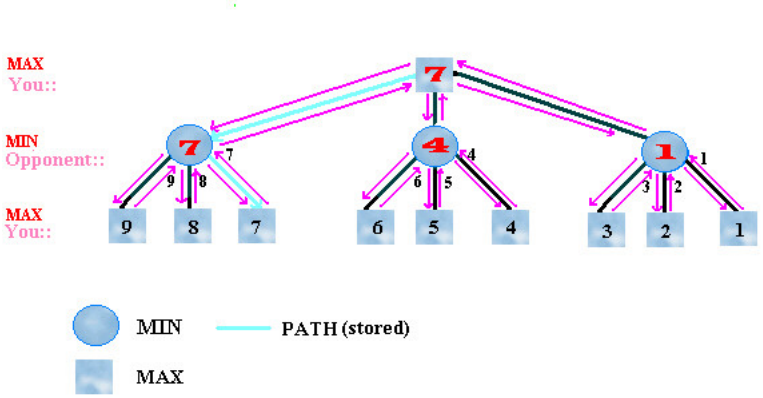
Play this game a few times with someone else; grids are below.

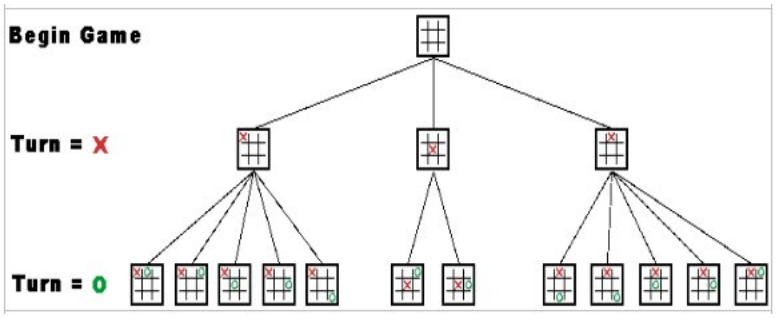
Each of you should be the first player at least once. After a few games, try to answer this question:
Question 2. Who is going to win at *Chomp!*, assuming you are both trying to win? Why?

Question 3. Today, we are (mostly) dealing with simplified games, such as card games and board games. There are four types of games; give some examples in the following table.

	deterministic	chance
perfect information		
imperfect information		

General Framework: Minimax





Question 4. Why are there only three choices for the first move? Aren't there nine choices?

Checkers

Question 5. How would you test a program designed to be an AI to play Checkers?

Question 6. Would the Minimax framework be appropriate for Checkers? Why or why not?

Chess

Question 7. There are three segments for Chess, each of which is typically handled differently by an AI. What are they, and why are they handled differently?

Question 8. What are the three types of solving a game, and how are they different?

Question 9. Why bother with game playing AI? What (if anything) are the practical societal benefits of this line of research?

Other Games

At this point, rather than having a set lesson plan, I'm going to open the floor to what you want to talk about. Here are a few I know at least something about the AI for. I do not necessarily know how to play these games.

Some of these games are *very different* from games we have discussed. Let's talk about what interests you.

- Go
- Backgammon
- Starcraft II
- Othello / Reversi
- Bridge
- Scrabble

For More Reading

- `https://webdocs.cs.ualberta.ca/~chinook/` is the website of the "Checkers solver" software. It has many links to more information, ranging from the research that went into this to other solved games.
- `https://www.science.org/doi/10.1126/science.1144079` has the "Checkers is Solved" article. I believe most of you now have the background knowledge to read this article and get more detailed information.
- `http://gamescrafters.berkeley.edu/` is the GamesCrafters club at Cal Berkeley. If you found this lecture interesting and want to learn more about some other games, check that out.