

A photograph of a basketball player in a red jersey shooting a ball in a gymnasium. The player is in the foreground, looking up at the ball. The background shows a gymnasium with bleachers and a basketball hoop. The text is overlaid on the image.

# **Patent Searching: A Game of Imperfect Information**

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DeMarco Intellectual Property, LLC  
PIUG 2013 Annual Conference**

For each of us, searching patents represents something different. It might be...

A job,

a career, or

even a calling.

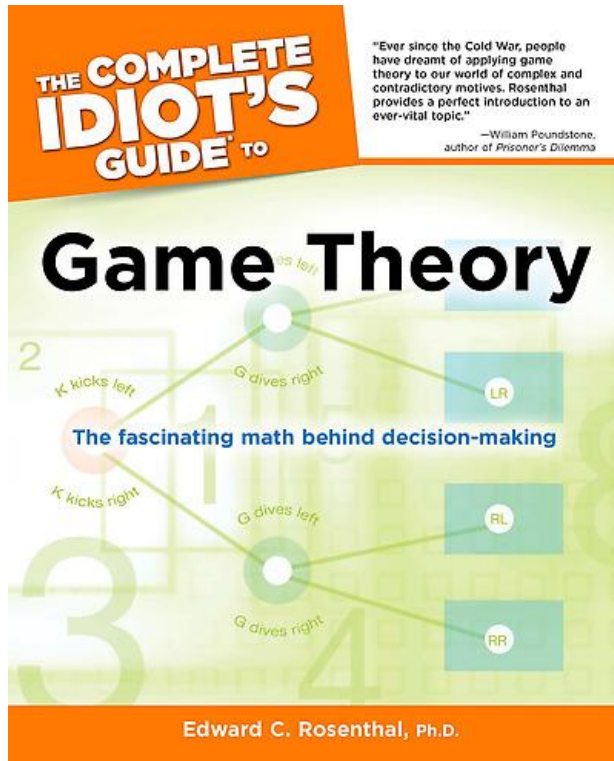
For me, it is also a fun game. This puts a smile on my face every day I go to work.

But what type of game is it?

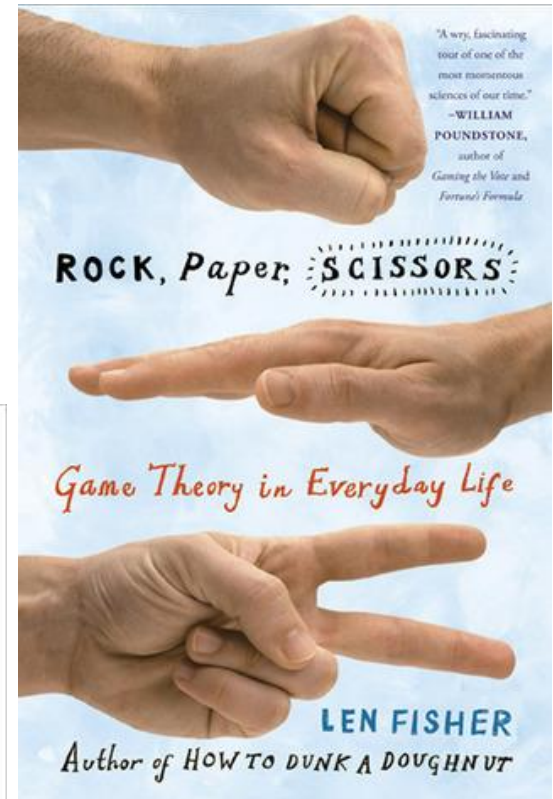
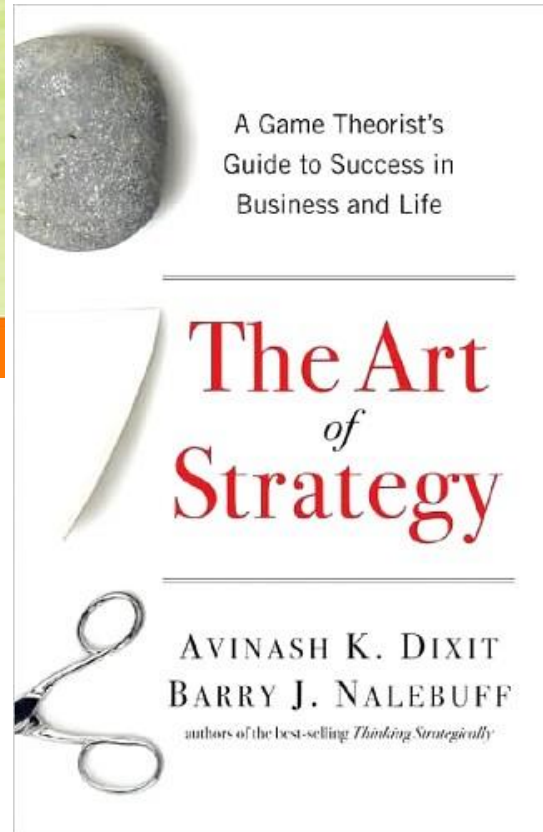
Who are the players?

What are the rules?

And what does this have to do with game theory?

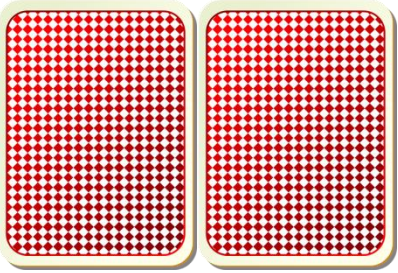


# The Basics

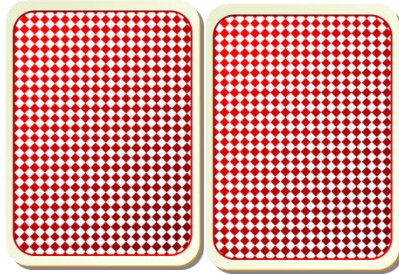


John von Neumann wrote the first book on game theory in 1944

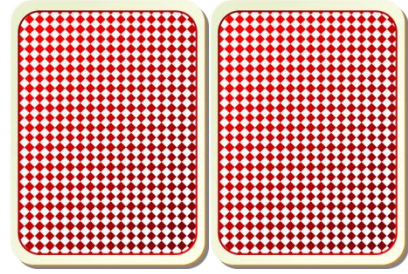
The movie *A Beautiful Mind* introduced the public to game theory



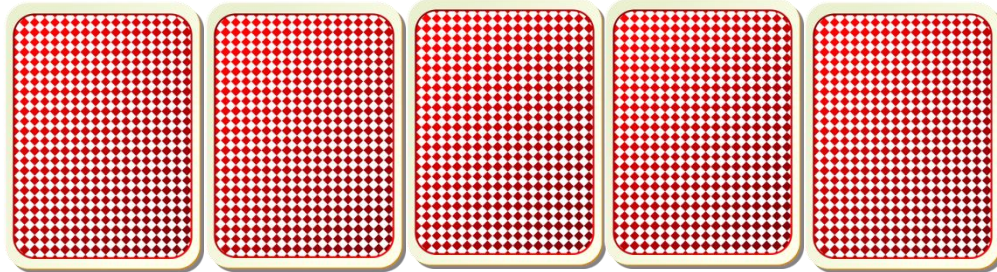
Player 1



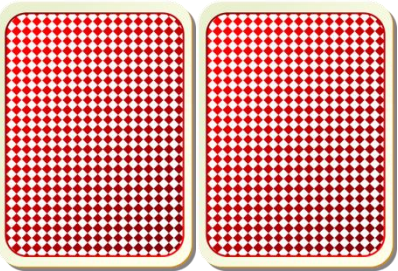
Player 2



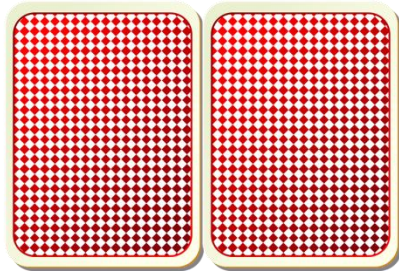
Player 3



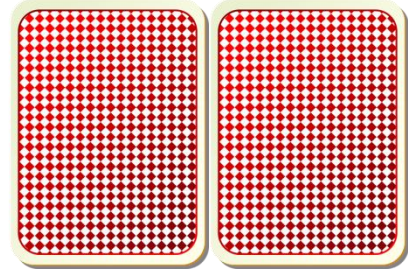
You are the dealer

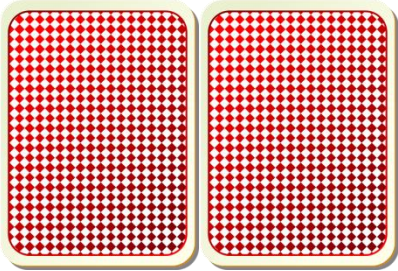


Player 5

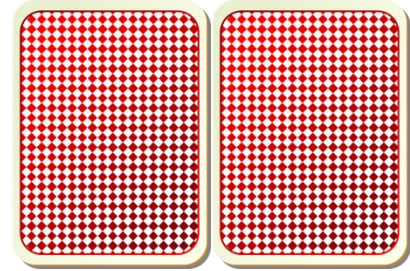


Player 4



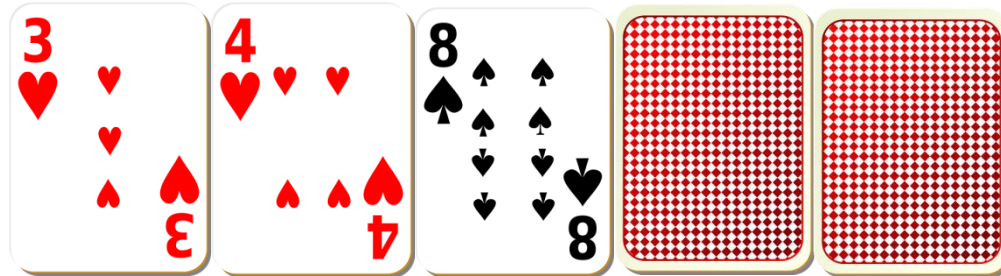


All in with \$100

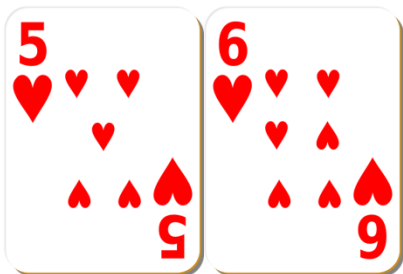


All in with \$100

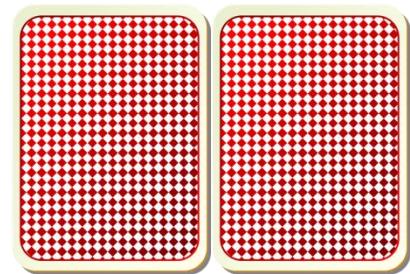
Pot has \$100



What do you do?



All in with \$100



# Prisoner's Dilemma

This is the most famous and one of the simplest applications of game theory.

		Prisoner 2	
		Cooperate	Defect
Prisoner 1	Cooperate	(3, 3)	(0, 5)
	Defect	(5, 0)	(1, 1)

# Prisoner's Dilemma

aka – “The Joint Venture”

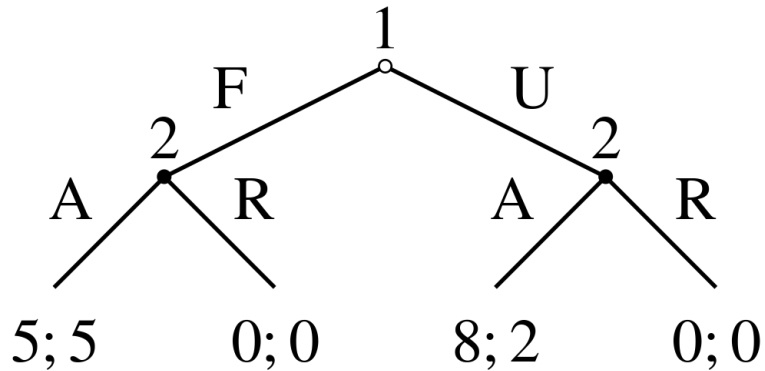
## Scenario A

		Company 2	
		Cooperate	Steal
Company 1	Cooperate	(4, 4)	(0, 6)
	Steal	(6, 0)	(0, 0)

## Scenario B (hostages worth 8)

		Company 2	
		Cooperate	Steal
Company 1	Cooperate	(4, 4)	(8, -2)
	Steal	(-2, 8)	(0, 0)





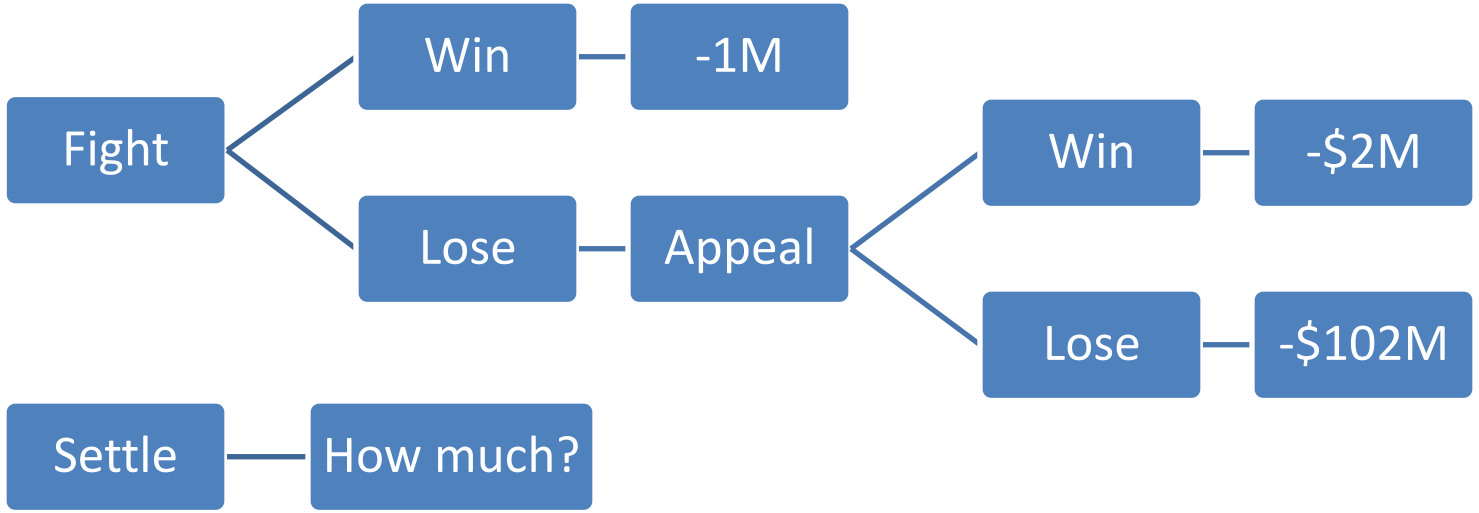
In the game pictured to the left, there are two players. *Player 1* moves first and chooses either *F* or *U*. *Player 2* sees *Player 1*'s move and then chooses *A* or *R*. Suppose that *Player 1* chooses *U* and then *Player 2* chooses *A*, then *Player 1* gets 8 and *Player 2* gets 2.

This decision tree and text is the opening paragraph on “game theory” at Wikipedia.

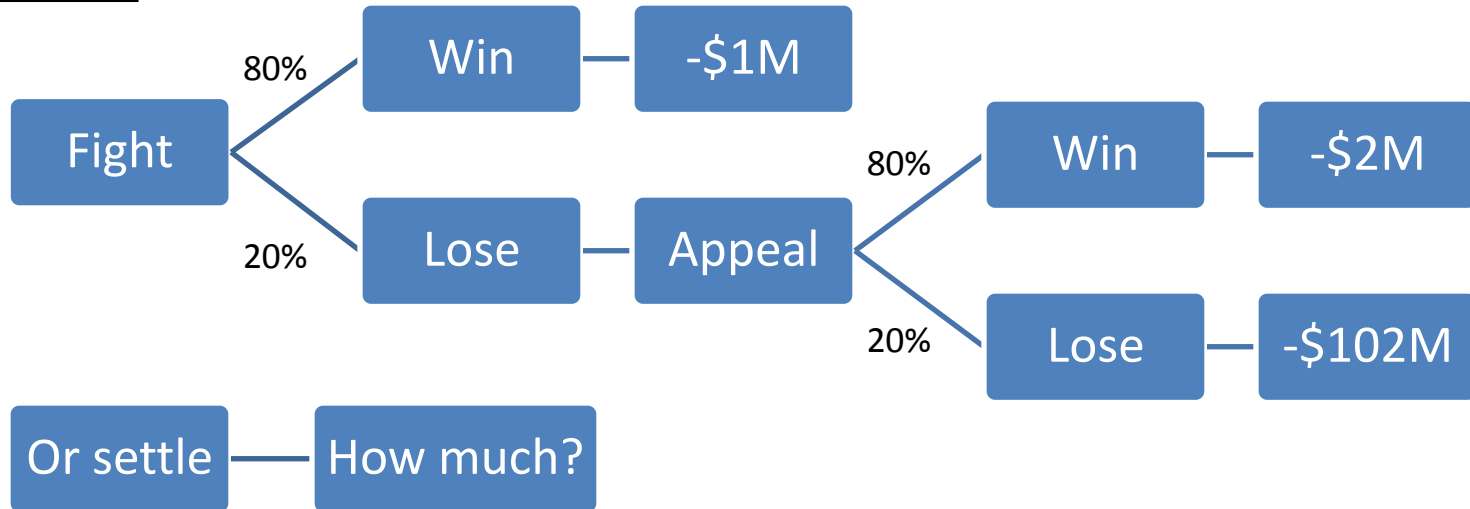
Let's try a "real" decision tree: You are a high-tech smartphone company that is accused of infringing a patent!

**\$100,000,000 is at risk.**

Scenario C



### Scenario C



This is not our first legal battle! We have an average win rate in court of 80% and we always appeal.

The **Expected Value** will be

$$(80\% \times 1M) + (20\% \times \{(80\% \times 2M) + (20\% \times 102M)\}) =$$

**\$5,200,000**

# Imperfect Information

A game in which at least one player does not know the payoffs to the other players.

For me, this describes my job!

## Potential Opponent List:

Job Applicant

Manager, Employee, or Coworker

Patent Classifier, Examiner, or Indexer

Inventor

Patent Attorney

Searcher at Another Company

Outsourced Patent Searcher

\*\*\* Not all games are win-lose. Some cooperative  
games are win-win!

Identify the opponent's motivation:  
What might their payoffs be?  
Do they know your payoffs?

**Scenario D**

		Manager	
		Review	No Review
Employee	Solid Effort	(-8, -2)	(-8, 0)
	Corner Cutting	(?, -2)	(-2, 0)

# Reputations and Signaling

## Scenario E (the wrist slap)

		Manager	
		Review	No Review
Employee	Solid Effort	(-8, -2)	(-8, 0)
	Corner Cutting	(-10, -2)	(-2, 0)

## Scenario F (the final straw)

		Manager	
		Review	No Review
Employee	Solid Effort	(-8, -2)	(-8, 0)
	Corner Cutting	(-502, -2)	(-2, 0)

# Another Reputation and Signaling Situation

Job Applicant 1 signals the following:

non-working spouse

mortgage

three young children

Job Applicant 2 signals the following:

independently wealthy

loves to travel

gaps in employment history



How is this different than a cost benefit analysis?

At these simple levels, it is not very different. Both involve analyzing the situation and making the most profitable move.

At higher levels, game theory allows the mathematical modeling of complex relationships and multiple payoffs.

What are games of imperfect information:

Poker!

Not Chess

Bridge, Hearts, and Spades!

Not Parcheesi or Sorry

Strategy games with a Fog of War aspect!



Fog of War

Now imagine Star Craft and a million South Koreans training to be patent searchers...

How are they training?

They have limited resources.

They scout to optimize resource usage.

They learn from their peers.

They monitor and adjust on the fly.

They apply singular focus.

They make educated guesses.

They are extremely results oriented.

They love their work and want to get better!

As a searcher, how do I integrate this into my work environment?

Identify the payoffs to others and act accordingly.

Is it an FTO, a validity, or both?

Why did the examiner cite a particular reference?

What will my manager do during a search review?

Where will our competitor search for art?

How much effort should go into an estimate?

Does the new legal client litigate or prosecute?

What signals do I give?

As a manager, how do I integrate this into my work environment?

Team Building Exercises

Company sponsored poker tourney

Ask different questions during interviews

“Do you prefer chess or card games?”

Signal your payoffs and build a reputation that engenders the behavior you need in your staff.

Thank you very much  
Questions?

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Managing Director



**DEMARCO** IP