

Lecture 4

Dynamic Games: Threats and Promises

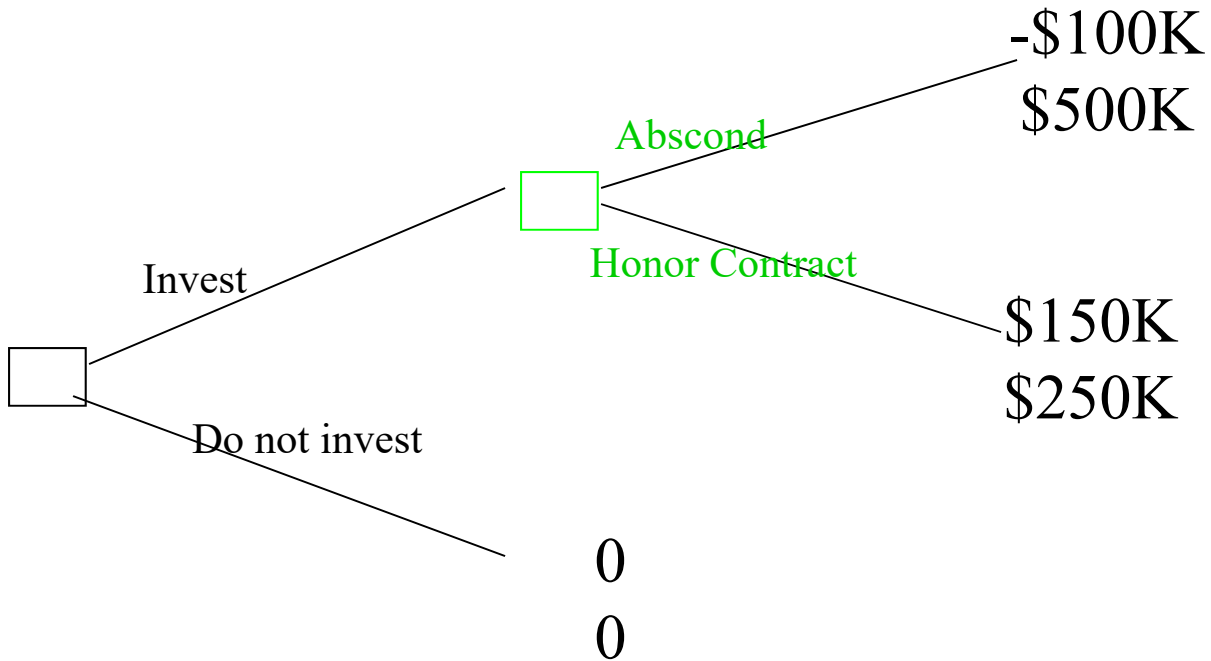
Lecture Outline

- Commitments, Threats and Promises.
- Fredo and Charlie again.
- Predatory Pricing.
- “If you do not do your homework, you are NOT going to sleep-away camp this year!”
- Reconstructing the game:
 - Contracts
 - Reputation,
 - Burning Bridges
 - Cutting off communication
 - Incrementalism (small steps)
 - Teamwork and agents.

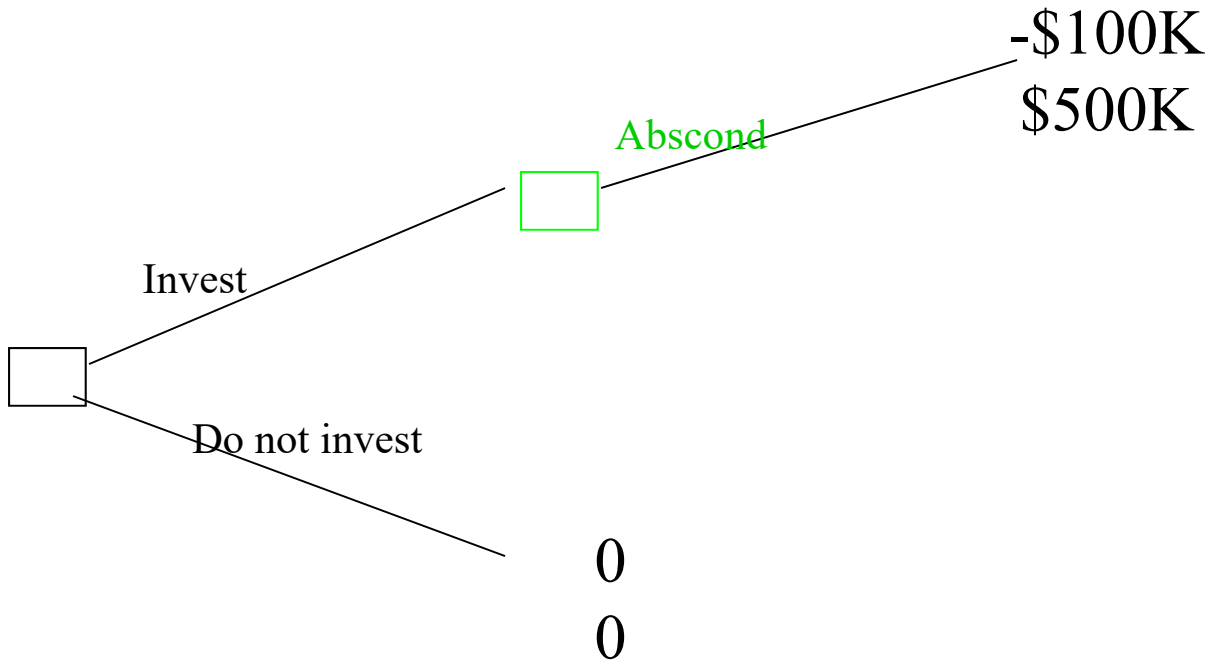
Dynamic Games: Threats and Promises

- The Hunt for Red October
- Chap 5, 46 minutes.

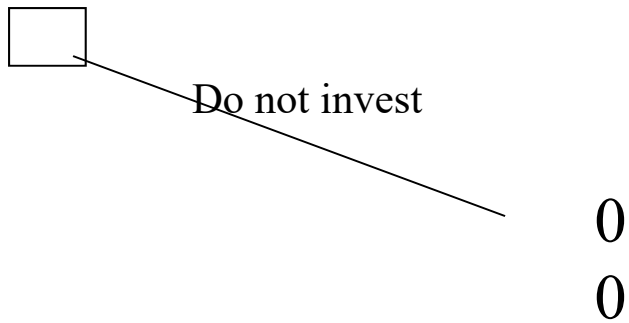
Game Tree Analysis



Game Tree Analysis



Game Tree Analysis



Solving The Investment Game

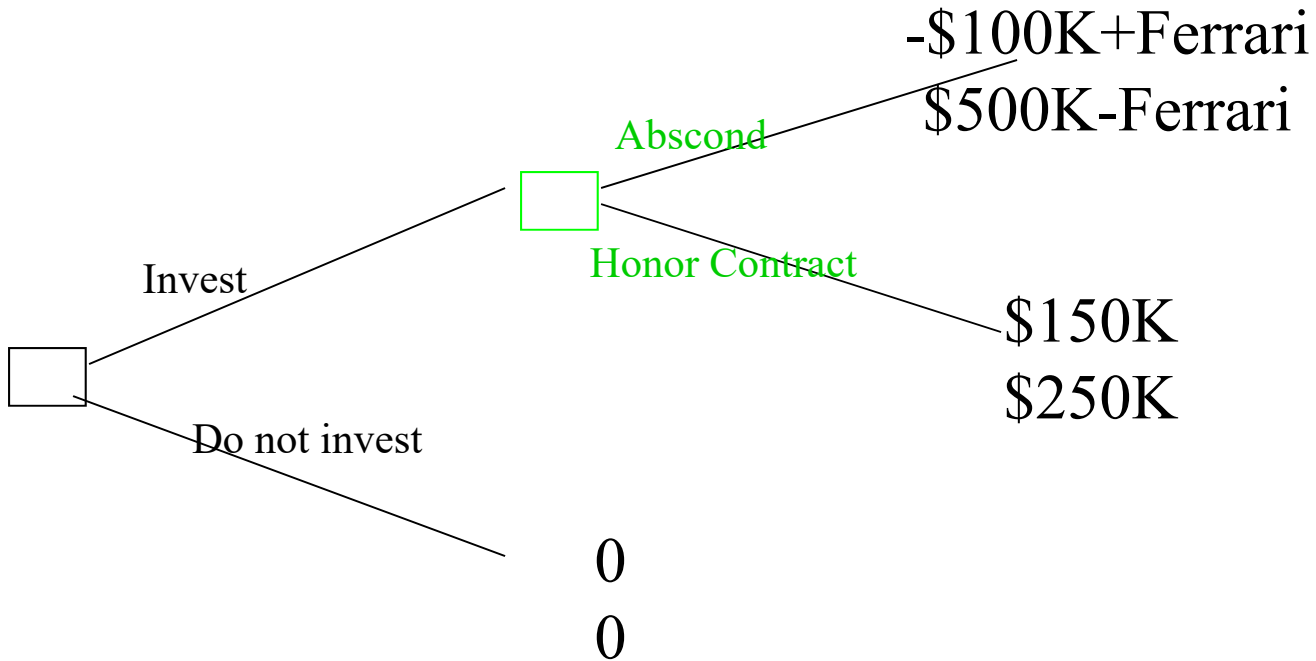
- Using Back to Front Reasoning, how will this game be played?
- Notice, that there is an outcome both players would prefer.
- But they cannot achieve it in this world.
- Is there anything that they can do?
 - Fredo has a vintage 1969 Ferrari 365 GTC
 - What if he offers a “hostage”? (Ie collateral).
 - <http://www.conceptcarz.com/vehicle/z9309/Ferrari-365-GTC.aspx>
 - http://www.rmauctions.com/lots/lot.cfm?lot_id=105751

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conceptcarz.com

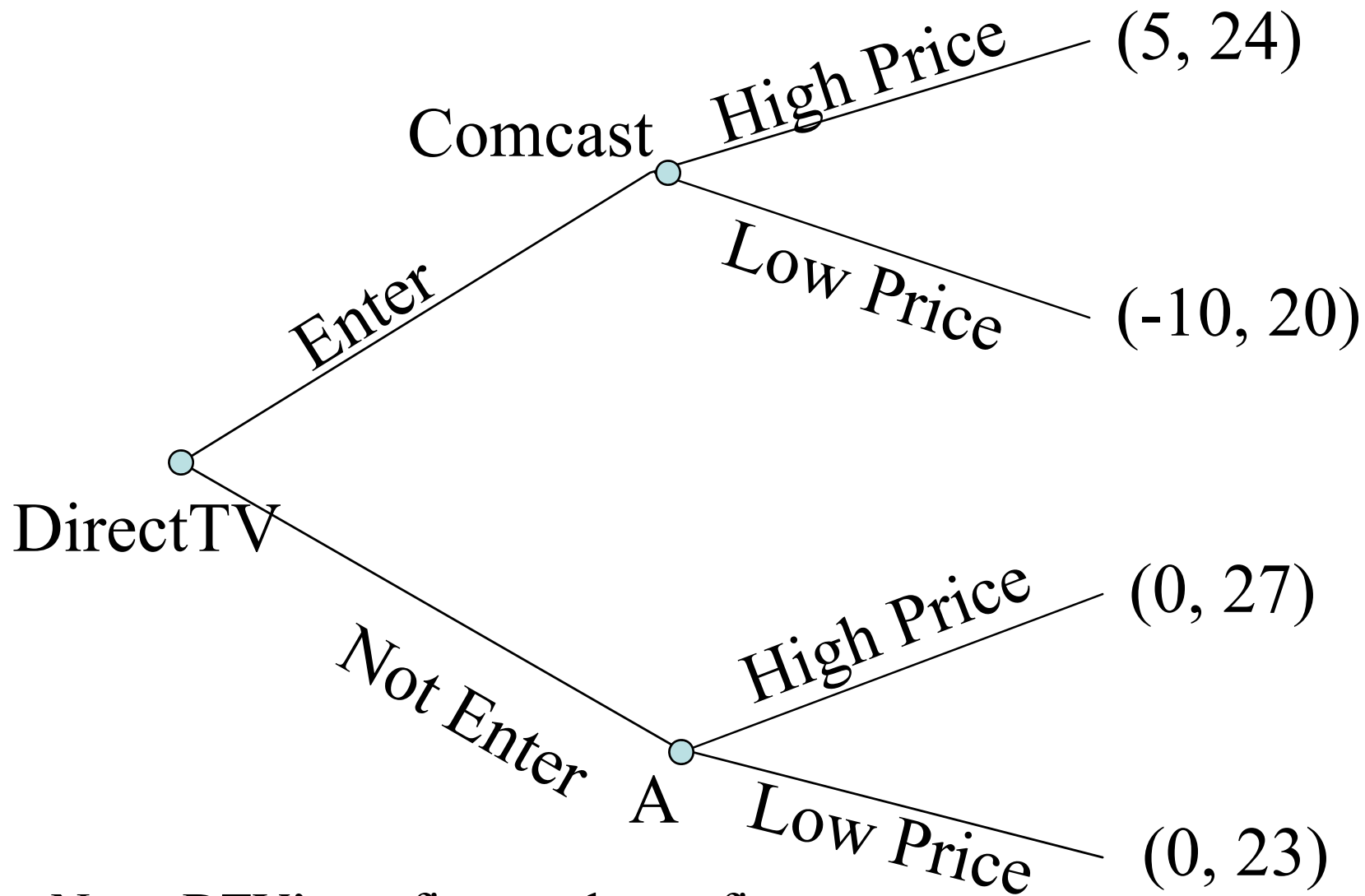


Game Tree Analysis



Predatory Pricing

- Antitrust authorities worry that an incumbent monopolist can keep out competition by threatening price wars.
- However, if price wars are painful, this threat may not be credible...



Note: DTV's profits are shown first

Credibility

- Player B may “Threaten” to punish or “Promise” to benefit Player A if A takes some action.
- But, once that action is taken, will it be in B’s interest (going forward) to follow through?
- After all, the choice of A may be SUNK and unchangeable.
- In this situation, we would question the CREDIBILITY of B’s threat or promise.

Re-establishing Credibility

- The inability to credibly promise or threaten can lead to unattractive outcomes (see Fredo and Charlie)
- In these situations, what can be done to re-establish credibility?
 - Change payoffs
 - Change options.

Changing Payoffs

Contracts

- Contracts are a way to change payoffs from actions.
- Fredo was unable to persuade Charlie that he would pay the debt because the legal system in Freedonia was incomplete
- In a society where it is costly to break contracts (liquidated damages is a term often used), signing contracts is a way of making it more costly to fail to follow through (mainly on a promise since legal systems usually do not enforce threats.)

Hostages or Collateral

- Exchanging or offering collateral is also a way to change payoffs.
- Fredo's offer of the Ferrari was an example.
- Often, banks require collateral in order to secure loans.
- In ancient military campaigns, hostages were often exchanged in order to ensure that promises were kept.
 - Caesar frequently used hostage exchange as a means of ensuring adherence to promises (as described in Tacitus)

Reputation

- Establishing a reputation is a way to create collateral.
- Firms will often create trademarks for this purpose (Rolls Royce: Road service?)
- By building up a reputation for (say) honesty or brutality, an agent can convince a rival that the threat or promise will be carried out or else the reputation will be damaged.
 - Pirates eg. see *The Invisible Hook*



Did Pirates Really Make Victims “Walk the Plank?”

- “Although walking the plank plays a large role in [contemporary pirate lore](#), in reality walking the plank was a very rare phenomenon. Most pirates, mutineers, etc., would not bother with such an elaborate (and prone to mishap) means of doing away with their captives.[\[6\]](#) The few who particularly enjoyed torturing their victims (such as [Edward Low](#)) would likely prefer longer-lasting methods.”
- Wikipedia entry

Why are trademarks important?

- Companies jealously guard their trademark.

- **McDonald's loses trademark case**

- *Tuesday, 8 September 2009*

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- McDonald's lost an eight-year trademark battle against the Malaysian restaurant McCurry, which serves Indian food.

- The country's highest court ruled today that the US fast food giant cannot appeal against another court's verdict that allowed McCurry to use the "Mc" prefix.

- The ruling by the Federal Court ends all legal avenues for McDonald's to protect its name from what it said was a trademark infringement.

- A three-member Appeal Court panel ruled in favour of McCurry Restaurant in April this year. The panel said there was no evidence to show that McCurry was passing off McDonald's business as its own.

- McDonald's asked the Federal Court for permission to appeal against that decision but was denied.

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Read more: <http://www.belfasttelegraph.co.uk/news/world-news/mcdonalds-loses-trademark-case-14482972.html?r=RSS#ixzz0RxTtnN0p>

Trademarks as Reputation

- Trademarks are measures of reputation.
- McD's would not like to destroy its very valuable reputation by cheating a customer.
- Travelers who see the Golden Arches come to expect certain levels of quality.
- Another firm that displays the same or similar symbols do not have the same incentives.
- But what is to keep them from copying the symbols?

Teamwork

- The payoff from failing to follow through on a promise or commitment can be altered by joining a team of agents with similar desires.
- AA is well-known method for achieving the goal of kicking an alcohol addiction.
- Armies
- Honor code.

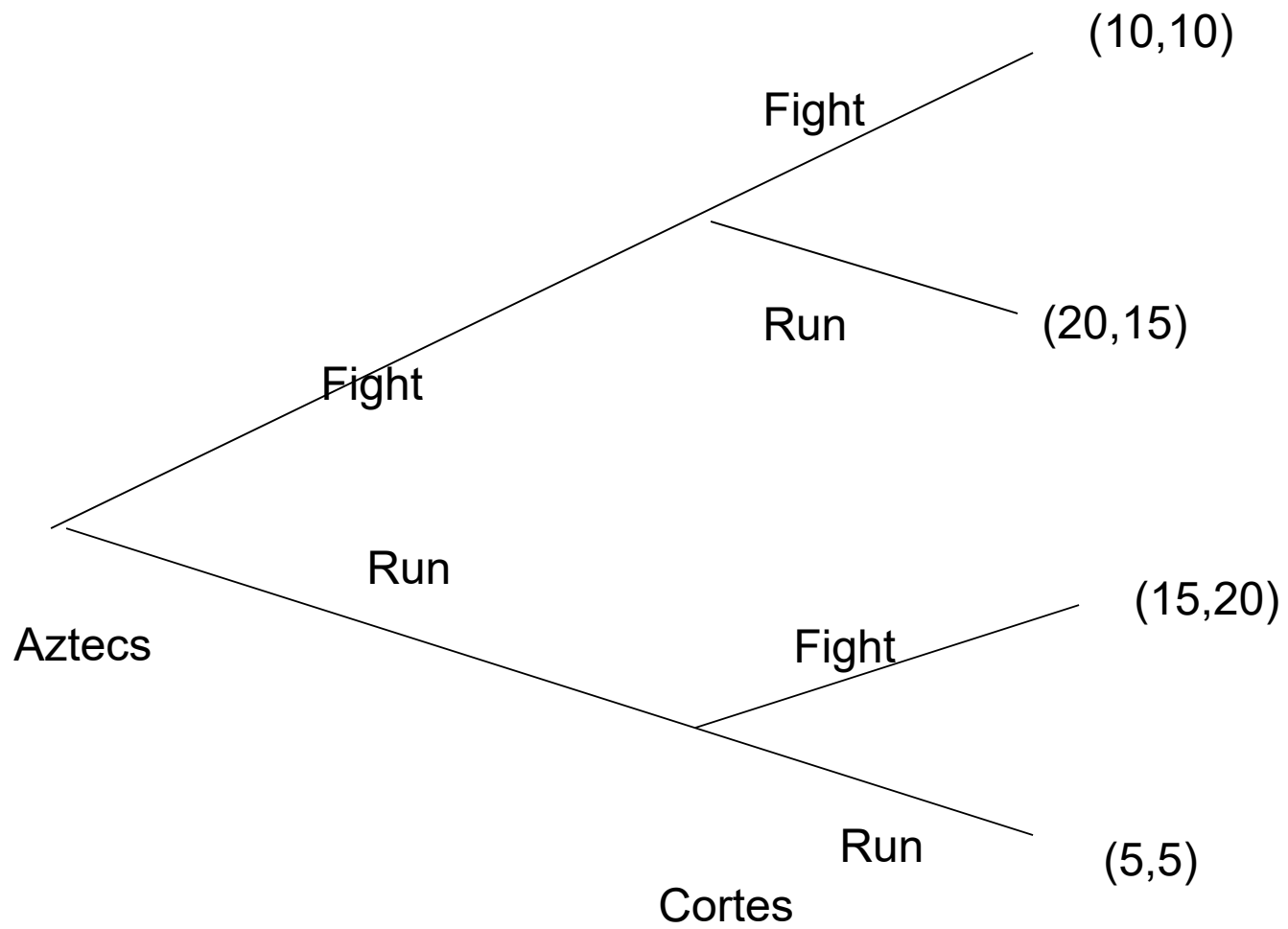
Changing Options

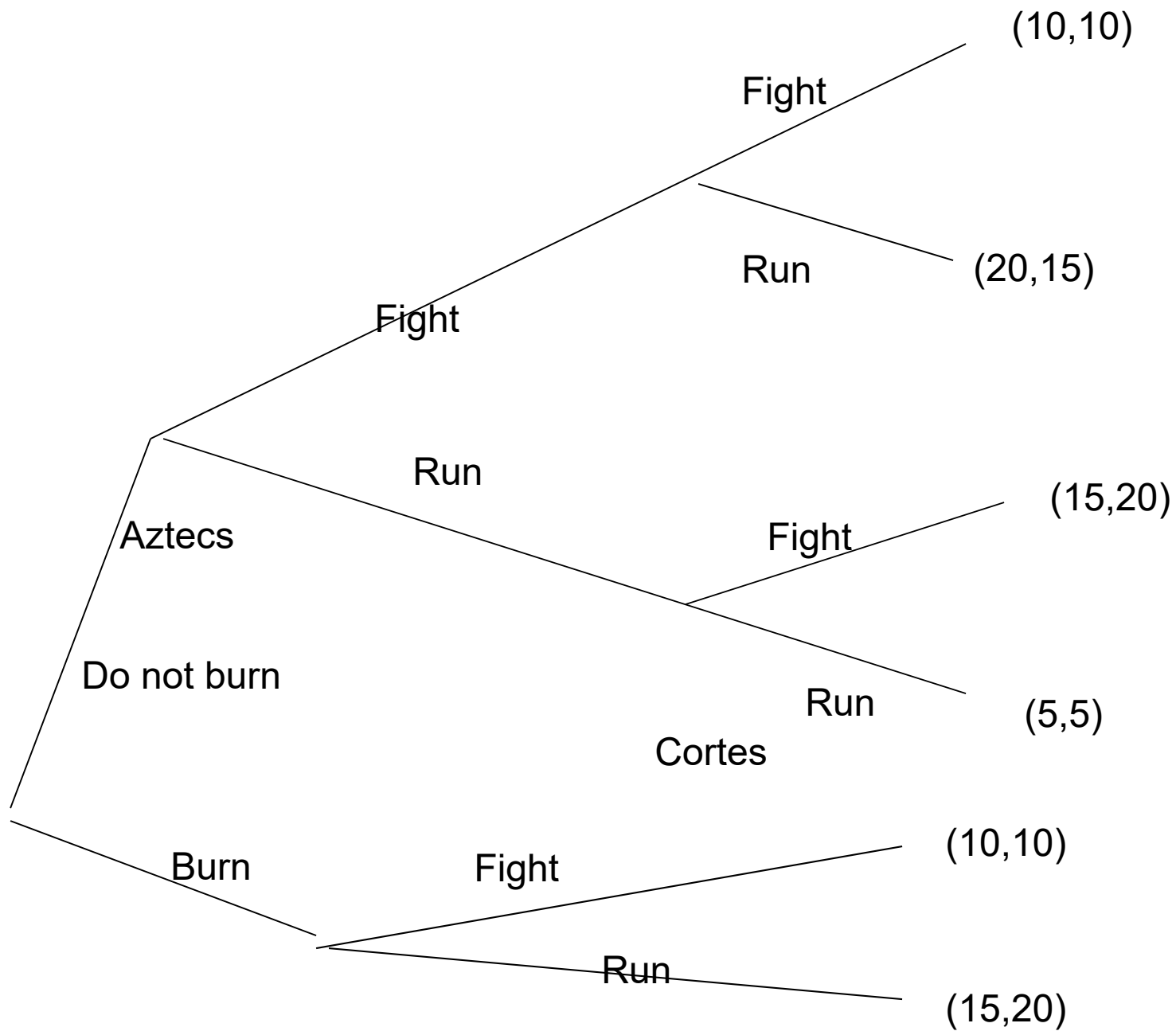
Burning Bridges

- When Cortes arrived in Mexico, he ordered all but one of his ships be burned.
- Similarly, William the Conqueror burned his ships after invading England.
- Sun Tzu argued that it is important to leave your enemy an escape route.
- Why this peculiar behavior?

Burning Bridges

- Cutting off your escape route is a way of demonstrating commitment to a line of action.
- Why was it a foolish act for the Trojans to burn the *Greek* ships?
- Allowing the fall of the Berlin Wall?





Incrementalism

- What if we changed the game to move in smaller steps?

Move in Small Steps

- Suppose you hire a contractor to renovate your kitchen for \$60K.
- You pay him upfront for the job. When will it get finished?
- You pay him at the end of the job. When will it get started?
- You both agree on a payment schedule: 10K after the first week, another 10K after the second.....
- But see the last slides of this lecture.

The Home Contracting Game

- A successful renovation is worth \$75K to the hh. Successful completion costs the contractor, \$20K. If the contractor fails to successfully complete the contract, he loses \$R in reputation, $\$10K < R < \$20K$. No deal gives each \$0.
- Game 1. The HH pays the contractor \$50K to complete the project, the contractor decides whether or not to complete. An unsuccessful renovation results in the contractor earning $50 - R$ and the hh getting $40 - 50$.
- Game 2: The HH pays the contractor \$25K for a first stage of completion that costs the contractor \$10K. If the contractor cheats on one stage, he gets $25 - R$. and the hh gets $30 - 25$. If the contractor does not cheat, and the HH does not pay the next installment, HH gets $40 - 25$, c gets $25 - 10$. If the HH pays, and the contractor cheats this time, HH gets $40 - 50$, c gets $50 - 10 - R = 40 - R < 30$. If c completes, HH gets $75 - 50$, c gets $50 - 20 = 30$.

Cutting off Communication

- <http://www.gametheory.net/media/Doomsday.wmv>
- “They are on their way in and no one can bring them back. For the sake of our country and our way of life, I suggest you get the rest of SAC in after them. Otherwise, we will be totally destroyed by Red retaliation. My boys will give you the best kind of start, 1400 megatons worth....” “And then he HUNG UP!”
- Last will and Testament.

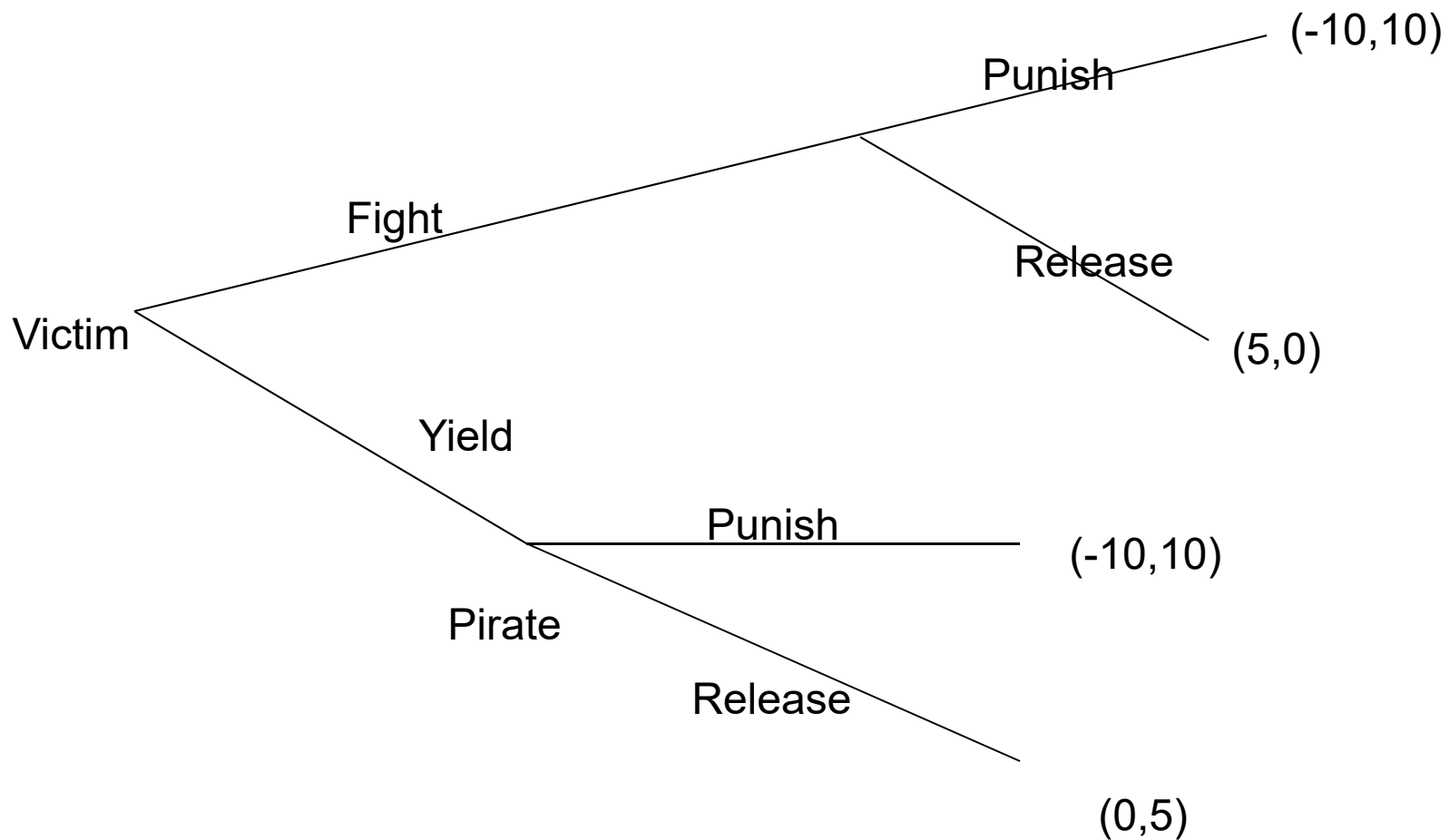
Employing Agents

- http://www.realclearsports.com/lists/memorable_nfl_holdouts/
- Rookie players want to play, coaches want them to play. Is it all the agents' fault?

Employing Agents

- What if there were no agents?
- Would holdouts stop?
- What would happen to rookie salaries?

A Pirates Dilemma – The Insane Pirate.



Why do these strategies work? OR do they?

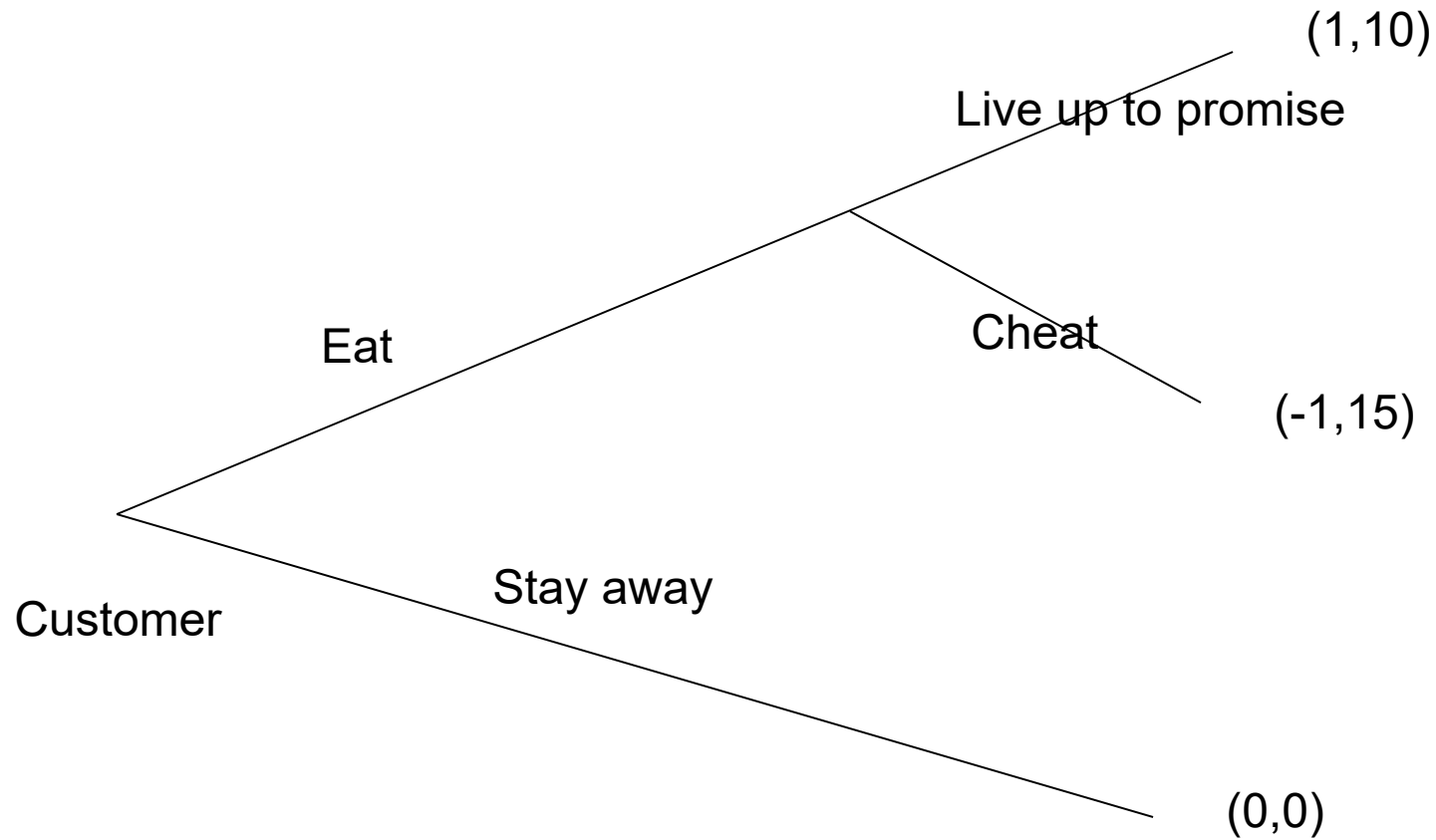
- Although all of these strategies seem plausible, strict back to front reasoning might make them questionable.
- We show next that reputation building is not as easy as one might think.
- Adding crazy behavior though might actually help.

Can we ever build a reputation? The McDonalds Paradox

Set-up

- Consider the problem of a “fast food” monopoly franchise that wants to convince its customers that it will always provide “good” quality food.
- In one market, the game looks like this:

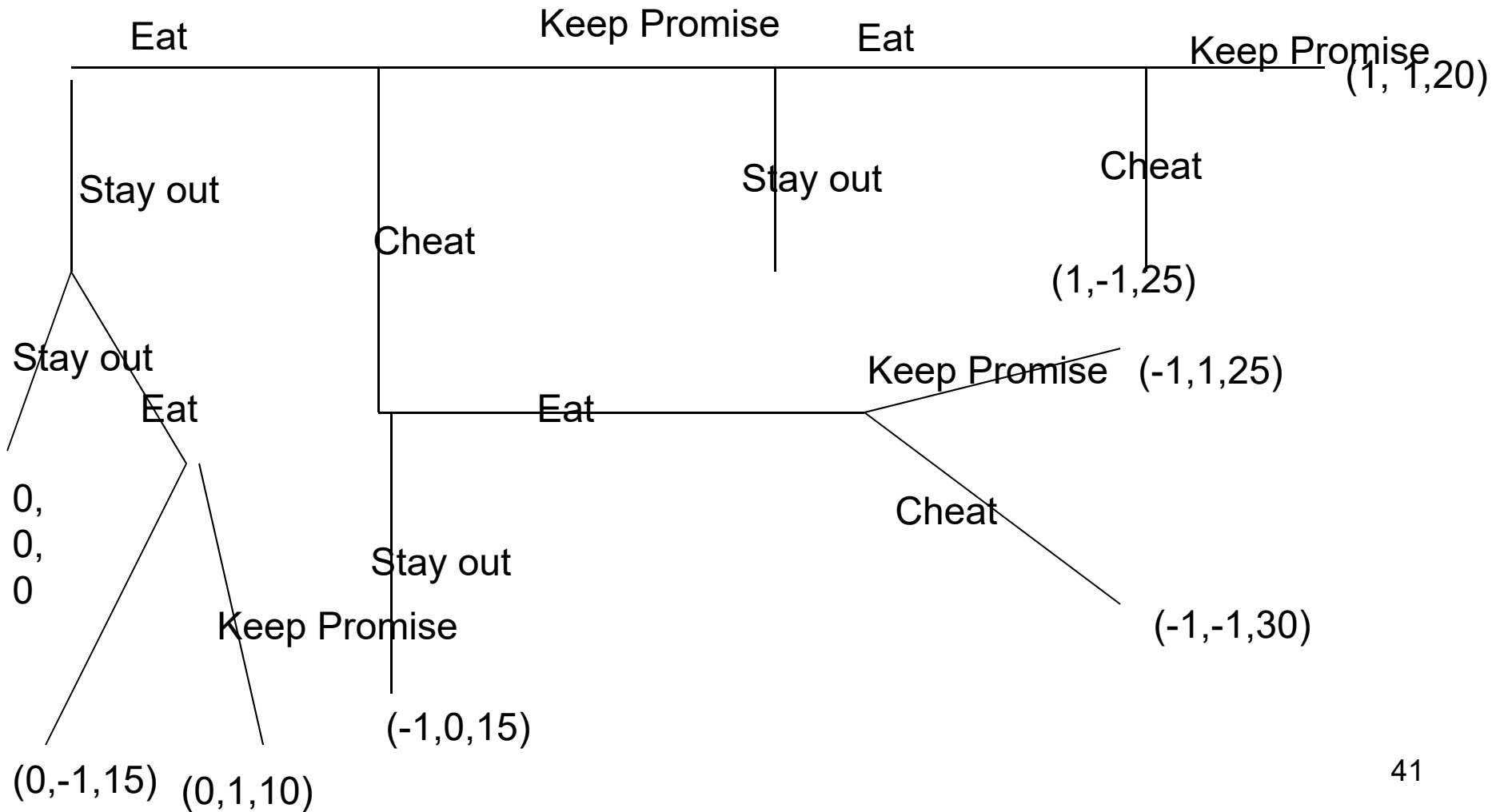
Single Visit Game



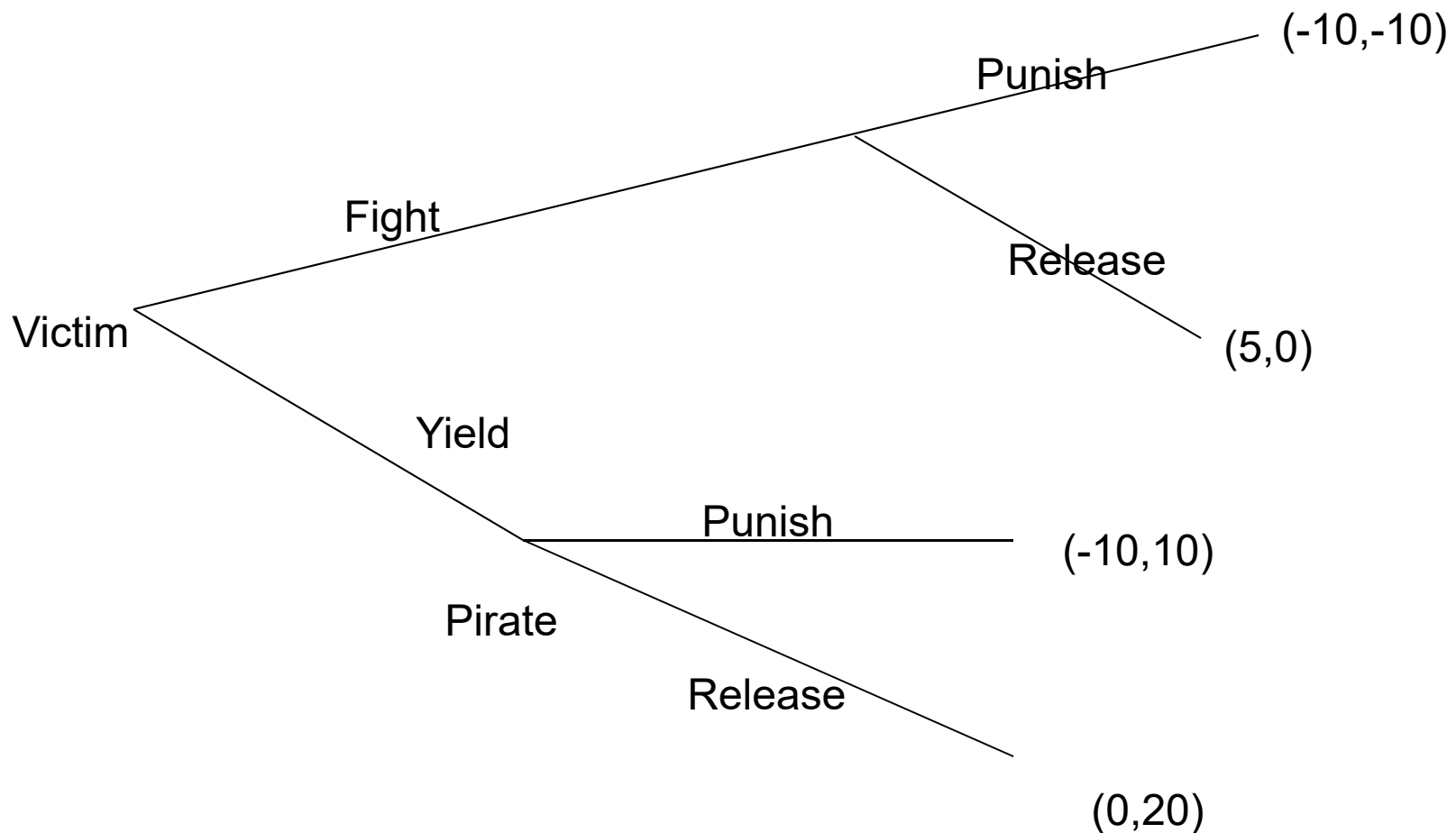
Multi-market game

- Back to front reasoning suggests that the restaurant cannot credibly promise to deliver good quality.
- But suppose the restaurant is present in many (say 10) markets, ie. a franchise.
- Does it want to develop a reputation for living up to its promise in early markets to make sure other customers will come in in later markets?
- But what happens when we reach the 10th market?

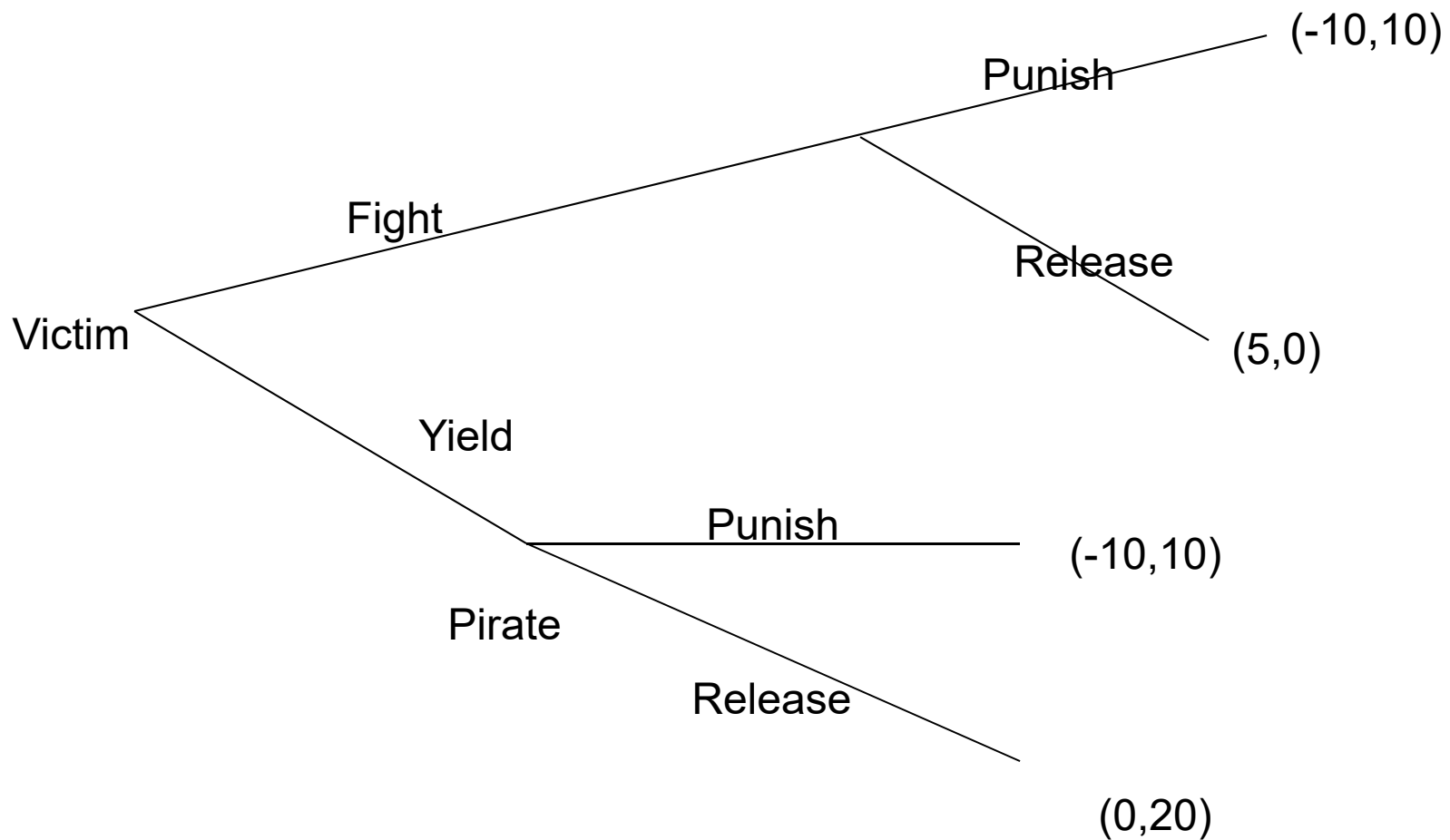
Multimarket Game



A Pirates Dilemma – The Rational Pirate.



A Pirates Dilemma – The Insane Pirate.



A Mix of Pirates

- Suppose there are some rational pirates and some insane pirates. Curse of the Black Pearl 38:20, chap 5
- 55:00 chap 8
- We know what the insane pirates will do,
- What will the rational pirates do in a repeated game?
- Now there is a reason to develop a reputation.
- By punishing a fighter the first time you meet a victim you increase the belief of the population that you are insane even if you are not.
- This might be worth doing if you can get the later victims to yield.
- NOTE That this would not work if the insane pirate ALWAYS likes to punish ...

The Home Contracting Game

- See board.