



**IGE 104:
LOGIC AND MATHEMATICS FOR
DAILY LIVING**

Lecture 20

1

SPLITTING 10 BAHT

- Player 1 will write down a whole number between 0 and 10 (this is how much of the 10 baht player 1 thinks he should get)
- Player 2 will see what Player 1 wrote and either “accept” or “reject” the offer
- If player 2 rejects, then neither player gets anything
- If player 2 accepts then player 1 receives his proposal, and player 2 gets the difference

HOMO ECONOMICUS

- Concept of a completely rational person who is both rational and self-interested.
i.e. does not value “fairness”, “altruism”, etc.
- Homo Economicus would accept 1 baht
- Would you?

SPLITTING 10 BAHT, TWICE

- What if we play this game twice in a row?
- If player 2 rejects a first time, player 1 can make a second offer.

- Does this change our equilibrium?
- Should it?

THE DICTATOR GAME

- Same as before, but player 2 is passive.
- Note that this is not really a game
- good evidence that people are irrational

THE PIRATE GAME- SETUP

- 5 greedy pirates, Angry Arnold, Black Beard, Callus Carl, Dreaded Derrick, and Evil Edward find a purse with 10 gold coins. After taking their loot onboard they must decide how to distribute the coins.
- This is just a multiplayer version of the 10 baht split we just talked about
- The code of the pirates dictates a strict seniority. Arnold is superior to Black Beard, who is superior to Carl, who is superior to Derrick, who is superior to Edward.

THE PIRATE GAME- RULES

- The code of the pirates has the following rules of booty distribution:
- The most senior pirate proposes a distribution of coins, and then the pirates, including the proposer, vote on whether to accept this distribution.
 - The proposal is accepted if there is a majority or tie
 - If the proposal is rejected, the proposer is thrown overboard from the pirate ship, and the next most senior pirate makes a new proposal to begin the system again.

THE PIRATE GAME- VALUES

- Since most of you probably aren't intimately familiar with pirates, here's a little information about their values
- Ultimately pirates are survivors, their desire to live is stronger than anything else
- But pirates are also greedy, they want to have as many gold coins as possible
- Pirates enjoy throwing one of their fellows overboard
- All pirates are rational and know that other pirates are rational
- Pirates are not trusting or trustworthy

THE PIRATE GAME- RESULT OF BACKWARD INDUCTION

- Angry Arnold: 8
- Black Beard: 0
- Callus Carl: 1
- Dreaded Derrick: 0
- Evil Edward: 1

TRAGEDY OF THE COMMONS

- Garrett Hardin, *Science*, 1968
- What happens when you have a public grazing land with no defined property rights?
- Each herder receives all the benefit of allowing their cattle graze on the land
- However, the damage to the land from each additional cow is shared among all the herders
- Thus each herder allows their cattle to graze on the land regardless of the damage it does to the common resource

TRAGEDY OF THE COMMONS

- Common resource (freely accessible)
 - Carrying capacity, or detriment from over-use
 - Unequal distribution of costs vs. benefits
 - Self interested individuals
 - Assumed lack of foresight
-
- Further examples:
 - Climate, national parks, and fish stocks

THE DINER'S DILEMMA

- A large group of coworkers all go out to eat lunch
- Prior to ordering they agree to split the check equally between all of them
- Each individual now chooses either the expensive dish (tastier), or the cheaper dish
- Although the expensive dish is tastier, the difference isn't large enough to justify paying more if someone was going out by themselves.

- What would you order? Why?

THE FREE-RIDER PROBLEM

- When someone consumes more than their fair share of a public resource, or shoulders less than their fair share of the costs.
- What is meant by “fair share”?
- How is the Diner’s Dilemma an example of this?

BIBLIOGRAPHY

The Pirate Game:

- http://euclid.trentu.ca/math/bz/pirates_gold.pdf

Splitting the Bill:

- <http://management.ucsd.edu/faculty/directory/gneezy/docs/splitting-bill.pdf>

Tragedy of the Commons:

- <http://www.sciencemag.org/cgi/content/full/162/3859/1243>