

Introduction to Game Theory

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Exercise Sheet 5

Due: Thursday, June 9, 2016

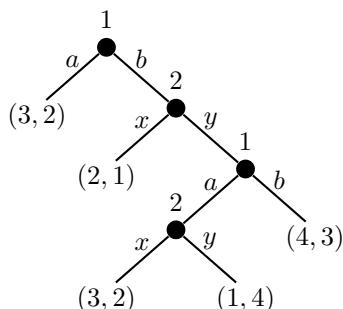
Exercise 5.1 (Extensive Form Games, 2 + 2 points)

US president Muffley (M) and Soviet premier Kissev (K) are in fear of a nuclear conflict with one another. The first to act can decide to keep the peace (P) or to launch a first strike nuclear attack (A) on the other. Afterwards, the opponent decides to attack (A) or to remain peaceful (P). If both sides remain peaceful they get a payoff of 10 and live happily ever after. If only one side attacks, the attacker gets a payoff of 20 and the opponent a payoff of 0. If both attack they end up causing nuclear armageddon and get payoff -1 each.

- (a) Model the situation as an extensive game with perfect information assuming Muffley acts first. Which strategy should Muffley choose if he was completely rational?
- (b) Seconds before committing to his decision, Muffley is informed about a *doomsday-device* in Kissev's possession that would automatically trigger a nuclear counter-attack if the Soviet Union was to be attacked. Luckily, the devices' construction plans have already been disclosed on *wikiLeaks*. Building his own doomsday-device, Muffley rethinks his decision. Assume Kissev is also aware that Muffley owns a doomsday-device and model the new situation as an extensive form game. Which strategy should Muffley choose now?

Exercise 5.2 (Induced Strategic Game, 2 + 2 points)

Consider the two player extensive form game defined by the following game tree.



- (a) Specify the induced strategic game.
- (b) Determine all Nash equilibria and decide for each one whether it is subgame perfect or not.

The exercise sheets may and should be worked on and handed in in groups of two to three students. Please indicate all names on your solution.