

# Assignment for Advanced Microeconomics

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Nim is the following two player game. A certain number of piles consisting of a certain number of matches is put together. Both players take turns. Each turn a player must remove at least one match from a pile. The player that takes the last match(es) wins. So there are infinitely many Nim games possible.

Consider a Nim game.

- a. Show that this is an antagonistic game.
- b. Show how the theory You learned enables You to conclude that exactly one of both players has a winning strategy.
- c. Explain which player has a winning strategy.
- d. Consider the game  $(5, 7, 6, 4, 1, 3, 9)$ , i.e. there is a pillow with 5 matches, one with 7, ..., and one with 9. Which player can win this game?

In order to answer parts c and d of the exercise, You probably have to consult some literature dealing with the Nim game. Please handle in before Thursday 8 October by email to `pierre.vanmouche@wur.nl`.