

# Algorithmic Game Theory

## CS498P Project

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*Submitted by*

**Dhandeep M Lodaya  
B080569CS**

**Ayush Sengupta  
B080545CS**

**Anuj Tawari  
B080511CS**

**Akshay Jain  
B080582CS**

Project Guide: **Prof.Dr Vinod Pathari**



**Department of Computer Science & Engineering  
National Institute of Technology Calicut  
Kerala - 673601  
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# ABSTRACT

The world is a game and everything that happens in this world is a game. Game theory models situations in which an individual's success in making choices depends on the choices of others. The range of situations from choosing the electives for your next semester in college or choosing your life partner to the evolution of life on earth all can be modelled as a game. Game theory is used in the social sciences as well as in other formal sciences like logic, computer science, and statistics, and even biology.

While initially developed to analyze competitions in which one individual does better at another's expense (zero sum games), it has been expanded to treat a wide class of interactions, which are classified according to several broad types of games.

We will pick and model some real world situations where multiple players interact to result in profit/loss according to game theory. We will define and study the equilibrium in these games. In an equilibrium, each player of the game will adopt a strategy that cannot improve his outcome, given the others' strategy.

At a later stage in the project we are planning to study and analyze some combinatorial polynomial time algorithms for finding equilibrium prices and allocations in a market. If possible we would also like to analyze combinatorial auctions from an algorithmic point of view.

**Prof.Dr Vinod Pathari**  
Faculty,  
Computer Science and Engineering