

# Extensive-Form Games

Branislav Bošanský

Czech Technical University in Prague

*branislav.bosansky@agents.fel.cvut.cz*

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Previously ... on multi-agent systems (tutorials and lectures).

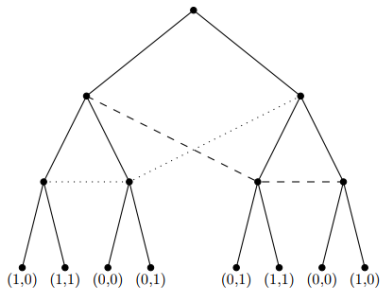
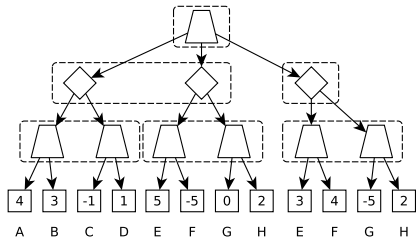
- 1 Different representations:
  - Normal-Form Games (game matrixes)
  - Extensive-Form Games (game trees)
- 2 Algorithms for computing different solution concepts:
  - Nash equilibrium
  - Correlated equilibrium
  - Stackelberg equilibrium

Task 1: Either construct the following game or show that such a game cannot exist: Find a game with 2 actions (pure strategies) for each player such that 1) there are exactly 2 pure Nash equilibria and 2) there is no fully mixed NE (that randomizes over more than 1 pure strategy for a player).

Task 2: Either prove the following statement or give a counterexample: Every convex combination of two different NE is a Correlated equilibrium.

Task 3: Find a Correlated equilibrium that is not a convex combination of NE.

Task 4: Consider following games. Write down a normal-form representation for these games.



Task 5: Formulate the following game of a small “poker” as an EFG.

- there is an ante of 1\$
- there is a limited deck of cards  $\{J, J, Q, Q\}$
- each player receives a card
- player 1 either folds or bets 2\$
- player 2 either calls or folds
- player with the higher card wins