

# Extensive-Form Games

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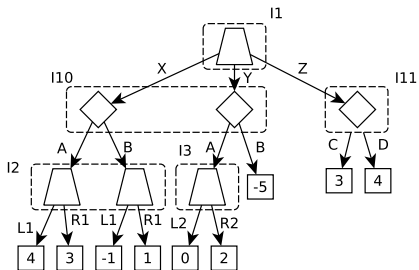
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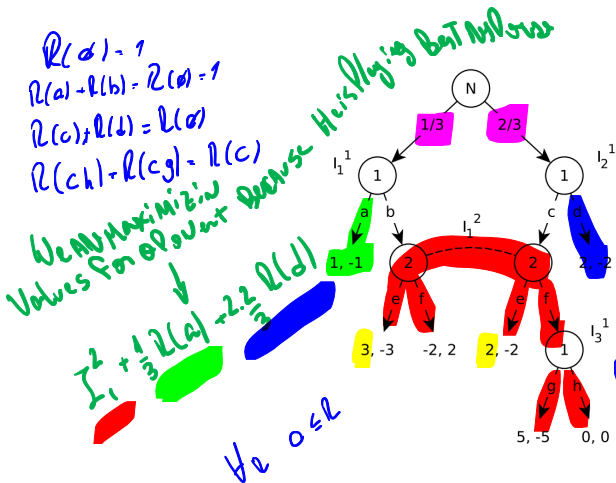
Previously ... on multi-agent systems (tutorials and lectures).

## 1 Extensive-Form Games (game trees)

Task 1: Consider the following games. Write down a sequence-form linear program for both players:



Task 2: Consider the following games. Write down a sequence-form linear program for both players:



$$\Sigma_1 = \{\emptyset, a, b, c, d, cg, ch\}$$

$$\Sigma_2 = \{e, f, \emptyset\}$$

$$I_1 = \{I_1^1, I_1^2, I_1^3\}$$

$$I_2 = \{I_2^1\}$$

$$I_1^2: e: \frac{1}{3}R(a) + \frac{2}{3}R(c) \geq R(I_1^2)$$

$$f: \frac{1}{3} \cdot -2 \cdot R(b) + \frac{2}{3} R(cg) \cdot 5 + \frac{1}{3} \cdot R(ch) \geq R(I_1^2)$$

Value Constraints

Task 3: Write down a sequence-form linear program for both players for the following game of a small “poker”:

- 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