Auctions:

- an example of mechanism design -- “reverse game theory”, where one designs rules of the game assuming the players are rational agents
- bidding in an auction -- an optimal strategy in a very large game against unknown opponents; also termed Bayesian games
- number of auction mechanisms

Exercises:

- Consider a second-price, sealed-bid auction with two bidders who have independent, private values *v_i* which are either 1 or 3. For each bidder, the probabilities of 1 and 3 are both ½.
    - What is the seller’s expected revenue?
    - Now let’s suppose that there are three bidders who have independent, private values *v_i* which are either 1 or 3. For each bidder, the probabilities of 1 and 3 are both ½. What is the seller’s expected revenue in this case?
    - Briefly explain why changing the number of bidders affects the seller’s expected revenue.
- A seller will run a second-price, sealed-bid auction for an object. There are two bidders, **a** and **b**, who have independent, private values vi which are either 0 or 1. For both bidders the probabilities of v_i = 0 and v_i = 1 are each 1/2. Both bidders understand the auction, but bidder **b** sometimes makes a mistake about his value for the object. Half of the time his value is 1 and he is aware that it is 1; the other half of the time his value is 0 but occasionally he mistakenly believes that his value is 1. Let’s suppose that when b’s value is 0 he acts as if it is 1 with probability 1/2 and as if it is 0 with probability 1/2. So in effect bidder **b** sees value 0 with probability 1/4 and value 1 with 3/4 probability. Bidder **a** never makes mistakes about his value for the object, but he is aware of the mistakes that bidder b makes. Both bidders bid optimally given their perceptions of the value of the object. Assume that if there is a tie at a bid of x for the highest bid the winner is selected at random from among the highest bidders and the price is x.
    - Is bidding his true value still a dominant strategy for bidder **a**?