The Unique-Bid Auction
TJHS Computer Systems Lab 2006-2007

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Abstract

The unique-bid auction is a developmental auction format that is rarely understood and more rarely used by auctioneers. Because there is no experimental data regarding this auction, they have no expectations of its performance. This project was designed not only to provide an opportunity for users to experience the auction, but also to shed some light on patterns in its behavior as the participants refine their bidding strategies.

The Auction Format

Before auction begins, the seller will set a range of acceptable bids for his or her item significantly below the market value of the item – typically less than 1%. He or she will then decide the number of bidders that will be entered in the auction and the fee for participating such that the bidding fees alone equal the value of the item. Bidders then submit their bids and the item goes to the winning bidder for the value of his or her bid. The winning bidder is the one who submits the highest unique bid within the range. For example, if in a range from 0 to 100 bidders submit bids of 100, 100, 100, 99, 99, 97, 96, 96, ... , the item will go to the participant who bid 97 because it is the highest bid that was not matched by another bidder.
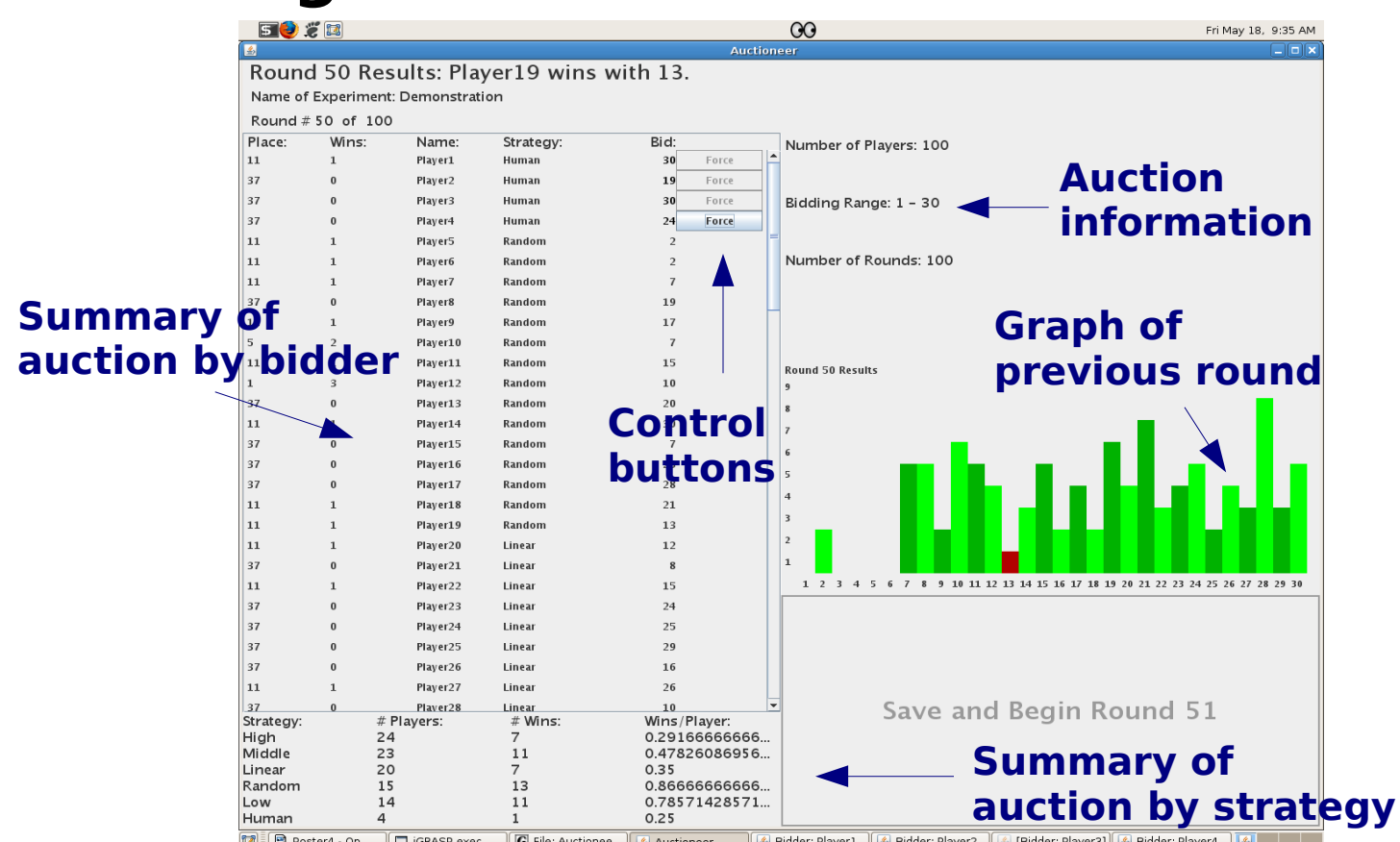
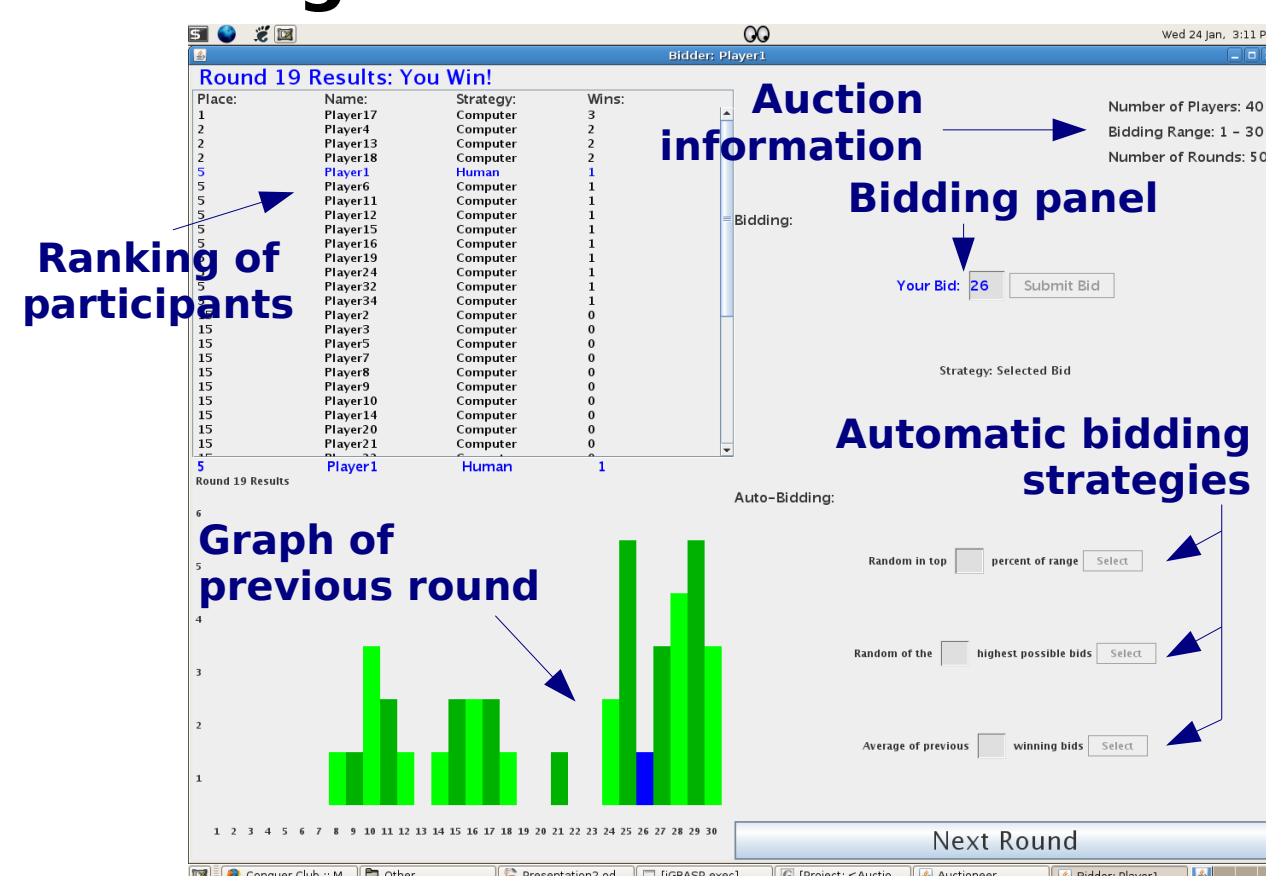### Figure 1: Auctioneer Interface
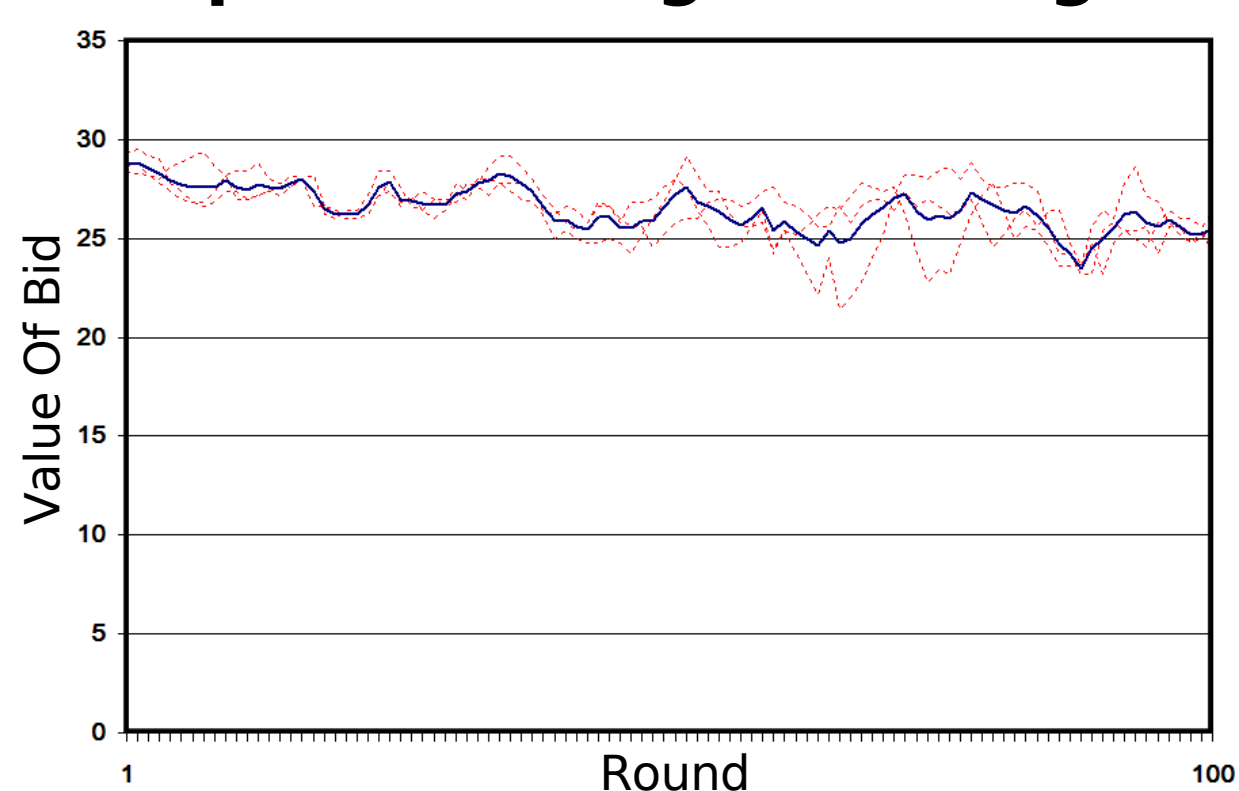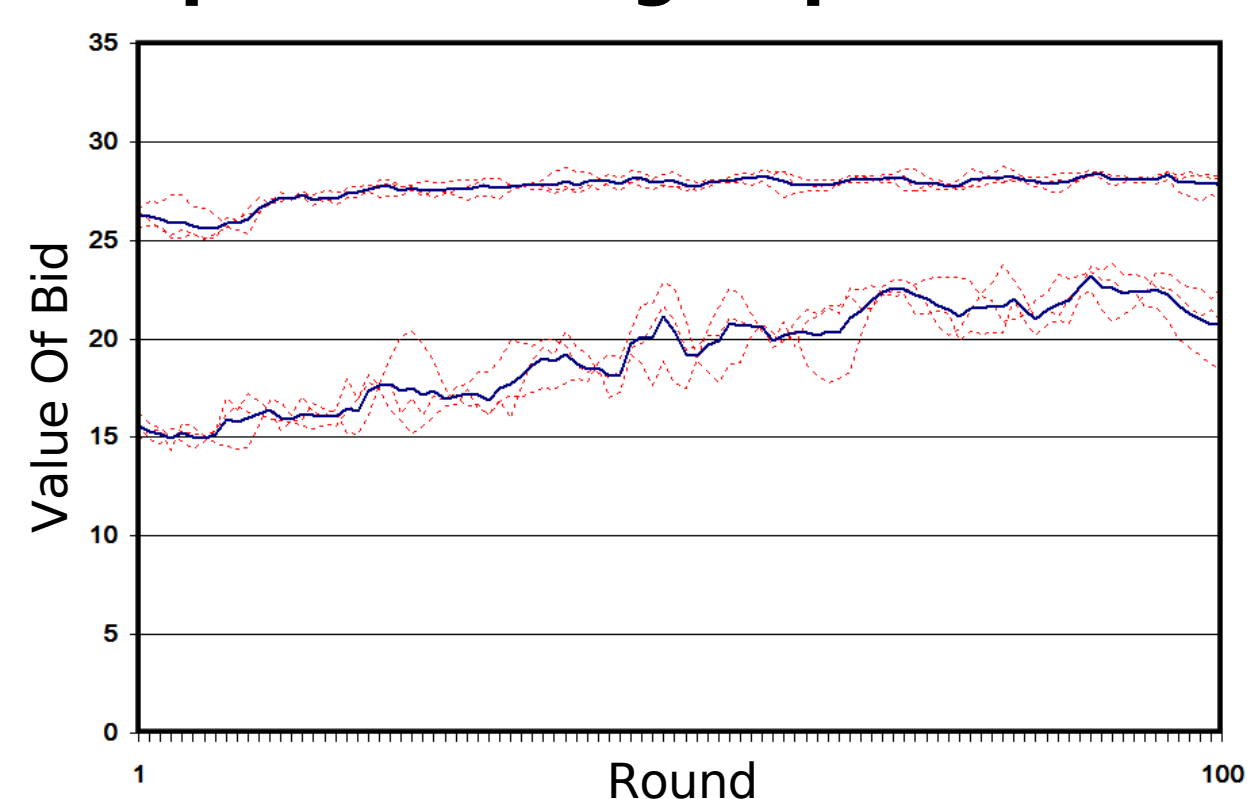

Figure 2: Bidder Interface

Procedure

The Auctioneer begins the experiment by setting the name of the experiment, the number of players, the bidding range, and the number of rounds in the auction (in reality, each round would be a different item). Then, the Auctioneer will set the beginning strategies of the players, designating them as human players or robotic players with one of five strategies. After this information is initialized, a Bidder interface appears for each human player and the interface displays a button for beginning the experiment. Once every Bidder is ready (or the Auctioneer forces a Bidder to be ready), the first round begins.

Once a round begins, the robotic bidders submit their bids using their own probability distribution and the Bidders are prompted to submit their own bids, which they can do by choosing a specific value or using one of 3 simple bidding strategies. Once every player has submitted a bid (or, again, the Auctioneer forces a Bidder to skip the round), the Auctioneer determines the winner of the round and a histogram appears for both the Auctioneer and Bidder interfaces showing the distribution of bids in the previous round. The Bidders are then given time to look at the results and possibly refine their strategies while the robotic bidders modify their own probability distributions. When every Bidder is ready to continue, the next round begins.

Graph 1: Average Winning Bid

Graph 2: Average Spread of Bids

Results

As the experiment progresses, the winning bid goes steadily downward, as is shown in Graph 1. Furthermore, as the experiment progresses, the 3rd quartile of bids increases slightly while the 1st quartile of bids increases dramatically, as it shown in Graph 2.