CSCI 3901 Assignment 1

External Documentation File

Meet Patel (B00899516)

Overview

An auction is way of selling one or more items. Items are placed into lots. This lots are present in Auctions and each auction can have several lots and lots have several items. During the auction one can bid on one or multiple lot and at the end of the auction the individual with highest bid won the lot.

The program creates the auction containing number of lots ranging between given values (First lot Number and Last lot Number), lots minimum bid increment and auction name. Then we add bidder to the system by creating bidder name. When the auction is opened for the bidding, the bidders can bid on particular lot/lots of the given auction. Depending upon the bid by the bidder it is decided that that particular bid is accepted or not.

Then the current bid on a lot is retrieved. Based on current bid bidders place the bid by entering lot number, bidder id and bid. When the bidding process is completed, we close the auction. After closing the auction, we return the winning bids for all the lots in auction.

Files and external data

1. **OnlineAuctionSystem.java** – Has supporting classes of auction and the bidder.
   - Methods
     - Auction createAuction() - Create auction using multiple lots with their minimum bid increment
     - Bidder createBidder() - Create bidder with the provided bidder name
     - auctionStatus()- Returns status of all the auctions
     - loadBids() - Return the number of successfully recorded bids from the file
     - placeBid() - Places bid on the lots by using lot number, bidder id and bid.
     - feesOwed() - Return the Name of bidder, Number of bids won by the Bidder and total bid

2. **Auction.java**
   - Methods
     - openAuction() - It marks auction as open
     - closeAuction() - It marks auction as close
     - winningBids() - It will return the current maximum bid for the lot and the id of bidder who is winning the lot along with lot Number

3. **Bidder.java**
   - Methods
     - getBidderId()- It will return the id of the bidder

4. **External Text File** - It contains a list of bids on lots with the bidder id who placed the bid. We have to load that file. It will return the successfully placed Bids from file. Each line of the file has one bid. It contains bidder number, positive bid and lot Number.

Data structures and their relations to each other

- **Array List** – As Array List does not require the size to be specified initially, I have used it to store information about the auctions, bidders, lots and for storing list of all the lots.
- **Nested Hybrid List** - For storing the Array list of auctions lots
- **Map** - It is used to map the lot to its relevant lot information
- **Classes**
    - **OnlineAuctionSystem** - It manages the overall functionality of online auction system with three supporting classes Auction, Bidder and Lot.
    - **Auction** - It manages auction related information like opening and closing of an auction and the winning bid.
    - **Bidder** - It manages bidders of auction system.
    - **Lot** - It contains information about lot such as current bid, minimum increment, remembered bid, next valid bid, lot id, bid, bidder id, etc.

Assumptions

- We may assume that initially current bid of the lot is 0.

Key algorithms and design elements

First, we have to create an auction by providing the first and last Lot Number, minimum bid increment of that auction and the auction name. Then, we have to create bidders by providing bidder name. Now we have to open the auction for bidding. We can also retrieve the bids on lots from the external files. We can also place the bid by using placeBid method.

When the bid is placed by the bidder on the particular lot or lots of open auction and if the bid is higher than the next legal bid then that bid value becomes remembered bid for the bidder and the current bid becomes the next legal bid. If another bidder places the bid on the same lot and the value is above the current bid and below the remembered bid then it will accept the bid and sets it as current bid value.

When there are no bids by the bidders on the lot anymore then the bidder with highest remembered bid is considered as winner. If the winning bidder again bids on the same lot with the new bid then in that case it will increase the remembered maximum bid and the bidder remains the winner of the lot.

At any point we can see the status of created auction. It will show the name of auction, its status (new, open, close) and the sum of currently winning bid.

Limitations

- Do not able to return the total bids by the bidder in feesOwed method
- Do not able to return the sum of currently winning bid in suctionStatus method