Readme file from Zhihao Wang(zwang238)

- **Server was created to host a auction**

```
PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop
desk\CSC573_project1\src> python auc_s         desk\CSC573_project1\src>                      desk\CSC573_project1\src>
erver.py 12345
Auctioneer is ready for hosting auctio
ns!

▮
```

- **Client 1 connected as Seller with its role prompt**

```
PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop
desk\CSC573_project1\src> python auc_s         desk\CSC573_project1\src> python auc_c         desk\CSC573_project1\src>
erver.py 12345                                 lient.py 127.0.0.1 12345
Auctioneer is ready for hosting auctio         Connected to the Auctioneer server.
ns!
                                               Your role is : [Seller]
Seller is connected from 127.0.0.1:603         Please submit auction request: ▮
09
▯
```

- **Client 2 tried to connected during Seller process and shows waiting and close the connection**

```
PS C:\Users\Administrator\Desktop\work   PS C:\Users\Administrator\Desktop\work   PS C:\Users\Administrator\Desktop\work   PS C
desk\CSC573_project1\src> python auc_s    desk\CSC573_project1\src> python auc_c    desk\CSC573_project1\src> python auc_c    desk
erver.py 12345                            lient.py 127.0.0.1 12345                  lient.py 127.0.0.1 12345
Auctioneer is ready for hosting auctio    Connected to the Auctioneer server.       Connected to the Auctioneer server.
ns!
                                          Your role is : [Seller]                   Server is busy. Try to connect again l
Seller is connected from 127.0.0.1:603    Please submit auction request: ▯          ater.
09                                                                                  PS C:\Users\Administrator\Desktop\work
▯                                                                                   desk\CSC573_project1\src> ▮
```

- **Seller sends incorrect auction request**

```
PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop\work
desk\CSC573_project1\src> python auc_s         desk\CSC573_project1\src> python auc_c
erver.py 12345                                 lient.py 127.0.0.1 12345
Auctioneer is ready for hosting auctio         Connected to the Auctioneer server.
ns!
                                               Your role is : [Seller]
Seller is connected from 127.0.0.1:603         Please submit auction request: yes
09                                             Server: Incorrect format
▯                                              Please submit auction request: ▮
```

- Seller sends correct auction request and seller receives Auction Start prompt

- Buyer 1 is created with role prompt and waiting signal

- Buyer 2 is created with role prompt and waiting signal

- Buyer 1-N is created with role prompt and waiting signal, and Buy N doesn't have waiting signal. After that, all buyers receive bidding start prompts

- Another client tries to connect during bidding and shows error message


```
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> python auc_lient.py 127.0.0.1
 12345
Connected to the Auctioneer ser
ver.

Your role is : [Buyer]
The Auctioneer is stilling wait
ing for other Buyers to connect
...
The bidding has started!
Please submit your bid:
```

```
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> python auc_client.py 127.0.0.
1 12345
Connected to the Auctioneer ser
ver.

Your role is : [Buyer]
The bidding has started!
Please submit your bid:
```

```
PS C:\Users\Administrator\Desk
top\workdesk\CSC573_project1\s
rc> python auc_client.py 127.0
.0.1 12345
Connected to the Auctioneer se
rver.

Server is busy. Try to connect
 again later.
PS C:\Users\Administrator\Desk
top\workdesk\CSC573_project1\s
rc>
```

- Buyers try different values and receive feedback, if returns an error message, will ask for one more input

  And for those clients have finished bid inputting will show the waiting message.


```
1 12345
Connected to the Auctioneer ser
ver.

Your role is : [Buyer]
The Auctioneer is stilling wait
ing for other Buyers to connect
...
The bidding has started!
Please submit your bid:
110
Server: Bid received. Please wa
it....
```

```
12345
Connected to the Auctioneer ser
ver.

Your role is : [Buyer]
The Auctioneer is stilling wait
ing for other Buyers to connect
...
The bidding has started!
Please submit your bid:
120
Server: Bid received. Please wa
it....
```

```
op\workdesk\CSC573_project1\src
> python auc_client.py 127.0.0.
1 12345
Connected to the Auctioneer ser
ver.

Your role is : [Buyer]
The bidding has started!
Please submit your bid:
No
Server: Invalid bid. Please sub
mit a positive integer!
Please submit your bid:
```

- Auctioneer (internally) displays all bids and auction
- And seller will receive the auction result(hear it is second price)
- Buyers receive auction result as well.
- All sockets are closed.


```
.0.1:61534
Buyer 3 is connected from 127.0
.0.1:61536
Requested number of bidders arr
ived. Let's start bidding!

>> New Bidding Thread spawned
>> Buyer 1 bid $110
>> Buyer 2 bid $120
>> Buyer 3 bid $20
>> Item sold! The highest bid i
s $120. The actual payment is $
110
```

```
Your role is : [Seller]
Please submit auction request:
2 100 3 Sample
Server: Auction Start.

Auction finished!
Success! Your item Sample has b
een sold for $110
Disconnecting from the Auctione
er server. Auction is over!
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> 
```

```
The bidding has started!
Please submit your bid:
110
Server: Bid received. Please wa
it....

Auction finished!
Unfortunately you did not win i
n the last round.
Disconnecting from the Auctione
er server. Auction is over!
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> 
```

```
mit a positive integer!
Please submit your bid:
20
Server: Bid received. Please wa
it....

Auction finished!
Unfortunately you did not win i
n the last round.
Disconnecting from the Auctione
er server. Auction is over!
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> 
```

```
The bidding has started!
Please submit your bid:
120
Server: Bid received. Please wa
it....

Auction finished!
You won this item Sample! Your
payment due is $110.
Disconnecting from the Auctione
er server. Auction is over!
PS C:\Users\Administrator\Deskt
op\workdesk\CSC573_project1\src
> 
```

- Another round with a different auction type works

```
.0.1:61536                          Auction finished!                The bidding has started
Requested number of bidders arr    Success! Your item Sample has b  Please submit your bid:
ived. Let's start bidding!         een sold for $110                110
                                   Disconnecting from the Auctione  Server: Bid received. P
>> New Bidding Thread spawned      er server. Auction is over!      it....
>> Buyer 1 bid $110                PS C:\Users\Administrator\Deskt
>> Buyer 2 bid $120                op\workdesk\CSC573_project1\src  Auction finished!
>> Buyer 3 bid $20                 > python auc_client.py 127.0.0.  Unfortunately you did n
>> Item sold! The highest bid i    1 12345                          n the last round.
s $120. The actual payment is $    Connected to the Auctioneer ser  Disconnecting from the
110                                ver.                             er server. Auction is o
Seller is connected from 127.0.                                     PS C:\Users\Administrat
0.1:61605                          Your role is : [Seller]          op\workdesk\CSC573_proj
                                   Please submit auction request:   > 
```

● If price is less than min price, the item will not be sold

```
aiting for the Buyer.            2 2 40 2                         The bidding has started!        The bidding has started!
                                 Server: Incorrect format        Please submit your bid:         Please submit your bid:
Buyer 1 is connected from 127.0  Please submit auction request:  40                              20
.0.1:61817                       2 30 2 2                         Server: Bid received. Please wa  Server: Bid received. Please wa
Buyer 2 is connected from 127.0  Server: Auction Start.          it....                          it....
.0.1:61819
Requested number of bidders arr  Auction finished!               Auction finished!               Auction finished!
ived. Let's start bidding!       Unfortunately your item 2 hasn'  Unfortunately you did not win i  Unfortunately you did not win i
                                 t been sold                     n the last round.               n the last round.
>> New Bidding Thread spawned    Disconnecting from the Auctione  Disconnecting from the Auctione  Disconnecting from the Auctione
>> Buyer 1 bid $40               er server. Auction is over!     er server. Auction is over!     er server. Auction is over!
>> Buyer 2 bid $20               PS C:\Users\Administrator\Deskt  PS C:\Users\Administrator\Deskt  PS C:\Users\Administrator\Deskt
>> No! Item not sold!            op\workdesk\CSC573_project1\src  op\workdesk\CSC573_project1\src  op\workdesk\CSC573_project1\src
                                 > []                             > []                            > 
```

● **Detailed description on how to compile**

Usage: python auc_client.py <#ip> <#port>

Usage: python auc_server.py <#port>

EXTRA CERDIT:

1. To know the true valuation of each Buyer: A second-price auction is better since it encourages truthful bidding.

2. In a first-price auction, the highest bidder wins the item and pays the price they bid.Bidders will typically shade their bids below their true valuation. That's because they want to pay less than their valuation to ensure a positive utility, but they also want to outbid others. However, In a second-price auctionBidders have an incentive to bid their true valuations. Here's why: If a bidder bids below their valuation and loses to a bid that was still below their valuation, they would regret not bidding truthfully. If they bid above their true valuation and win, they risk paying more than the item is worth to them. But if they bid their true valuation, they either win and pay less than or equal to what it's worth to them or lose without any regret.

In all, to sell the item for a reasonable price: A second-price auction ensures that the item is sold for the highest bid of the 'losing' bidders. This is likely a reasonable price because it reflects the valuation of the highest-valued buyer who didn't win.

3. Assume Buyer A has a true valuation of $110 and Buyer B has a valuation of $150. B will be the winner and pay the price of 100. its utility will be 150-110 = 40.

If $b > v$, it doesn't increase their chances of winning, but they risk overpaying.

If $b < v$ and they win, they'll pay the second-highest bid which could be less than v but more than b. But they would regret not bidding their true valuation if the second-highest bid is between b and v.

If $b = v$, and they win, they'll pay the second-highest bid, which is less than their valuation, maximizing their utility.

```
Buyer 1 is connected from 127.0.0.1:54       Connected to the Auctioneer server.          The Auctioneer is stilling waiting for        Your role is : [Buyer]
179                                                                                         other Buyers to connect...                  The bidding has started!
Buyer 2 is connected from 127.0.0.1:54       Your role is : [Seller]                       The bidding has started!                    Please submit your bid:
197                                          Please submit auction request: 2 80 2         Please submit your bid:                     150
Requested number of bidders arrived. L       Sample                                        100                                         Server: Bid received. Please wait..
et's start bidding!                          Server: Auction Start.                        Server: Bid received. Please wait....

>> New Bidding Thread spawned                Auction finished!                             Auction finished!                           Auction finished!
>> Buyer 1 bid $100                          Success! Your item Sample has been sol        Unfortunately you did not win in the l       You won this item Sample! Your paym
>> Buyer 2 bid $150                          d for $100                                    ast round.                                   due is $100.
>> Item sold! The highest bid is $150.       Disconnecting from the Auctioneer serv        Disconnecting from the Auctioneer serv       Disconnecting from the Auctioneer s
 The actual payment is $100                  er. Auction is over!                          er. Auction is over!                         er. Auction is over!
                                             PS C:\Users\Administrator\Desktop\work        PS C:\Users\Administrator\Desktop\work       PS C:\Users\Administrator\Desktop\w
```