Online Auction

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Outline

- Introduction of Online Auction

- Types of Auction Models

- Traditional Auctions Versus Electronic Auctions

- Auction Process

- Auction Requirements

- Online Auction

- Auction Protocols

- Agent-Based Auction Systems

- Problems and Issues
Introduction to Online Auction

According to the Webster Universal College dictionary,

“Auction, also called public sale, is a publicly held sale at which property or goods are sold to the highest bidder.”

McAfee and McMillan (1987) states that:

“an auction is a market institution with an explicit set of rules determining resource allocation and prices on the basis of bids from the market participants”

The earliest web-based auctions:
- Onsale appear in May 1995
- eBay opened in September 1995
Types of Auction Models

- **Forms of bids**
  - **Private**
  - **Public**

- **Sequence rule?**
  - **Yes**
  - **No**

- **Occurrence of trans.**
  - **Periodic**
  - **Continuous**

- **Multiple bids - multiple offers**
  - **Single**
  - **Multiple**

- **Ordering mechanism**
  - **Order-book**
  - **‘clock’**

- **Multiple bids - multiple offers**
  - **Double Auction**

- **Forms of bids**
  - **Closed Auction**
    - **Ascending**
    - **Descending**

- **Forms of bids**
  - **English Auction**
  - **Dutch Auction**

- **Forms of bids**
  - **Japanese Auction**
  - **Call Auction**

- **Forms of bids**
  - **Double English Auction**
  - **Double Dutch Auction**
  - **English - Dutch Auction**

Topic: Online Auction

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Types of Auction Models

**English Auction:**
- **Bidders:** see high bid and possibly high other bidders’ bids and comments, and update their bids during the auction.
- **Winner:** the highest bidder and pays the price bid.
- **Example:** Onsale

**First Price Sealed Bid Auction:**
- **Bidders:** email in secret bids for item; bids are opened simultaneously. no chance to update the submitted bids.
- **Winner:** the highest bidder is the winner.
- **Example:** The Chicago Wine Company, Timeshare Resale International.

**Dutch Auction:**
- **Auctioneer:** begins at a high price and incrementally lowers it until some bidder signals acceptance to buy at the current price.
- **Bidders:** see current price and make a bid or wait until it drops.
- **Winner:** the first bidder at the current price.
- **Example:** Bookbid, Klik-Klok Dep. Store.
Types of Auction Models

Continuous Double Auction: similar to NASDAQ
buyers/sellers: continuously view market and prices,
make real-time offers, which clear at market price.
Example: Auction Depot

Sealed Double Auction:
buyers/sellers: simultaneously submit secret sealed offers to buy and sell.
Auctioneer opens offers and clears market.
The auction repeats several times to give a continuous market price.
Example: Fastparts

Vickrey Auction: similar to first price sealed bid auction.
Bidders: email in secret bids for item;
bids are opened simultaneously.
no chance to update the submitted bids.
Winner: the highest bidder is the winner.
The winner only pays amount of second-highest bid.
Example: Antebellum Covers.
Types of Auction Models

Reverse Auction: buyers and sellers together to set a mutually agreeable price.
Sellers: the seller bids the price down for the buyer.
Example: Travelbids.com, Fastparts.com

Reserve Price Auction: continuous descending auction.
Bidders: see current price and make a bid or wait until it drops.
Winner: the first bidder at the current price.
Example: Bookbid, Klik-Klok Dep. Store.
## Traditional Auctions Versus Electronic Auctions

<table>
<thead>
<tr>
<th>Auction Attributes</th>
<th>Traditional Auctions</th>
<th>Electronic Auctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auction Schedule</td>
<td>fixed schedule</td>
<td>available 24/7/365</td>
</tr>
<tr>
<td>Auction Location</td>
<td>auction site or room</td>
<td>auction web site on the Internet</td>
</tr>
<tr>
<td>Auction Process</td>
<td>manually controlled</td>
<td>systematic controlled</td>
</tr>
<tr>
<td>Auction Transaction</td>
<td>people</td>
<td>automatic and systematic</td>
</tr>
<tr>
<td>Supporting</td>
<td>people</td>
<td>people, network and Internet support</td>
</tr>
<tr>
<td>Auctioneers</td>
<td>people</td>
<td>auction systems</td>
</tr>
<tr>
<td>Buyers/sellers</td>
<td>people</td>
<td>people/software agent</td>
</tr>
<tr>
<td>Auction items</td>
<td>limited no.</td>
<td>Large selection no.</td>
</tr>
<tr>
<td>Item evaluation</td>
<td>experts</td>
<td>experts</td>
</tr>
<tr>
<td>Auction overhead</td>
<td>higher</td>
<td>lower</td>
</tr>
<tr>
<td>Decision time</td>
<td>very limited</td>
<td>unlimited</td>
</tr>
<tr>
<td>Item checking</td>
<td>physically checking</td>
<td>no physically inspection</td>
</tr>
<tr>
<td>Auction rules</td>
<td>fixed</td>
<td>configurable and changable</td>
</tr>
</tbody>
</table>
Traditional Auctions vs. Online Auctions

Major disadvantages of traditional auctions:

- Limited variety and breadth of goods
- Buyers are limited to searching through multiple auctions or traveling to numerous geographically dispersed areas for auctions
- Inefficient transactions, and high transaction cost
- Fixed schedules, locations, rules, and auction types
- Low risk

Major advantages of online auctions:

- Broader variety of goods and large number of buyers and sellers
- Low-cost of transactions
- Automatic and efficient transactions
- Flexible, convenient, and easy access and participate auctions
- Direct communications between buyers and sellers
- High risk and inefficient item inspection
Online Auction Process

An online auction process involves an auctioneer, bidder, and seller.

An online auction process consists of:

- a bidding process
- a selling process
- the auction rules
- transaction processing
- auction protocols
- auction algorithms
- auction servers supports different types of auctions and features
Requirements of Online Auction

Security:    - Ensure to provide secured transactions
            - Provide secured solutions to protect the online system from:
              - active attacks by an intruder
              - any unpredictable termination of transactions
              - corruption of data on the network

Privacy:    Make sure that all information related to buyers and sellers, bids, and offers are protected to be exposed to other parties, external, public.

Anonymity: Make sure that the system should be designed in a way that nobody should recognize the true identity of the customer unless it is desirable.

Atomicity: The auction transactions should be conducted in a way that either it come to a completion, or terminate without any incomplete transaction.

Low cost: the cost of come transaction should be kept as minimal as possible.

Insurance, performance and scalablility.

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Online Auction Components

Sellers

Online Auction System

Auction Items

Auction Items

Buyers

Auctioneers

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Classifications of Online Auctions

Online auctions on the Internet can be classified into three classes:

- **Consumer-to-Consumer (C2C):** Ebay, YahooAuction
- **Business-to-Consumer (B2C):** PriceLine, Ubid
- **Business-to-Business (B2B):** Fastparts, Freemarkets.com, Gpbid
Classifications of Online Auctions

Single-Unit Auction:
• The seller takes offers on a good or service from more than one bidder.
• After a specified time, the auction clears and determines the price of the good.
• The winner is the highest bidder.

Multi-Unit Auction:
• In multi-unit auctions, there is more than one item or good to be allocated simultaneously.
• A multiple-unit bid specifies a set of price-quantity pairs for multiple identical goods.

Double-Sided Auctions:
• Double-sided auctions admit multiple buyers and multiple sellers at once.
• The continuous double auction matches bids in the order received.
• When a new bid is processed, the auction checks if the offered price matches the lowest existing sell bid and vice versa. If a match is found, the auction clears the price at the existing bid and generates a new price quote.
Online Auction Activities

Online auctions on the Internet involves several basic activities:

• **Registration:**
  The buyer and seller register by providing detailed information about their businesses.

• **Setting up auction events:**
  A registered seller (or buyer) can set up an auction event (or reverse auction event) by choosing the auction type, auction rules, auction schedule, product details, payment and shipment method.

• **Reverse Bidding Process/Bidding process:**
  Only registered buyer (or seller) can place a bid (or a reverse bid) for an item.

• **Assessment and finalization of bids (or reverse bids):**
  The bids (or reverse bids) are evaluated and settled based on auction type and the set-up rules.

• **Post-auction settlement process:**
  Conduct the payment for the goods to the seller and the delivery to the buyer.
Auction Processes and Transactions

Auction processes and transactions can be supported in two different approaches:

- Auction server with auction processes
- Auction networking with auction protocols

Message types for auction transactions and processing:

- bid/offer messages
  bid, bid withdrawal, bid admittance, bid rejection
  offer, offer withdrawal, offer admittance, offer rejection
- publishing messages
  posting messages, notifications
- accept and confirm messages
- settlement messages
  payment, delivery & shipping messages
- clear messages
Online Auction Rules

Auction rules in auction processing can be classified into:

- Auction starting rule: (starting rule for bidding and offering)
- Rules for posting bids and offers:
  - How to post bid/offer information? (public/registered users/trading parties)
  - completed/Sealed/Subset information.
- Rules for publishing bids and offers:
  - When to publish information about bids and offers?
  - How to post information about trading parties?
- Rules for hitting bids and taking offers: (condition/non-condition/…)
- Rules for auction timing: (auction scheduling rules and time intervals)
- Rules for price determination: (price setting, increasing, decreasing)
- Rules for number of messages: (one or more messages)
- Rules for trade formation: (auction types)
- Rules for occurrence and publishing of traders: (open/closed)
Transition State Diagram for Online Auction Bids

Unprocessed

Withdraw requested

Valid

Rejected

Expired

Withdraw Requested (validated)

Partially Transacted

Transacted

Withdrawn

Replaced
Object Model for Online Auction Application

- Auction House
- Trader
  - Is a
  - Buyer
  - Seller
  - product
  - Terms of sale
  - Rules
  - Auction
  - Search
  - trade
  - Message
  - notification
  - participant

Sent to
Online Auction Process Flow

Buyer

- register
- alert
- search
- display
- bid
- select
- Short list
- notify
- auction
- offer
- close
- evaluate
- settlement

Seller

- registration
- Product description & auction setup
- bidding
- Auction close & evaluating bids

Top: Online Auction
Online Auction Navigation Flow

- Welcome
- login

Home

New registration

search

browse

Product description

Auction rules

bid

pay

All auctions

All bids of an user

All bids of an user

Personal auction galley

messages

Shipping instructions

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**Sealed Bid Auction Protocols**

Auction Model

![Diagram of Auction Model](Image)

Process of Elimination

![Triangle Diagram](Image)

- R=1
- R=2
- R=3

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Topic: Online Auction

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## Online Auction Web Sites

<table>
<thead>
<tr>
<th>Auction Sites</th>
<th>Classification</th>
<th>Fees</th>
<th>Auction models</th>
<th>Security</th>
<th>Proxy bidding</th>
<th>Notification</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>eBay.com</td>
<td>C2C</td>
<td>For sellers</td>
<td>English, Dutch.</td>
<td>TRUSTe and BBBOnline License</td>
<td>Yes.</td>
<td>Yes. Facility</td>
<td>Escrow payment</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>.. Reserve price</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Auctions.yahoo.com</td>
<td>B2C/C2C</td>
<td>None</td>
<td>English</td>
<td>SSL</td>
<td>Yes.</td>
<td>Yes. Facility</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TRUSTe-certified</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ubid.com</td>
<td>B2C/B2B</td>
<td>---</td>
<td>English</td>
<td>SSL</td>
<td>Yes.</td>
<td>Yes. Email</td>
<td>Credit Payment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VeriSign Digital Server Certificate</td>
<td></td>
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<tr>
<td>Priceline.com</td>
<td>B2C/C2C</td>
<td>For sellers</td>
<td>Name of your Price</td>
<td>---</td>
<td>N/A</td>
<td>---</td>
<td></td>
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<td>Freeparts.com</td>
<td>B2B</td>
<td>for sellers</td>
<td>English</td>
<td>---</td>
<td>N/A</td>
<td>Yes. Facility</td>
<td>Escrow payment</td>
</tr>
<tr>
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<td>B2B</td>
<td>only for sellers</td>
<td>English, eSealedTM InstadealTM</td>
<td>---</td>
<td>Yes.</td>
<td>Yes. Email</td>
<td></td>
</tr>
</tbody>
</table>

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Derivations of Online Auctions

Online auction presents a new web-based channel for companies that have excess inventory and asset management challenges.

A virtual private marketplace offers forward thinking companies many compelling business advantages:

- A rapid return on investment
- Maximized revenues through competitive bidding
- Creation of a bidding history database for use in one-to-one marketing
- Minimized sales channel conflict
- Preservation and strengthening of the company brand
- Reduction in administrative costs
Issues in Online Auctions

(1) Fraud issue:
- How does online auction players are taking proactive steps to make consumers feel safe and secure about auctions? (solutions: monitoring, tracking, and security)

(2) Undelivered products:
- You win the auction and pay the money, but the goods never arrive.
  Solutions: use the escrow services and insurance

(3) Inaccurate description for items:
- the item description is not matching the received product
  Solutions: asking questions and requesting some specifications and proves.

(4) Bid shielding, shill bidding and deadbeat bidders:
  Shill bidding --> using a decoy to drive up bids by sellers.
  Bid shielding --> using a decoy to get a low-bid by buyers
  Deadbeat bidders --> bidders who win an auction but fail to make payment.
Issues in Online Auctions

(4) Security threats:

(a) Black-box attacks:
   - Seller collusion: Nothing can prevent sellers from colluding amongst themselves. Recent U.S. Bandwidth auction example.
   - Delivery failures.
   - Jurisdiction problems.

(b) End-run attacks:
   - False certificates, key companies, and repudiation.

(c) Direct attacks:
   - Forged bounding certificates and arbiter acceptance
   - Forged post of a CPO (in CPO control), forged binding of a CPO.
   - Learning CPO in advance.