

CS297

How Google sell ad spaces ?

By

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Outline...

- About Online Advertisement
- Overview of Google AdWords
- Auction and auction methods
- Single Item auctions
- Multi-Item auctions
- Examples of different auction methods.

Online Advertisements

- Mostly, online information is “free” because of advertisements shown on websites.
- Ranked 2nd in ad industry.
- Initially, sold on a per-thousand-impression basis.
- 1997 onwards, ad spaces sold on a per-click basis.

Overview : Google AdWords

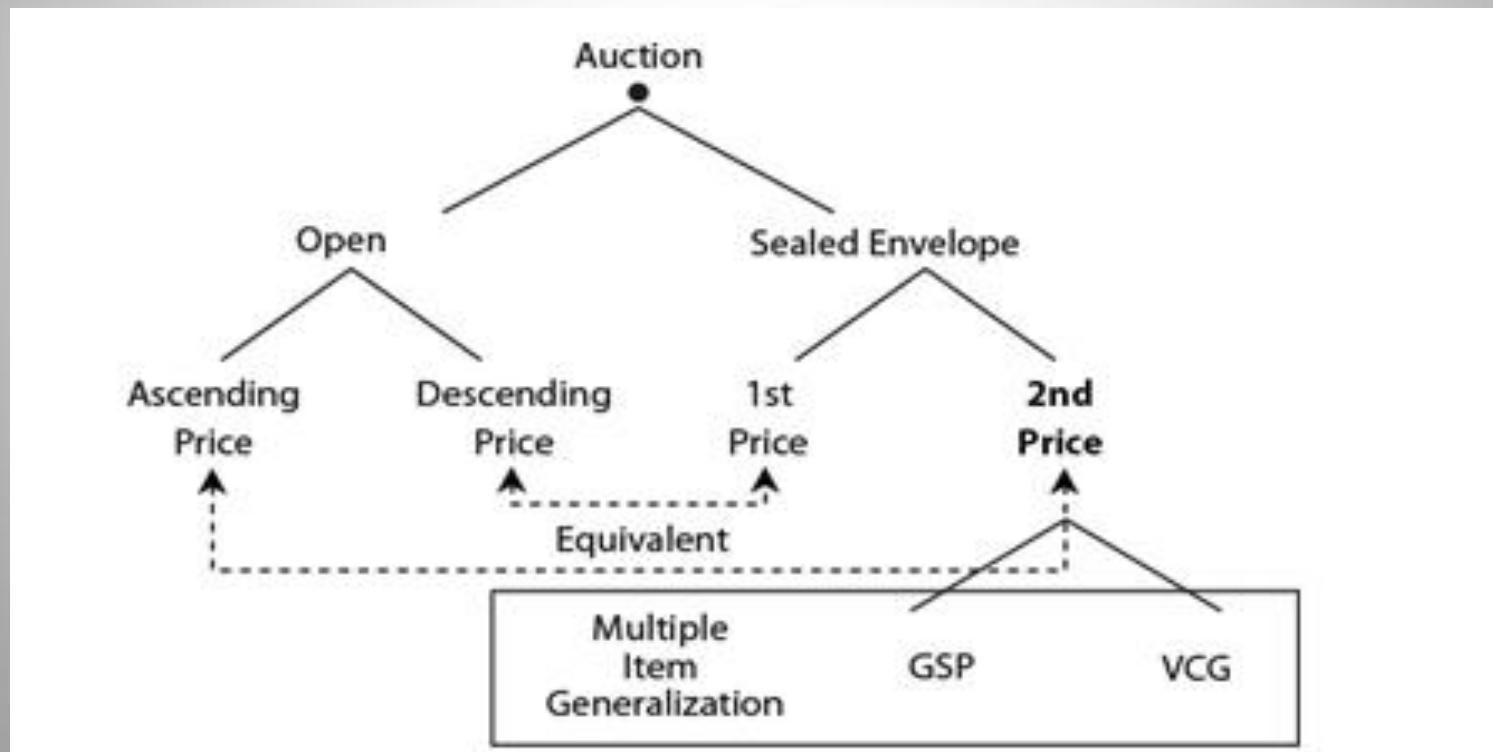
- Started in 2002.
- User can create advertisement, attach keywords to it and send to Google's database.
- Google returns ads if search keyword matches with attached keywords.
- Ads displayed on search results page are based on search query contents.

Questions to ask

- Where will my advertisement appear on the list ?
 - Google uses ad space allocation strategy.
- When will advertisers pay Google ?
 - Only when someone clicks on link.
- What is in it for advertisers then ?
 - Revenue derived from number of clicks and average revenue.

Auction

- Allocating ad space according to some rule.
- Methods



Open auctions

- Require a public venue for announcing the bids.
- Generally useful in one-item auctions.
- Types
 - Ascending price
 - Descending price

Sealed envelope auctions

- Private disclosure of bids.
- Auctioneer decide the allocation and charge for each item.
- Methods
 - First price
 - Second price
 - Generalized second price (GSP)
 - Vickrey-Clarke-Groves (VCG)

Single Item auction : Second price

- Bid determines how long you will stay in price war.
- Amount paid is bid amount plus a small amount capped by the minimum increment per new bid.
- No matter what other bidders do, neither lower nor raise your bid.
- Bid amount should be close to actual valuation.

Multiple item auction : GSP

- Ad markets have multiple ad spaces to sell in each auction.
- Advertisers submit many bids one bid per ad space.
- Highest bidder gets most valuable ad space.
- i^{th} ad space winner pays per click of the $(i+1)^{\text{th}}$ highest bidder.
- It is possible that none of bidders do truthful bidding.

Single item auction example : eBay

- Reserve price in auction in addition to start price.
- Not a sealed envelope auction. Current highest and 2nd highest released to public.
- Example:

| | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|-----------|--------|---------|---------|---------|---------|
| Alice | \$5.00 | \$9.00 | \$11.50 | – | – |
| Bob | – | \$8.00 | \$10.50 | \$17.50 | – |
| Chris | – | – | – | – | \$18.00 |
| Ask price | \$6.00 | \$10.00 | \$12.50 | \$13.50 | \$19.00 |

GSP example : Google

- Does not guarantee truthful bidding.
- Most valuable space allocated to highest bidder.
- Truth telling is not dominant strategy.

VCG

- Enables truthful bidding.
- Each bidder send bids, one per item.
- Matching is computed i.e. each item is matched to bidder.
- VCG, maximizes total valuation of the whole system.

