CSC 200—Social and Economic Networks
Quiz 6 February 5, 2015   Solutions

Time: 25 minutes; Total Marks: 20

Consider the following search engine auction problem. There are three slots a, b, c with (respectively) clickthrough rates $4, 3, 1$. There are three advertisers x, y, z with (respectively) values per click $7, 5, 1$.

1. Suppose the search engine uses the VCG auction.

    - If all advertisers bid truthfully what will be the allocation, the utlilty to each advertiser and what prices they will pay?

      Solution x gets slot a and pays 7; y gets slot b and pays 2; z gets slot c and pays 0.

    - Would any advertiser have an incentive to not bid truthfully?

      Solution Snce VCG is truthful, there is no incentive for any advertiser to not bid truthfully.

2. Suppose the search engine uses the GSP auction.

    - If all advertisers bid truthfully what will be the allocation, the utlilty to each advertiser and what prices they will pay?

      Solution If everyone bids truthfully, then x gets slot a and pays 20; y gets slot b and pays 3; z gets slot c and pays 0.

    - If all other advertisers bid truthfully, would any advertiser have an incentive to not bid truthfully?

      Solution x has incentive to reduce his bid to be less than that of y so as to obtain slot b. Specifically, when x bids truthfully, the utlility for x is 28-20 = 8. if x bids less than 5 (say 4) then the utility for x is 21 - 3 = 18.