

Exercise 4 – Auction Theory (96573)

1. Describe a truthful mechanism that implements the social choice function $f(v) = \operatorname{argmax}_{a \in A} w_1 \cdot v_1(a) + \dots + w_n \cdot v_n(a)$, where w_1, \dots, w_n are some fixed non-negative weights. (Hint: start from VCG)
2. (a) Prove that the revenue-maximizing auction for unlimited supply, that is based on *CostShare*, is monotone for every result of the coin tosses, and that the price that a winner pays is exactly her threshold value.
(b) Show that when there are two bidders with a value of $h \gg 1$, and $n-2$ bidders with a value of 1, then this auction obtains one-fourth of $F^{(2)}$ (and therefore the approximation analysis is tight).