CS 6100 Program 4: Auctions (40 points)

Place the following program on CSILM.

Suppose that there are three bidders. Each bidder’s utility is zero (if he doesn't win the bid) and his valuation minus the bid amount (if he wins the bid).

Assume the bidders have private values that are drawn from some distribution $F$. Check out Java's class Random for help in generating valuations. The valuation distributions for each bidder are controlled by the user and are one of the following:

1. Uniform [0-10]
2. Normal with a mean of 5 and a standard deviation of 2.

Allow the user to control the risk characteristics of each bidder (risk seeking, risk neutral, and risk averse). A bidder does not know the valuation function or risk characteristics of the other bidders.

Consider the following auction types:

1. Vickrey
2. English
3. Dutch
4. First Price Sealed bid (FPSB)
5. An auction mechanism of your own design (or one found in the literature)

Given a particular auction setup (auction type, value distribution of bidders, and bidder risk type), show the utility achieved by each agent over $N$ runs (where $N$ is some reasonably large number).

Report

Create a readme file that describes the following:

1. Your auction mechanism.
2. Your method of implementing the risk strategies.
3. Your conclusions about expected utility of voters under various circumstances. Answer the following questions:
   - If we only change the risk characteristics, what happens to expected revenue?
   - Under the same risk characteristics, do Vickrey and English auctions have the same expected revenue?
   - Under the same risk characteristics, do Dutch and FPSB auctions have the same expected revenue?
   - How does your auction compare with the others?
   - How does each auction compare in terms of pareto efficiency?
   - Anything else that was interesting?