1. In December of last year, a car dealer is trying to determine how many cars of the next model year to order. Each car ordered in December costs $20,000. The demand for the dealer's next year models has the following probability distribution.

Demand	Probability
20	0.30
25	0.15
30	0.15
35	0.20
40	0.20

Each car sells for $25,000. If demand for next year's cars exceeds the number of cars ordered in December, the dealer must reorder at a cost of $22,000 per car. Excess cars can be disposed of at $17,000 per car.

a) (20 pts) Build a simulation model and run it for 10000 replications. How many cars should be ordered in December?

b) (20 pts) For the optimal order quantity, find a 98% confidence interval for the expected profit.

2. A hardware company sells a lot of low-cost, high-volume products. For one such product, it is equally likely that annual unit sales will be low or high. If sales are low (60,000), the company can sell the product for $10 per unit. If sales are high (100,000), a competitor will enter and the company will be able to sell the product for only $8 per unit. The variable cost per unit has a 25% chance of being $6, a 50% chance of being $7.50, and a 25% chance of being $9. Annual fixed costs are $30,000.

a) (20 pts) Use simulation to estimate the company's expected annual profit.

b) (10 pts) Find a 95% interval for the company's annual profit, that is, an interval such that about 95% of the actual profits are inside it.

c) (10 pts) Can you say that the expected profit from a simulation is equal to the profit from the scenario where each input assumes its expected value? (suppose that annual unit sales, variable cost, and unit price are equal to their respective expected values, that is, there is no uncertainty). Determine the company's annual profit for this scenario and compare it to the simulation results.

Submit your report as a pdf file onto Blackboard showing your name and USC ID. Report must be made of letter size pages in portrait format (not landscape). Screenshots are not acceptable.