

BU 610.625

Simulation for Business Applications

Group Homework Number One

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**Q1**

**Q2:** The optimal inventory is 105 with highest average profit $1895. The inventory changes from 65 to 115 as an integer (the same as demand) and starts as 100. There are 51 trials in total. According to log2, there are 3 major improvements in the average profit:

* Trial 1 with average profit $1889 and inventory 100
* Trial 6 with average profit $1892 and inventory 108
* Trial 7 with average profit $1895 and inventory 105

**Q3**

In question 3, we first filled out all known information into the blanks and wrote the normal distribution function on demand and other formulas on the rest variables such as profit, revenue. After setting trails=2000 and iterations=10000, we set a range of decision variable inventory to (350,450) and values to "integer" in the Model Definition setting. After we found the optimal number of inventory which is 442 and the maximum expected profit which is $229.5, we set the more accurate range of inventory to (441,443) and set values from "integer" to "discrete" with the step size of 0.1 to get the more accurate number. Because of the optimization runtime limitation, finally we got the optimal number of inventory is 442.1, which means 442.1 sweet cider needed to be ordered every week can maximize its expected profit.

**Q4**

**Table

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The optimal purchase quantity is around 250 gallons, having the highest average profit of $3,750. Reviewing the optimizing log, the decision variable increases from 0 (initial value) to 250 in a few trials. It then oscillates around 250 throughout the rest trials. Detail optimization log as shown below:

Table

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**Q5**