



Group-work Number 1

Due date: beginning of the next class

Reminder 1: IT DOESN'T MATTER WHICH TEAM MEMBER SUBMITS THE HOMEWORK REPORT. **One submission per team.** ONLY ONE OF THE TEAM MEMBERS WILL SUBMIT EACH GROUP'S HOMEWORK REPORT. Your submission must have a cover page. There is a sample cover page in the course website. Please submit your answer in MS Word format. For each of these questions you do need to submit your excel file as well. Name your Excel files as GW1-Team number-Problem number.xlsx. The latest team numbers and members list is also available in the course website. **A new team member cannot be added after homework submission.**

Reminder 2: Only clearly typed solutions will be accepted & graded. Any hand-written homework submission will not be accepted/graded.

Late Submission Grading Rule: (0,1] hour delay: 10% deduction of homework grade, (1,2] hours delay: 20% deduction, (2,3] hours delay: 30% deduction, ... (you got the idea)

1. Based on Wink Hotel problem. Based on the provided template, find optimal number of reservations using simulation-optimization. **You cannot use risksimtable.**

You are required to submit the optimal solution along with the optimization logs and briefly explain your understanding of the optimization logs. Please confirm the following settings before running your model:

trials: 500

iterations: 10000

Make sure to un-check **Use Multiple CPU During Optimization** from **Advanced** tab of **RiskOptimizer Settings**

Hint: You need to set appropriate limits for the value of decision variable in **Model Definition...** menu of **RiskOptimizer**.

2. Based on Zara problem statement: Based on the provided template, find the optimal value of inventory using simulation-optimization. **You cannot use risksimtable.**

You are required to submit the optimal solution along with the optimization logs and briefly explain your understanding of the optimization logs. Please confirm the following settings before running your model:

trials: 500

iterations: 10000

Make sure to un-check **Use Multiple CPU During Optimization** from **Advanced** tab of **RiskOptimizer Settings**

Hint: You need to set appropriate limits for the value of decision variable in **Model Definition...** menu of **RiskOptimizer**.

3. Sweet Cider is delivered weekly to Cindy's Cider Bar. Weekly demand is normally distributed with mean 400 liters and standard deviation of 50 liters per week. Cindy pays 20 cents per liter for the cider and charges 80 cents per liter for it. Unsold cider at the end of the week cannot be carried over into the next week due to the possibility of spoilage. However, remaining unsold cider at the end of the week can be sold at the price of 5 cents per liter. Cindy wants to know how much sweet cider to order every week in order to maximize its expected profit?

You are required to submit the optimal solution along with the optimization logs and briefly explain your understanding of the optimization logs. Please confirm the following settings before running your model:

trials: 2000

iterations: 10000

Make sure to un-check **Use Multiple CPU During Optimization** from **Advanced** tab of **RiskOptimizer Settings**

Hint: Your decision variable is continuous.

4. WeHarmTheEnvironment Inc. needs to order a raw material to make a special polymer. The demand for the polymer is forecasted to be Normally distributed with a mean of 250 gallons and a standard deviation of 25 gallons. WeHarmTheEnvironment Inc. sells the polymer for \$25 per gallon. WeHarmTheEnvironment Inc. purchases raw material for \$10 per gallon and WeHarmTheEnvironment Inc. must spend \$5 per gallon to

dispose off all unused raw material due to government regulations. (One gallon of raw material yields one gallon of polymer.) If demand is more than they can make, then WeHarmTheEnvironment Inc. sells only what they made and the rest of the demand is lost. How much raw material should WeHarmTheEnvironment Inc. order in order to maximize the expected profit?

You are required to submit the optimal solution along with the optimization logs and briefly explain your understanding of the optimization logs. Please confirm the following settings before running your model:

trials: 2000

iterations: 10000

Make sure to un-check **Use Multiple CPU During Optimization** from **Advanced** tab of **RiskOptimizer Settings**

Hint: Your decision variable is continuous.

5. Based on *Laser Tooth Whitening* mini-case study. **This is just a simulation problem.** There is a template in blackboard for each part of this question. Please submit your graphs and make sure to explain your answers and solution procedure.
- (a) On average how much revenue does Dr. Chen's laser tooth whitening practice generate each week?
 - (b) On average, how much revenue would her practice generate each week if Dr. Chen did not cancel sessions with two or fewer reservations?
 - (c) Dr. Chen has doubts about her pricing policy. She believes that 40% of the people attending the information sessions would have the procedure if she reduces the price by 20%. Under this scenario, and assuming her current cancellation policy, how much revenue could Dr. Chen expect to realize per week from laser tooth whitening?