Module 3 – Homework Questions

Please submit your answers to these homework questions via the Coursera website.

Taco Truck

A food truck serves customers during lunch hour by taking orders and making fresh tacos. There is only one choice during lunch hour, since the objective is to maximize the number of customers served.

The taco cooking works in this manner. First, a batch of orders is cooked on a grill by one person. The cooking depends upon the number of orders in the batch and takes a little more time if more orders are in a batch. The time taken to cook just one order is 10 minutes. For each additional order, it takes one minute more. Thus, cooking two orders in a batch takes 11 minutes, cooking three orders takes 12 minutes, and so on.

The other person in the process is accepting payments. It takes 2 minutes to receive the payment (one payment for each order). Assume each order corresponds to one taco.

TT1. What is the process capacity if Taco Truck's batch size is 4 orders (in orders per minute)?

TT2. Calculate the batch size (in orders) at Taco Truck that will maximize the overall flow rate without causing the customers to wait unnecessarily.

Sarah's Organic Soap Company

Sarah's Organic Soap Company makes four kinds of organic liquid soap: "regular," "lavender," "citrus," and "tea tree." Demand for the four scents are 150, 120, 75, and 50 kilograms per hour, respectively. Sarah's production process can produce any soap at the rate of 450 kgs per hour, but 1.5 hours are needed to switch between scents. During those switchover times, the process doesn't produce any soap. Sarah wants to choose a production schedule that (i) cycles repeatedly through the four scents, (ii) meets the required demand, and (iii) minimizes the amount of inventory held.

SOSC1. How much total set-up time (in hours) will Sarah incur in one production run (production cycle)?

SOSC2. How many kgs of "regular" soap should Sarah produce before switching over to another scent?

Pooling

P1. Which of the following actions will provide you with the biggest pooling benefits?

a. Pooling two negatively correlated demand streams
b. Pooling two independent demand streams
c. Pooling two positively correlated demand streams