# ISE 754

## Exam 2

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#### Problem 1

1. This question is example of production planning model with 2 products, 2 stages and 13 periods. I have received these results:

: TCp TCi TCt TC

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1: 224,400 1,033.14 20,754.24 246,187.39

1. To keep everything in corresponding units, I converted demand to tons, price to $/ton and initial/final inventories to tons, inventory carrying rate to %/week.
2. I treated this problem as a variation of multiproduct multistage planning problem, where products = 2 and stages = 2 (production – stage 1, shipping – stage 2). I used a “Multiple Product Example - 2-product, 3-stage, 6-month” from makeNetwork3 and solution to Q1 in Exam2-F2019 as prototypes to assist me in comprehending the model and implement a solution.

#### Problem 2.

1. This problem is similar to Q4 in HW8 with some modification. The number of trucks needed is 4.
2. Assumption that were made are the expansionAroundXY = 0.1, demand can be divided by any fraction, travel speeds are equal to those in HW7,.
3. When I appoached the problem at first, one of the routes was infasible due to cubic capacities of truck. Shipment # 28 is 44 cubic ft greater than the truck capacity. This is why I have added one more shipment with all parameters identical to shipment 28 except demand. This shipment’s demand was the difference between orogonal demand and trucks capacity. Then the original demand of shipment 28 was reduced to truck’s capacity.  
   The optimal number of routes was 10 (20 of tem are independent shipments 18 and 28), where non of them exceeded 7 hours. In order to achieve optimal # of trucks I used Bin Packing model from makeFacLoc7 with some modifications. This yielded the optimal list of routes for each of 4 trucks:

