Module 08 – Scheduling Problem

Exploratory Data Analysis



Seasonal spikes in foot traffic in the Spring and Fall months. Dips in Fall and Summer.

Model Formulation

*Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints.*

Min: 23,950X1+27,312X2+37,170X3+21,170X4+31,899X5+33,705X6+117,503.94X7

Workers Required Each Month:

0X1+0X2+0X3+0X4+1X5+0X6+1X7>=304} Jan

1X1+0X2+0X3+0X4+1X5+0X6+1X7>=416} Feb

1X1+0X2+0X3+0X4+1X5+0X6+1X7>=574} Mar

0X1+0X2+0X3+1X4+0X5+0X6+1X7>=643} Apr

0X1+0X2+0X3+1X4+0X5+0X6+1X7>=563} May

0X1+1X2+0X3+0X4+0X5+0X6+1X7>=415} Jun

0X1+1X2+0X3+0X4+0X5+1X6+1X7>=346} Jul

0X1+0X2+0X3+0X4+0X5+1X6+1X7>=437} Aug

0X1+0X2+0X3+0X4+0X5+1X6+1X7>=620} Sep

0X1+0X2+1X3+0X4+0X5+0X6+1X7>=740} Oct

0X1+0X2+1X3+0X4+0X5+0X6+1X7>=692} Nov

0X1+0X2+1X3+0X4+0X5+0X6+1X7>=525} Dec

Non Negativity and integrality Conditions

Xi>=0, integer for all i

Model Optimized for Min Costs to Cover Store Foot Traffic



The model is minimizing the amount of workers scheduled in order to minimize the total cost.

Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.*

*Please do both of the following:*

1. *Unfortunately, leadership wishes to have a reduction in workforce. While the monthly salary for full time employees is cheaper than temporary workers, there are other costs associated with full time employees that they wish to cut. Add a constraint to your model that takes your first model’s recommended number of full-time employees and constrains it to be only 80% of it. Add a text explanation of the change in the optimal value as well as any other changes noticed between the models.*



This only increased the total price by around $1,000,000 and the available workers for January and July decreased.

1. *Alternatively, leadership would like to see what the average monthly salary for an employee would need to be to cut out all temporary workers as they believe that will help negate excess spending. Convert your model (or do the math out yourself) to figure out what monthly salary you would need to pay your full-time employees to only have full-time workers at the same optimal cost as the original model.*

The original cost per month for workers is $9,792 and decreases to $8,740 when you only have full time workers. Therefore having fulltime workers only decreases total salaries.

1. *Considering trends and seasonality of this business, what would you recommend leadership to do? Feel free to play with the model and recommend something else.*

I would recommend having a baseline of fulltime employees to cover the minimum foot traffic seasons of the year, such as Winter and summer. Then hire seasonal part time workers during the busier seasons, such as Fall and spring.