Module 08 – Scheduling Problem

Exploratory Data Analysis

*In this section, you should perform some data analysis on the data provided to you. Please format your findings in a visually pleasing way and please be sure to include these cuts:*

* *Make a table (similar to the textbook example) showing the temporary agency data*

A table with months off

AI-generated content may be incorrect.

* *Run summary statistics on the sample of Full-Time employee salaries. Record the Mean to use in our model*

A screenshot of a graph

AI-generated content may be incorrect.

* *Make a line graph showing foot traffic over the next 12 months. Call out any seasonality or trend you may see.*

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 = 77388.02X1 + 15318X2 + 25449X3 + 13476X4 + 15888X5 + 28146X6 + 27543X7

1X1 + 1X2 + 0X3 + 0X4 + 0X5 + 0X6 + 0X7 >=300} January

1X1 + 1X2 + 0X3 + 1X4 + 0X5 + 0X6 + 0X7 >=410} February

1X1 + 0X2 + 0X3 + 1X4 + 0X5 + 0X6 + 0X7 >=566} March

1X1 + 0X2 + 1X3 + 0X4 + 0X5 + 0X6 + 0X7 >=634} April

1X1 + 0X2 + 1X3 + 0X4 + 0X5 + 0X6 + 0X7 >=556} May

1X1 + 0X2 + 1X3 + 0X4 + 0X5 + 0X6 + 0X7 >=410} June

1X1 + 0X2 + 0X3 + 0X4 + 0X5 + 1X6 + 0X7 >=342} July

1X1 + 0X2 + 0X3 + 0X4 + 1X5 + 1X6 + 0X7 >=431} August

1X1 + 0X2 + 0X3 + 0X4 + 1X5 + 1X6 + 0X7 >=612} September

1X1 + 0X2 + 0X3 + 0X4 + 0X5 + 0X6 + 1X7 >=730} October

1X1 + 0X2 + 0X3 + 0X4 + 0X5 + 0X6 + 1X7 >=682} November

1X1 + 0X2 + 0X3 + 0X4 + 0X5 + 0X6 + 1X7 >=518} December

Model Optimized for Min Costs to Cover Store Foot Traffic

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

* *A screenshot of your optimized final model (formatted nicely, of course)*
* *A text explanation of what your model is recommending*

A screenshot of a computer

AI-generated content may be incorrect.

The model recommends Bonbon Blvd., Tootie Fruity Trading Co., and The Jelly Jubilee for temp workers. Full time workers will take up 67.06% of the schedule, with the temp agencies filling the remaining 32.94%.

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.*

*A screenshot of a computer

AI-generated content may be incorrect.*

*The model now suggests the use of Bonbon Boulevard in addition to the temp agencies already contracted. It also raises the total by $566,349.44 because the temp agencies come at a higher premium than the Full-Time Workers.*

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.*

**

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.\*

They would need to drop the monthly salary by roughly 750 dollars, which would affect morale negatively, but it would increase team cohesion because it would be the same people the whole year and not a revolving door of employees. This would probably increase efficiency as well because there would be no learning curve for new employees.