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*
* *Run summary statistics on the sample of Full-Time employee salaries. Record the Mean to use in our model*
* *Make a line graph showing foot traffic over the next 12 months. Call out any seasonality or trend you may see.*

A screenshot of a spreadsheet

AI-generated content may be incorrect.

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: 12970X1 + 16908X2 + 12882X3 + 20370X4 + 10788X5 + 15408X6 + 62723.95784X7

Month 1 - 0X 1+0X 2+1X 3+0X 4+0X 5+1X 6+349X 7 ≥242

Month 2 – 0X 1+0X 2+0X 3+0X 4+1X 5+0X 6+458X 7 ≥332

Month 3 – 0X 1+0X 2+0X 3+1X 4+1X 5+1X 6+458X 7≥458

Month 4 – 0X 1+0X 2+0X 3+1X 4+0X 5+0X 6+513X 7≥513

Month 5 – 0X 1+0X 2+0X 3+1X 4+0X 5+0X 6+513X 7≥450

Month 6 – 0X 1+0X 2+0X 3+1X 4+0X 5+0X 6+349X 7≥332

Month 7 – 0X 1+0X 2+0X 3+0X 4+0X 5+0X 6+349X 7≥276

Month 8 – 0X 1+0X 2+0X 3+0X 4+0X 5+0X 6+349X 7≥349

Month 9 – 0X 1+1X 2+0X 3+0X 4+0X 5+1X 6+591X 7≥495

Month 10 – 1X 1+1X 2+0X 3+0X 4+0X 5+1X 6+591X 7≥591

Month 11 – 1X 1+1X 2+0X 3+0X 4+0X 5+1X 6+419X 7≥552

Month 12 – 0X 1+0X 2+0X 3+0X 4+0X 5+0X 6+419X 7≥419

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*
* *Staff have been scheduled (green cells) only when needed, suggesting optimized scheduling to match demand (red cells indicate not scheduled).*
* *No overstaffing: “Available” matches or slightly exceeds “Required” in each time period.*
* *Zesty Zagout has the highest number of scheduled time periods (6), possibly due to efficiency or lower wage rate.*
* *Moonbeam Morsels and The Sassy Taffy have fewer assignments, possibly due to higher wages or limited availability.*
* *Wages vary by entity—used selectively to minimize the total wage cost.*
* *The model balances between meeting staffing needs and controlling payroll costs.*

A screenshot of a computer

AI-generated content may be incorrect.

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.*

*It increased cost by $1,515,852.95*

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.*

**

*Its cheaper to cut out all temp workers*

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.*

*Introduce Flex Staffing or Part-Time Roles*