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.*

Mean: 9239.998

|  |  |  |
| --- | --- | --- |
| agenices | months off | wage |
| The Jelly Jubilee | 1,2,5,6,7,8,9,10,11,12 | 24,356 |
| Rainbow Chomp | 1,2,3,4,7,8,9,10,11,12 | 18,875 |
| Penny Candy & Co. | 1,2,3,4,5,6,7,8,9 | 18,982 |
| Caramel Caper | 2,3,4,5,6,7,8,9,10 | 34,155 |
| Taffy & Tales | 1,2,3,4,5,6,10,11,12 | 30,414 |
| Sweetie Spell | 1,2,3,4,5,6,10,11,12 | 32,562 |

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=12,178X1+ 9,437X2+9,491X3+11,385X4+10,138X5+10854X6+9,240X7

X=0X1+0X2+0X3+1X4+1X5+0X6+0X7+0X8+0X9+0X10+0X11+0X12>= 257

X=0X1+0X2+0X3+0X4+1X5+1X6+0X7+0X8+0X9+0X10+0X11+0X12>=352

X=0X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 485

X=1X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 543

X=0X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 476

X=1X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 351

X=0X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 293

X=1X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 369

X=0X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 524

X=1X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 626

X=0X1+0X2+0X3+0X4+0X5+0X6+0X7+0X8+0X9+1X10+1X11+0X12>= 585

X=1X1+1X2+1X3+1X4+1X5+1X6+1X7+1X8+1X9+1X10+1X11+1X12>= 444

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 spreadsheet

AI-generated content may be incorrect.

The model is recommending a mixed workforce approach where both are used to meet workforce demand. Adding more reliance on full-time employees instead of costly temporary workers. Minimizing expensive agency contracts to reduce overall workforce costs. Along with ensuring workforce availability meets demand by carefully adjusting the mix of workers per day.

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.
2. *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.*

Highest daily requirement is: 715

Exchange the current workforce (444) for the full time employees(715), keeping the annual total cost at $ 58,133,765

Annual total cost $ 58,133,765 /715 = $ 332,192.94 salary per employee

Annual total cost$ 58,133,765 /12 = $ 4,844,480.45monthly salary

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 also recommend hiring seasonal workforce where if it is predictable It would be more cost- effective than temporary workers with higher wages.

Along with introducing part time positions instead of relying on temp agencies.

I would also incentivize overtime for full-time employees during peak times.

A screenshot of a graph

AI-generated content may be incorrect.