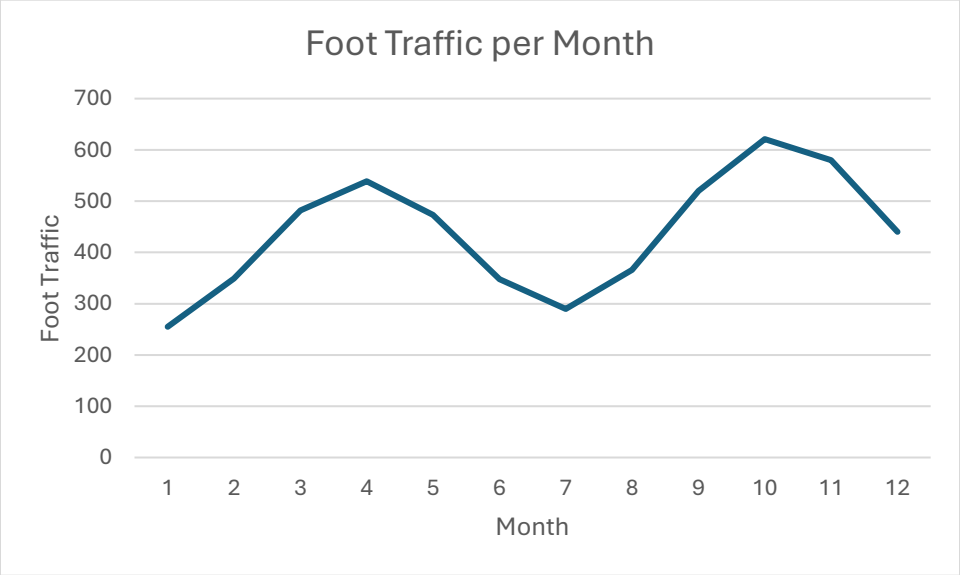
Module 08 – Scheduling Problem

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.*

Agency	Months Off	Wages per Agency
Tootie Fruity Trading Co.	January, May-December	$ 32,193.00
Chewtopia	January-September	$ 36,282.00
The Jellybean Treasury	January-April, August-September	$ 39,621.00
Snaps & Snickers	April-December	$ 38,811.00
Rainbow Chomp	January-July, October-December	$ 21,876.00
Full Time Workers	None	$ 108,612.05



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.

- Workers Required Each Month:
    - 0X1+0X2+0X3+1X4+0X5+1X6= January
    - 1X1+0X2+0X3+1X4+0X5+1X6= February
    - 1X1+0X2+0X3+1X4+0X5+1X6= March
    - 1X1+0X2+0X3+0X4+0X5+1X6= April
    - 0X1+0X2+1X3+0X4+0X5+1X6= May
    - 0X1+0X2+1X3+0X4+0X5+1X6= June
    - 0X1+0X2+1X3+0X4+0X5+1X6= July
    - 0X1+0X2+0X3+0X4+1X5+1X6= August
    - 0X1+0X2+0X3+0X4+1X5+1X6= September
    - 0X1+1X2+0X3+0X4+0X5+1X6= October
    - 0X1+1X2+0X3+0X4+0X5+1X6= November
    - 0X1+1X2+0X3+0X4+0X5+1X6= December
- The workers required for each month must be greater than or equal to zero
- The workers scheduled must be an integer

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*

				Months Each Agency Works 0=Off Month 1=On Month										
Agency	Jan	Feb	Mar	Apr	May	June	July	August	September	October	November	December	Workers Schedule	**Wages per Agency**
Tootie Fruity Trading Co.	0	1	1	1	0	0	0	0	0	0	0	0	66	$ 32,193.00
Chewtopia	0	0	0	0	0	0	0	0	0	1	1	1	148	$ 36,282.00
The Jellybean Treasury	0	0	0	0	1	1	1	0	0	0	0	0	0	$ 39,621.00
Snaps & Snickers	1	1	1	0	0	0	0	0	0	0	0	0	0	$ 38,811.00
Rainbow Chomp	0	0	0	0	0	0	0	1	1	0	0	0	47	$ 21,876.00
Full Time Workers	1	1	1	1	1	1	1	1	1	1	1	1	473	$ 108,612.05
Available	473	539	539	539	473	473	473	520	520	621	621	621		
Required	255	349	482	539	473	348	290	366	520	621	580	440	**Total->**	**$ 59,896,144.70**

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.*

The amount of workers working went down from 473 to 378 in January where all other months had the same amount of workers. Fish and Murr's Candy saves around 2$ million in this scenario.

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.*

   I would need to pay my employees $8,309.90 a month.
3. *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 consider adding seasonal employees during the late winter/early spring time period of the year as well as the fall, our business's two busiest time periods of the year to assist with simpler tasks that anyone can do.