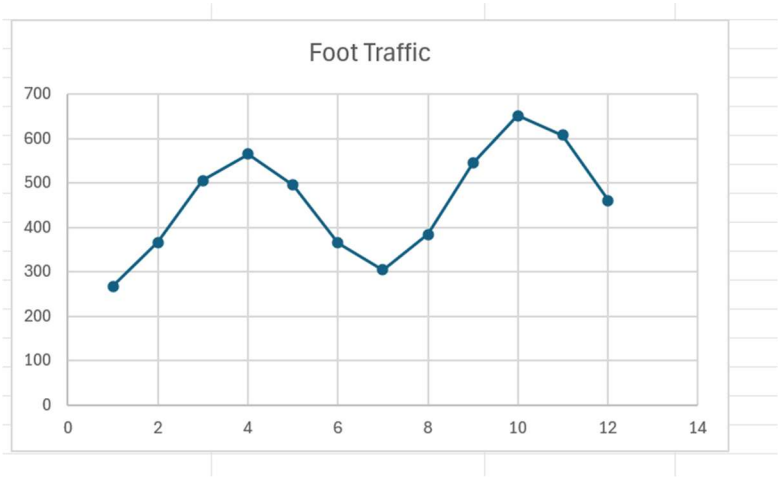
Module 08 – Scheduling Problem

Exploratory Data Analysis

month	foot_traffic
1	267
2	366
3	505
4	565
5	495
6	365
7	304
8	384
9	545
10	651
11	608
12	461

employee	monthly_salary
Lolly McSprinkle	$ 9,025.25
Pixie Peppermint	$ 11,707.04
Ginger Gumdrop	$ 7,461.39
Lulu Licorice	$ 10,255.86
Sprinkle Bea	$ 10,015.51
Taffy Twinkleton	$ 6,307.00
Dizzy Dandelion	$ 11,182.62
Caramel Clementine	$ 11,191.56
Gingersnap Gwen	$ 10,421.23
Tootsie McGiggly	$ 12,768.55
Sugarplum Sally	$ 9,049.12
Sunny Sassafras	$ 9,284.06
Truffle Tilda	$ 12,077.28
Bonbon Bella	$ 7,780.55
Gumdrop Grace	$ 8,415.12
Merry Marzipan	$ 8,594.73
Chuckles Choco	$ 9,616.77
Zippy Licorice	$ 7,577.84
Chuck ChocoChip	$ 12,440.11
Maple Marshmallow	$ 8,494.06
Cocoa Clement	$ 7,403.57
Cherry Chewella	$ 8,787.77

agency	beginning_month_of_service	duration_of_service	monthly_salary
Snickerdoodle Street	7	2	$ 10,776.00
The Gobstopper Grove	1	3	$ 12,175.00
Chomp & Circumstance	10	3	$ 12,105.00
Candyfloss & Co.	7	3	$ 12,361.00
Bonbon Boulevard	8	2	$ 10,006.00
Magic Munchies	4	3	$ 12,632.00



Average used: $ 9,554.00

Some seasonal trend I see is that it peaks in the month of April and the month of October. It dips in the month of July

Model Formulation

MIN: 10,776A1 + 36,525A2 + 36,315A3 + 37,083A4 + 20,012A5 + 37,896A6 + 114,647.97A7

Subject to:
0X1 + 0X2 + 0X3 + 0X4 + 0X5 + 0X6 + 1X7 + 1X8 + 0X9 + 0X10 + 0X11 +
0X12

1X1 + 1X2 + 1X3 + 0X4 + 0X5 + 0X6 + 0X7 + 0X8 + 0X9 + 0X10 + 0X11 + 0X12
0X1 + 0X2 + 0X3 + 0X4 + 0X5 + 0X6 + 0X7 + 0X8 + 0X9 + 1X10 + 1X11 + 1X12
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1X1 + 1X2 + 1X3 + 1X4 +1X5 + 1X6 + 1X7 + 1X8 + 1X9 + 1X10 + 1X11 + 1X12

Model Optimized for Min Costs to Cover Store Foot Traffic

Agency	Months 1	2	3	4	5	6	7	8	9	10	11	12	Workers Schedule	wages
Snickerdoodle Street	0	0	0	0	0	0	1	1	0	0	0	0	0	$ 10,776.00
The Gobstopper Grove	1	1	1	0	0	0	0	0	0	0	0	0	0	$ 36,525.00
Chomp & Circumstance	0	0	0	0	0	0	0	0	0	1	1	1	146	$ 36,315.00
Candyfloss & Co.	0	0	0	0	0	0	1	1	1	0	0	0	0	$ 37,083.00
Bonbon Boulevard	0	0	0	0	0	0	0	1	1	0	0	0	40	$ 20,012.00
Magic Munchies	0	0	0	1	1	1	0	0	0	0	0	0	60	$ 37,896.00
Full time	1	1	1	1	1	1	1	1	1	1	1	1	505	$ 114,647.97
Available	505	505	505	565	565	565	505	545	545	651	651	651		
Foot traffic	267	366	505	565	495	365	304	384	545	651	608	461	Total -->	$66,273,452.69

My model is recommending that the optimal solution for this would be $66,273,452.69.

Model with Stipulation

1. *The optimal value increased because the full-time employees are cheaper, if you were to take them away this would allow the leadership to distribute more hours to other agencies.*

2. *The original model number would be $8, 483 and the model stipulation number would be $8, 691. I would rather keep the number of workers and not fire people. Although this is almost a $300 difference a month, this will prevent workers from getting scared if they get fired as well.*

3. *Considering trends and seasonality of this business, I suggest this business hire seasonal employees for their peaks in business but also their slow seasons as well.*