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.*

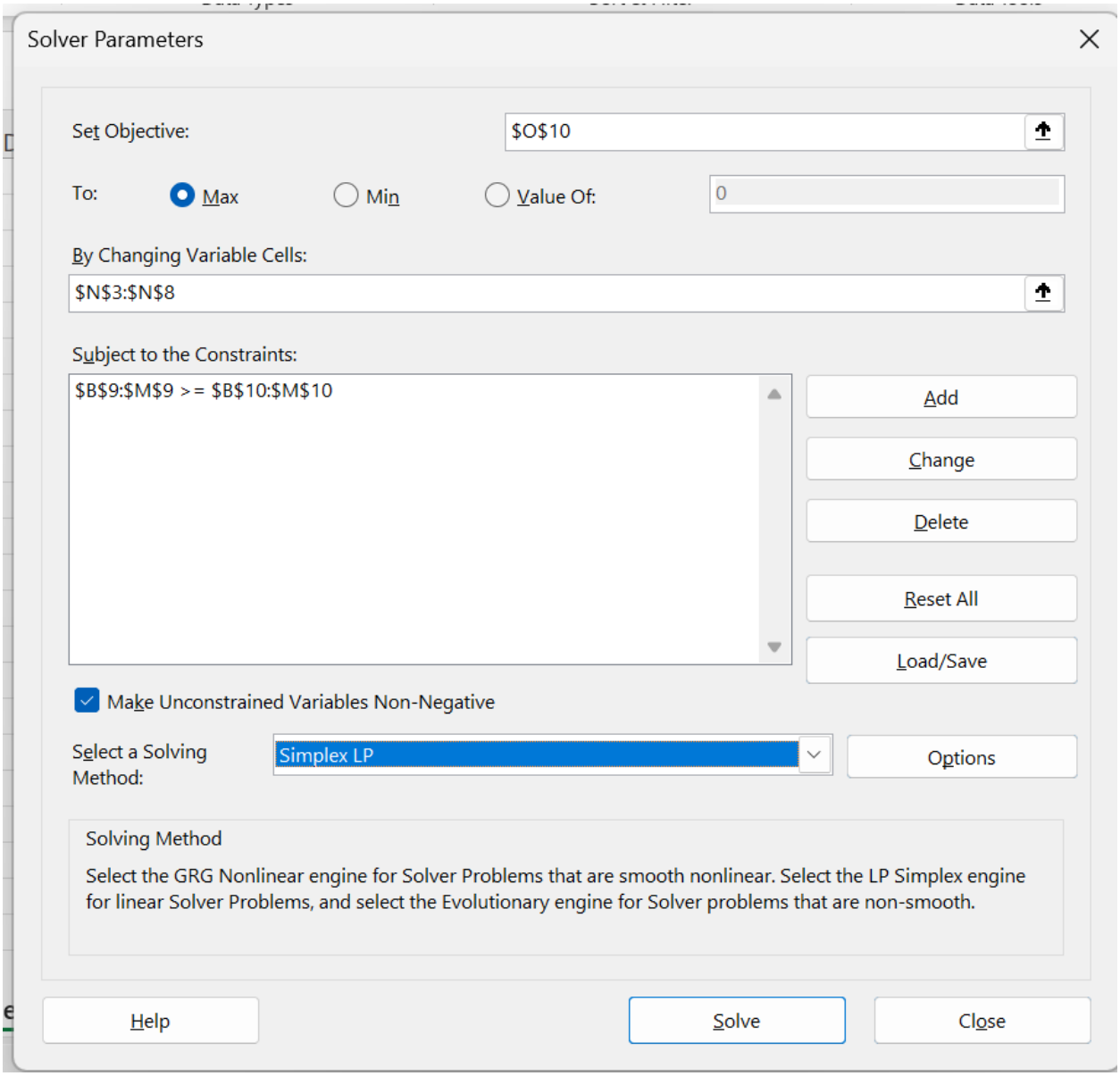
Model Formulation

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.

➔ To create this model I placed all of the part time shift workers, and the full time with the correct amount of days that they can and cannot work. Additionally I set the model to minimize the amount of money that was being spent to pay the workers while meeting the shift requirements.

	Days On = 1, Days Off = 0												Workers S	Wages per Worker
Shift	1	2	3	4	5	6	7	8	9	10	11	12		
WigglePop Wonders	0	0	0	0	0	1	1	1	0	0	0	0	0	$23,862.00
The Jellybean Treasury	0	0	0	0	0	0	0	0	0	1	1	1	204	$22,503.00
PopRocks & PixieDust	0	0	0	1	1	1	0	0	0	0	0	0	134	$19,875.00
Gumdrops & Giggles	0	0	0	0	0	0	0	1	1	0	0	0	117	$16,292.00
Cocoa Quirk	1	1	1	0	0	0	0	0	0	0	0	0	84	$21,303.00
Full time	1	1	1	1	1	1	1	1	1	1	1	1	332	$72,371.95
Availible	416	416	416	466	466	466	332	449	449	536	536	536		
required	220	301	416	466	408	301	251	316	449	536	501	380	TOTAL -->	$34,976,966.06

$103,835.00
$72,371.95
$31,463.05
$94.77



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*

The model is recommending

Model with Stipulation

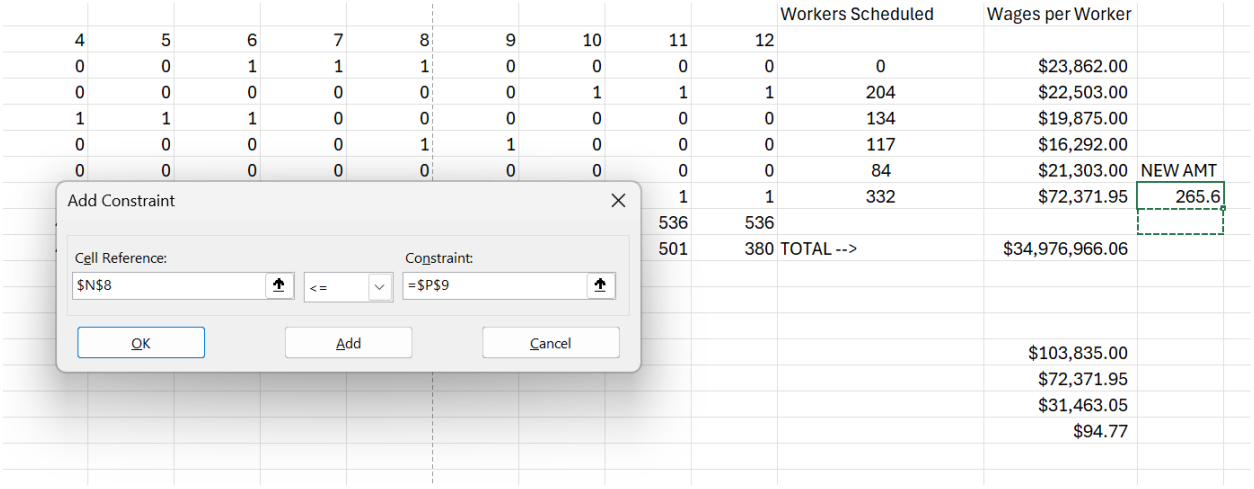
Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.

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.

➔ *When then was employees into the model it decreased by several thousand dollars. To do this I created a new cell which had the original amount *0.8, and I had the solver ensure that the new cell did not exceed the amount I had created*



									Workers Scheduled	Wages per Worker	
4	5	6	7	8	9	10	11	12			
0	0	1	1	1	0	0	0	0	0	$23,862.00	
0	0	0	0	0	0	1	1	1	204	$22,503.00	
1	1	1	0	0	0	0	0	0	134	$19,875.00	
0	0	0	0	1	1	0	0	0	117	$16,292.00	
0	0	0	0	0	0	0	0	0	84	$21,303.00	NEW AMT
							1	1	332	$72,371.95	265.6
							536	536			
							501	380	TOTAL -->	$34,976,966.06	
										$103,835.00	
										$72,371.95	
										$31,463.05	
										$94.77	

Add Constraint

Cell Reference: N8 | <= | Constraint: =P9

OK | Add | Cancel

➔

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.*

➔ *When summing all of the workers scheduled in total, which is 871, and dividing the total amount spent, roughly 35 million, you would need to pay them 40,157.25 annually.*

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 feel it is costly for a business in other ways not to have their facilities properly staffed. Additionally you should have the most full time workers as they usually know what they are doing due to more experience, and having people who do not understand what to do could hurt the company.*